REAL CORP 2010

15th International Conference on Urban Planning, Regional Development and Information Society

CITIES FOR EVERYONE

Liveable, Healthy, Prosperous

Promising Vision or Unrealistic Fantasy?

PROCEEDINGS
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REAL CORP 2010. Cities for Everyone: Liveable, Healthy, Prosperous

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Edited by

Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE

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PREFACE

Manfred SCHRENK,
Chairman CORP, Managing Director of CEIT – Central European Institute of Technology &
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A very warm WELCOME to VIENNA/AUSTRIA,
and to
REAL CORP 2010,
the
15th International Conference on Urban Planning & Regional Development in Information & Knowledge Age

under the general topic of
CITIES for EVERYONE:
Liveable, Healthy, Prosperous!

Of course this topic is meant as an urgent appeal, but in the second line there is already the question:

PROMISING VISION or UNREALISTIC FANTASY?

Can cities ever be liveable, healthy and prosperous for everyone?

Cities are and have always been places of competition, stress, inequalities, traffic jams, environmental stresses and strains and permanent struggle. Cities often are an aggressive environment, not only for children, the elderly and the weak.

On the other hand cities are the centres of economy, culture, creativity, science and innovation and therefore provide excellent perspectives and a lot of chances for many people – cities are attractive places! Meanwhile more than 50 percent of world population lives in cities, soon it will be about 70 percent.

REAL CORP 2010 asks for cities for everyone that are liveable, healthy and prosperous. Is this a promising vision we should work on or is it an unrealistic fantasy? Is it possible to keep and even improve the advantages of cities and reduce the negative effects? Or does the one aspect require the other? What are the possibilities and contributions of urban planning and real estate development? How can ICT, urban, transport and environmental technologies help to improve quality of our life in cities?

To pick out just one topic that is hardly asked until now in the public discussion (at least in Europe): Do we really always have to try to adopt cities and neighbourhoods to the needs of the people currently living there?
Or is it possible to make "offers" for certain groups of people to find the best surrounding for their lifestyles for a limited time and therefore move in and out to certain areas according to their phase of life?
Does the second way automatically lead to monotonous ghettos with uniform inhabitants? Or is there a way to keep up the mixture and variety that is one of the key aspects of urban life?

REAL CORP 2010 covers many different topics in more than 150 presentations. The proceedings comprise more then 1350 pages of hand-picked knowledge for planners and for cities.

It is on purpose that CORP-topics are rather vaguely defined and usually more questions are raised then actually answered.
Maybe this is against the trend as specialisation in science and research still wears on.

Cities are the most complex invention of mankind and the question of "The Future of Cities" can not be answered from just one perspective – so CORP tries to bring together experts from different fields and from all over the world and provides the stage for meeting and learn from each other.
A conference should never be only about papers and presentations – it's the face-to-face contacts that generate new thoughts and friendships!

Have a great conference!

Manfred Schrenk,
Schwechat, April 2010

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🏆 *reviewed paper*

A Multi-Scale (Multi-Fractal) Approach for a Systemic Planning Strategy from a Regional to an Architectural Scale.

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1 ABSTRACT

A sustainable and sustaining planning strategy is globally important for metropolitan areas. Sustainable planning addresses the development of strategies to reduce the use of resources, increase economic efficiency and improve integration of social aspects (e.g. pedestrian friendly environments, well balanced public and private transport modes, efficient street networks; land use, movement economy; access for all to jobs, retail, services, healthcare, culture, and leisure). In order to reduce urban sprawl, numerous authors recommend going back to the concept of compact cities. However, policies favoring the compact city concept turned out to be less efficient than expected. Indeed, a large number of households choosing these areas reject urban density since they prefer living in individual houses surrounded by a garden and enjoy a green and calm environment.

Hence, instead of rejecting urban sprawl it seems more reasonable to find solutions for better managing the dynamic aspects of cities, in order to reduce traffic costs and pollution, and to avoid undermining natural and agricultural resources. Frankhauser (2004) first proposed reflections onto what extent planning concepts referring to fractal geometry could be of interest for reducing negative impacts of urban sprawl. In a recent research project, financed by the French Ministry of Ecology, Energy, Sustainable Development and Sea in the framework of the PREDIT research program, a planning concept was developed concretizing this basic idea. A planning support system was developed which allows testing the efficiency of the concept (Frankhauser et al 2007, 2008).

Let us recall that fractal geometry is based on a hierarchical principle, which has been to be an essential element of urban structures. The hierarchical ordering principle is a cascade of similar elements on different levels of detail: house, block, quarter, district - or: path, residential road, side street, main road, freeway, and highway. According to Read (Read 2000), different scales of hierarchy are distinguished by scales of mobility, and are designed to convey different scales of movement. The spatio-functional pattern describes everyday space use and movement. The above-mentioned fundamental systematic of the built environment requires a structural-analytical approach on all interwoven scales (global to local) for future developments (regional, urban and architectural). The multi-scale logic allows the articulation of residential areas and leisure areas across scales, introducing different levels of service centres according to their frequency of use. These service centres are localized in the nodes of the transportation system thus improving their accessibility with respect to residential areas.

This paper addresses a further development of this theoretical model, extending it to be a holistic, comprehensive system. The idea of an “urban” hierarchy (street network, green areas, building blocks, building heights, and urban centres), generated as a multi-scale urban planning model for developing scenarios (regional, urban, architectural scale - 2D & 3D) for metropolitan areas, allows the implementation of highly efficient, functional and sustainable transport networks, masterplans and mass models.

The comprehensive system presented here can not only simulate growth scenarios but also assesses the quality of an existing area for consolidation and revitalisation (masterplan, urban fringe) or to identify areas with low overall access for a sustainable negative growth scenario (inverse model for shrinking cities and quarters).

2 INTRODUCTION

The basic principles of the built environment are the relationships between physical elements and between physical elements and dynamic components. These can be described as “spatial packing” (Franck 2005). They aggregate on different scales through interactions of dense and separated spaces created by

fluctuations. Hence, two major architectural definitions emerge as the basis of cities' spatial nature: buildings and movement channels.

The constitution of space (e.g. the aspect of accessibility and centrality) is determined by its spatial organisation. The term organisation refers to Hillier's terminology *spatial configuration* (Hillier 1996) - a set of relationships. Configuration can be analysed and understood on all scales - from regional planning to urban planning and design, and further to architecture itself. The geometric pattern of spatial configuration of dense and separated spaces is accomplished by a system of piling and accessibility. Every space connects other spaces as well as itself. This scheme repeats itself on all scales to such an extend that we can speak of it as a fractal structure (fragmented, self-similar, multi-scale). Research has shown that a hierarchically structured ordering principle of urban agglomeration are self-organising and exists everywhere where people have to share limited amount of space. Self-organisation structures the space in traditional European towns as well as in synthetically ones (Batty and Longley 1994, Frankhauser 1994, Frankhauser 2008, Franck 2005).

The characteristic of a city (fractal structure) demands a structure-analytical approach on all interacting scales (regional scale, urban scale, and architectural scale). The idea of hierarchy as a foundation for developing an urban growth model allows an efficient usage of space by using the law of all living systems. The combination of configuration and accessibility (individual transport, public transport) combined with plot sizes, free spaces, building volumes and building heights (population density) puts the built environment in the context of ecological and socio-economic aspects. Regional and urban models which take these factors in consideration represent a holistic strategy for sustainable and sustaining planning. Visionary scenarios demand an interdisciplinary approach from architecture, regional planning and geography. In the course of urban and regional development in Europe over the last decade, sustainable strategies have become the focal point of planning strategies on all scales.

2.1 Sustainable and Sustaining Development

The Brundtland Report of the United Nations defines sustainability as "[…] development that meets the needs of the present without comprising the ability of future generations to meet their own needs". The report also comments on the availability of non- renewable resources "as their use reduces the stock availability for future generations. […] But this does not mean that such resources should not be used. In general, the rate of depletion should take into account the criticality of the resource, the availability of technologies for minimizing depletion, and the likelihood of substitutes being available." (Brundtland Report, Our Common Future, Chapter II, 1987).

Transport and network strategies play a key role in this context as high accessibility (pedestrians, public and individual transport) is a major aspect in reducing the use of resources (fossil fuels) and at the same time minimizing a community's carbon foot print of which, in the developed world, 13% is contributed by transport an 7% by car manufacture. The figure below shows the main elements which make up the total of a person's carbon footprint in the developed world.

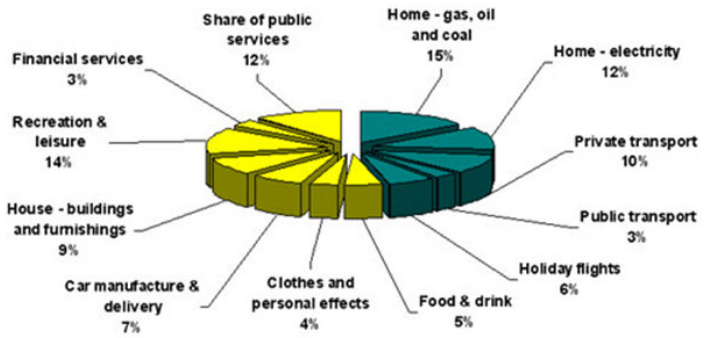

Fig. 1: A carbon footprint is made up of the primary foot print (blue slices) and the secondary foot print (yellow slices). The primary footprint is a measure of direct emissions of CO2 from the burning of fossils (a person is in direct control of these). The secondary foot print is a measure of indirect emissions of CO2 from the whole life circle of products (www.uhv.edu, accessed 2010).

Highly efficient transport and network strategies support users when using the car to produce less carbon dioxide, and give the opportunity to use public transport on more occasions or simply walk or ride the

bicycle to the aimed location. Therefore, sustainable planning strategies not only influence the usage pattern (primary carbon foot print), but also reduce production and consumption (secondary carbon foot print), and the depletion of no-renewable resources.

To make a built environment work sustainable we also need to take into account the aspect of density. This complex dynamic between density and transport infrastructure must not be a reactive process. The choice of transport mode influences land use, this, in turn, influences the transport mode (individual transport, public transport, pedestrian). In general, sustainable transport strategies can only function on the basis of an efficient network with high accessibility, connectivity, centrality and potential through movement (preferred for pedestrians within an urban system). Further, on different scales the whole network needs to be distinguished into a pedestrian network, bicycle network, private vehicle network, bus and rail network, freight network, transit network, and green network. For all these networks the same rules apply as to the system as a whole.

The reduction of consumption of resources does not only take into consideration the three areas of sustainable development - ecology, economy and social aspects - but also allows cities and regions to act independently from international and political decisions.

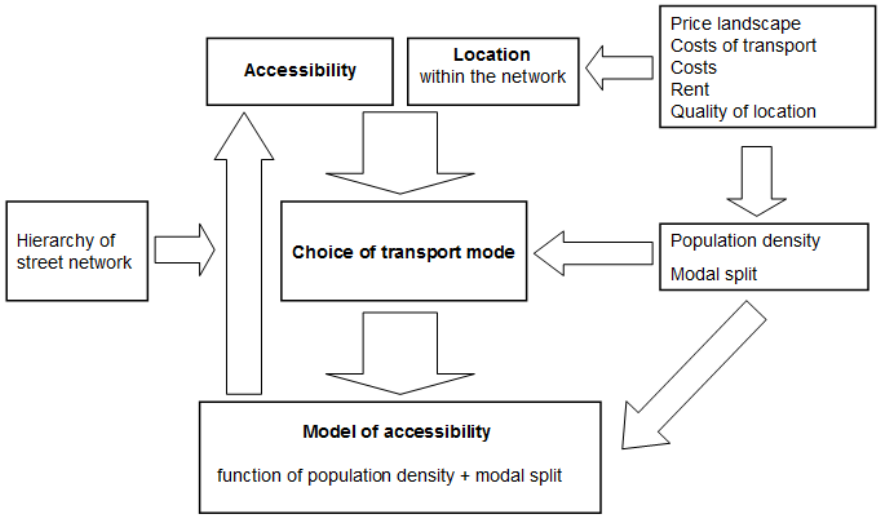

Fig. 3: Interdependency of accessibility and socio-economic factors (Czerkauer 2009)

Let us recall that since the critique of Newman and Kenworthy (1989), many authors have seen in the compact city, a solution for reducing individual transport (Dantzig et Saaty 1973). Experience shows however, that policies favoring the compact city turn out to be less efficient than expected, not least, because the affected population has a critical view of a high-density approach (Garcia et Riera 2003, Remy 1994). In reality, surveys made evident that a moderate to high percentage of people prefer households close to green areas, low density developments and quiet living areas which are important factors in location choice (eg. Guénaëlle Gault / Laurence Bedeau 2007). Hence it seems difficult to convince such households to come back to density (e.g. Owens 1992, Breheny 1997, Garcia et Riera 2003). Schwanen et al. (2004) argue that households tend to minimize the distance or the travel time not only with respect to work, as also shown by Brun and Fagnani (1994) and McDowell (1997), but they optimize their residential location with respect to different kinds of spatial amenities that they frequent as well. This holds, e.g., for commercial areas (Lerman 1976) or even leisure areas (Guo and Bhat 2002). It reinforces the risk that households relocate to a lower-density environment, which risks increasing the costs of housing, traffic congestion and reduces the accessibility of leisure areas (Breheny 1997).

3 MULTI-SCALE PLANNING MODEL

3.1 Theory and Methodology

3.1.1 The Basic Ideas

As pointed out, simple models referring to monocentrism and densification of residential areas seem not to be realistic alternatives for managing urban sprawl. The concept presented by this paper refers to a

hierarchical organization of metropolitan areas. The hierarchical structure of an agglomeration, developed based on social and economic interaction and interdependency between the locations (e.g. villages), has been investigated in urban geography for a long time. These observations served Christaller as foundation for his Central Place Theory (Christaller 1933). He was able to explain the hierarchy of centres, namely, that the catchment areas of different services are dependent on how often the services are used. That is why the services for everyday life (e.g. supermarket) are close to housing, whereas weekly or monthly services require bigger catchment areas. By this characteristic services can be distinguished, leading to a centre-hierarchy (global centre, intermediate centre, local centre) with diverse catchment areas (Figure 3). However, Christaller's theory is constrained to only concerning a functional hierarchy, not reflecting the spatial structure. This explains why in Christaller's theory locations are evenly distributed across the spatial surface plane. The accessibility of such a distribution is disadvantageous for several reasons. On one hand it demands a pseudo-homogeneous traffic infrastructure, on the other hand all of the remaining free spaces are approximately the same size.

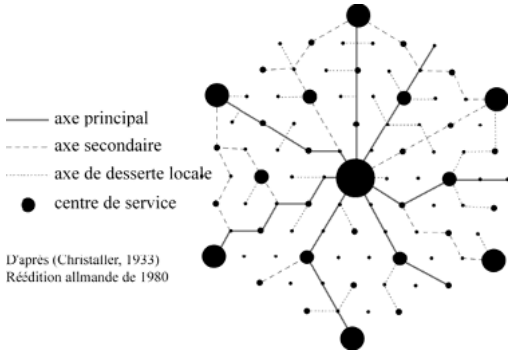

Figure 4: Christaller's net of central places including traffic infrastructure (Christaller 1933, reprint 1980)

In the framework of the PREDIT research program, financed by the French Ministry of Ecology, Energy, Sustainable Development and Sea, a planning concept was developed at the ThéMA institute (Université de Franche-Comté) featuring Christaller's centre-hierarchy, in which spatial distributions are linked to the hierarchy of the traffic infrastructure, equating to a multi-fractal structure (Frankhauser et al. 2007, 2008).

In doing so, the agglomerations are pushed closer to the main traffic axes, decreasing distances and increasing accessibility from and to services. The structured services in Christaller's centre-hierarchy are localised in traffic nodes and have different sized catchment areas. The designed traffic system, using a radio-concentric principle, offers high accessibility with regard to its functional impact (global centre, intermediate centre, local centre). This axes-oriented concept concentrates and lumps traffic flows and therefore allows public transport to be prioritised. In addition, a hierarchically organised system of linked free spaces allows small green areas to be obtained next to housing estates as well as nature resorts and vast woodlands. Therefore, the green corridor principle is expanded as not only non-built-up surfaces and corridors are kept free, but also the interweavement of urban space and free space on all scales becomes the leading concept. On purpose, the urban edge and agglomeration fringes are not chamfered, but linked to green spaces on all scales in order to reduce traffic flow and minimize travel distance to leisure areas.

The linked spatial system of free spaces and agglomeration avoids uncontrolled and splinter developments. Ergo, this concept addresses all postulations of sustainability without propagandising a mono-centric, compact city model.

The concept presented allows the integration of the above described needs reducing environmental pollution at the same time. In summary, the model is a further development of Ebenezer Howard's garden city in combination with Christaller's Central Place Theory. Green areas are prioritised (grey wedges - figure far right).

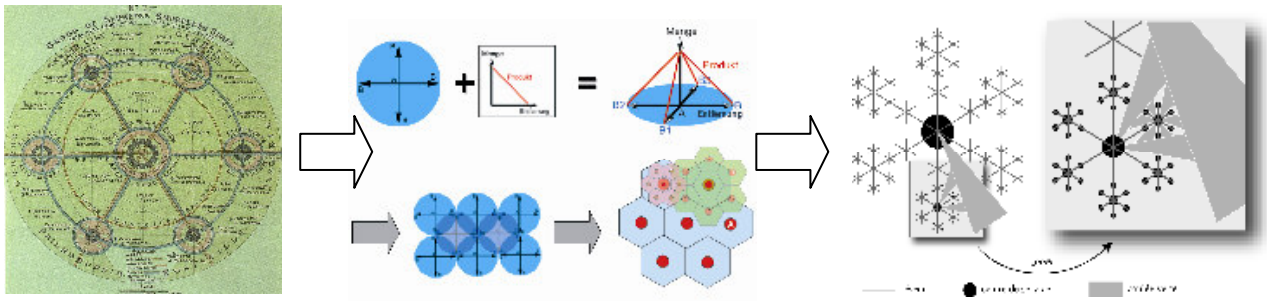

Fig. 5: Theoretical model derivation – far left: Ebenezer Howard's garden city (Wikipedia 2009), middle: Christaller's model (Czerkauer 2007), far right: Frankhauser's fractal model (Frankhauser et al 2007)

An important feature of the concept consists of distinguishing different levels of services according to their frequency of use. For the reduction of pollution, it seems crucial to localize services for daily needs next to residential areas. Services or malls frequented once a week can be placed at a greater distance. Hence, according to frequency of use, the concept distinguishes at least three levels of services and commerce. The goal is to develop planning scenarios respecting the multiscale logic of the concept. For this aim, a given situation is first analysed. Then, predefined standards are applied for developing planning scenarios. The standards refer to the following topics:

- the multi-scale soil occupation index, which corresponds to fractal dimension measures;
- morphological aspects like the articulation of built-up space and open landscape across scales;
- the accessibility of urban amenities (retail centers, services) and green amenities (leisure areas);
- the potential of city-size development (rank-size distribution of cities);
- natural and environmental constraints or recommendations.

These rules are implemented in a planning support system allowing the conception of scenarios for future development in an interactive way starting from a cartographic representation of the considered area.

In the framework of the French research project, a particular method, fractal decomposition, and a software package (MUP-city) has been developed which intergrates fractal, morphological and accessibility rules for services (Frankhauser et al 2007, 2008; Tannier et al 2010). This tool is particularly adapted for working on an urban scale (see below). In the framework of the project Fractalopolis, it is intended that an application concept that allows us to go even further will be developed, taking into account the regional level and including the 3rd dimension, i.e. the height of buildings.

3.1.2 Regional Model

Before applying the regional model, a region's qualitative and quantitative generic (growth) potential is identified by geometry, demographic data sets and morphology. From the present situation of a region, a variety of geometric and demographic analyses (agglomeration sizes, agglomeration hierarchies, cluster, population, distances and many others) are carried out to generate the model's scaling factors (reduction factors for a multi-fractal approach) for the best fit (structure-function model).

Based on an algorithm (including buffers for non-potential zones such as water areas, natural parks, etc.) the model will then be adjusted to the existing network and agglomerations. The simulated scenarios undergo an assessment (accessibility, services, etc.) to identify the advantages and disadvantages of each scenario.

In particular, the interface between existing urban morphology and new potential development (from the simulation) is an interesting challenge, as we have to deal with a non-linear urban fringe, with underlying characteristics of self-organisation paired with former planning and building interventions. The strategy of merging simulated and existing networks is of major importance as the urban development and extension has to be continuous, without any noticeable phase transition, neither for the urban structure nor for the residents of the area. Standards have to be developed corresponding to a city's population, ranking different levels of central places.

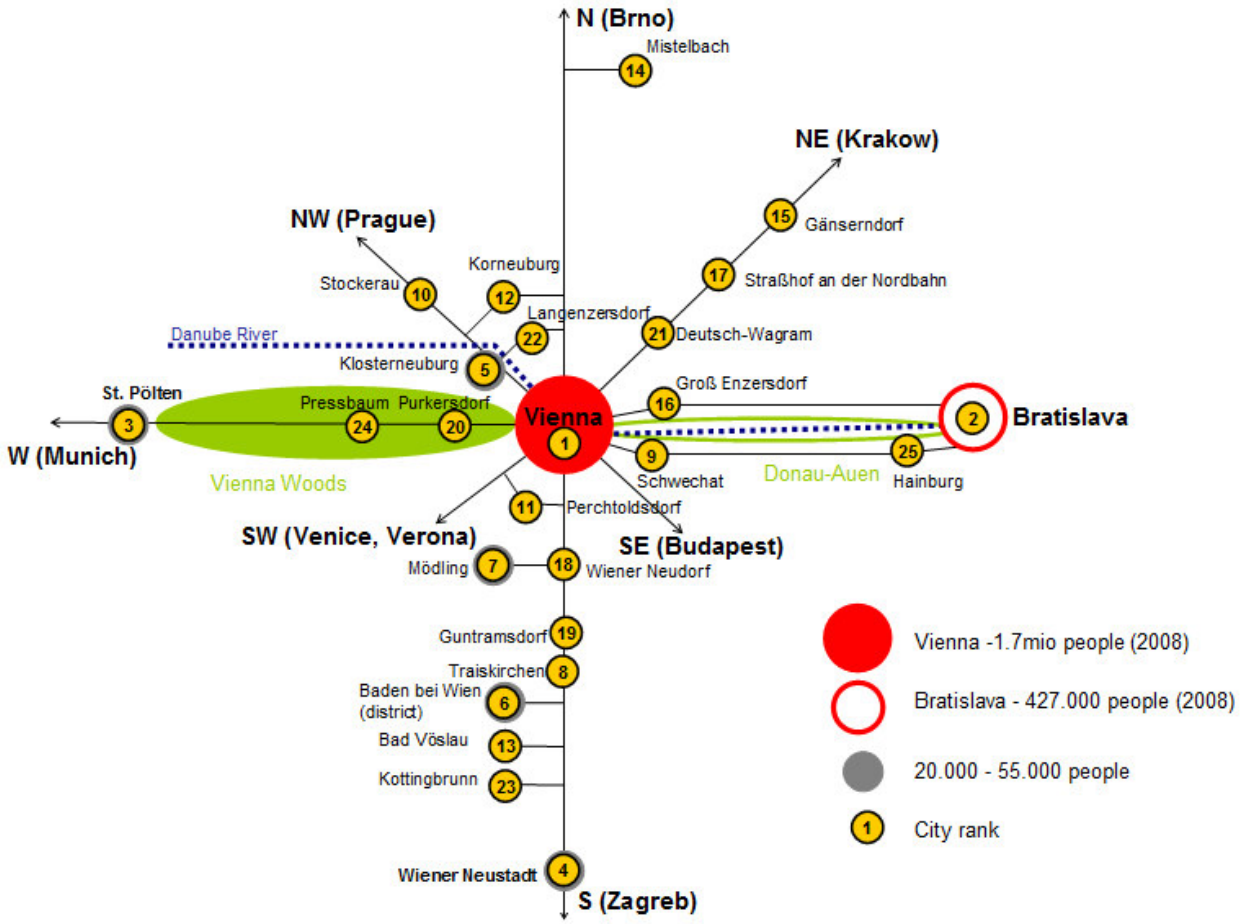

Figure 6: Schemata - City ranking by population of the Vienna-Bratislava metropolitan region (Czerkauer 2010)

In the framework of the fractalopolis-project, it is intended that a decision support system will be developed, which allows the evaluation of development scenarios on the regional scale. With this tool, rules and standards will be implemented referring to the situation on the regional scale. However, we must be aware that on this scale the logic will be different from that of the urban scale, since the pre-existing settlement network comes into play. Indeed, it is easier to develop sites (or not) within a city than to build new cities or urban districts.

3.1.3 Urban Model

In order to apply the planning concept on an urban scale the method of "fractal decomposition" was developed, which is similar to that of grid analysis currently used in fractal analysis (Mandelbrot 1983). The area under consideration is covered by a grid of square-like cells, their size being large in the first step (e.g. 540 m). We identify the "occupied" cells, i.e. those containing buildings. In the next step, each of these cells is cut into nine smaller squares, i.e. the size of the squares is a third of the initial one (fig. 7). In each of the occupied cells identified, we look again for those containing buildings. Of course, since our cells are smaller, we will again find empty ones within the occupied larger cells of the previous step. Hence the total ratio of occupied cells decreases from one step to the other, which corresponds to a decrease in intensity. This procedure is reiterated up to the size of the cells corresponding approximately to that of plots (e.g. 20 m). One of the decomposition steps for a real world pattern is illustrated in figure 8.

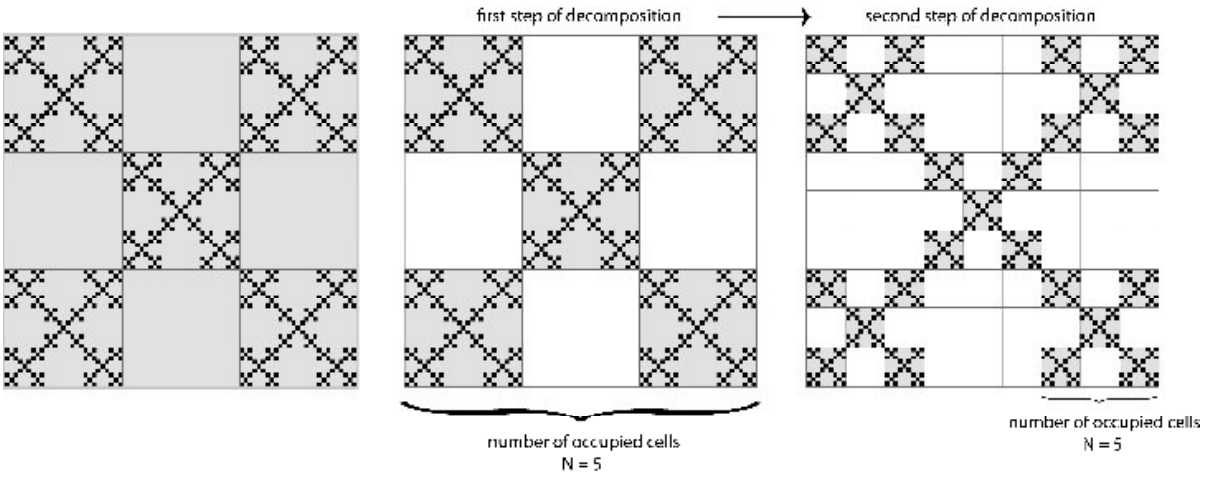

Figure 7: Fractal planning scheme (Frankhauser et al 2008)

In order to avoid fragmentation for urbanized areas as well as for open landscape, the concept demands topological rules of interconnectedness of free space and built up surfaces and a multi-scale hierarchical configuration.

On an urban scale, accessibility to jobs, services, leisure, etc. is of major importance. For a sustainable settlement, service clusters and facilities have to function on different levels (daily, weekly, monthly) indicating a certain catchment area (150-250m, 400-600m, 2-6km, 4-10km radius) linked to a catchment population. Hence, MUP-city evaluates the overall accessibility of each cell with regard to the existing network as well as accessibility to diverse services (Tannier et al 2010). Based on these criteria, MUP-city provides, at each decomposition step, global information for each cell about its suitability for future development. This is shown for one decomposition step in figure 8. By selecting a specific selected cell (surrounded in blue) detailed information are shown in the box. We must be aware that the number of cells which can be urbanized is constrained by fractal law. With this in mind, the larger meshes surrounded by a dark yellow line are introduced. Each of these larger meshes contains nine small meshes but, according to the chosen fractal law only Nmax of these cells can be urbanized. This holds for all meshes and for all decomposition steps.

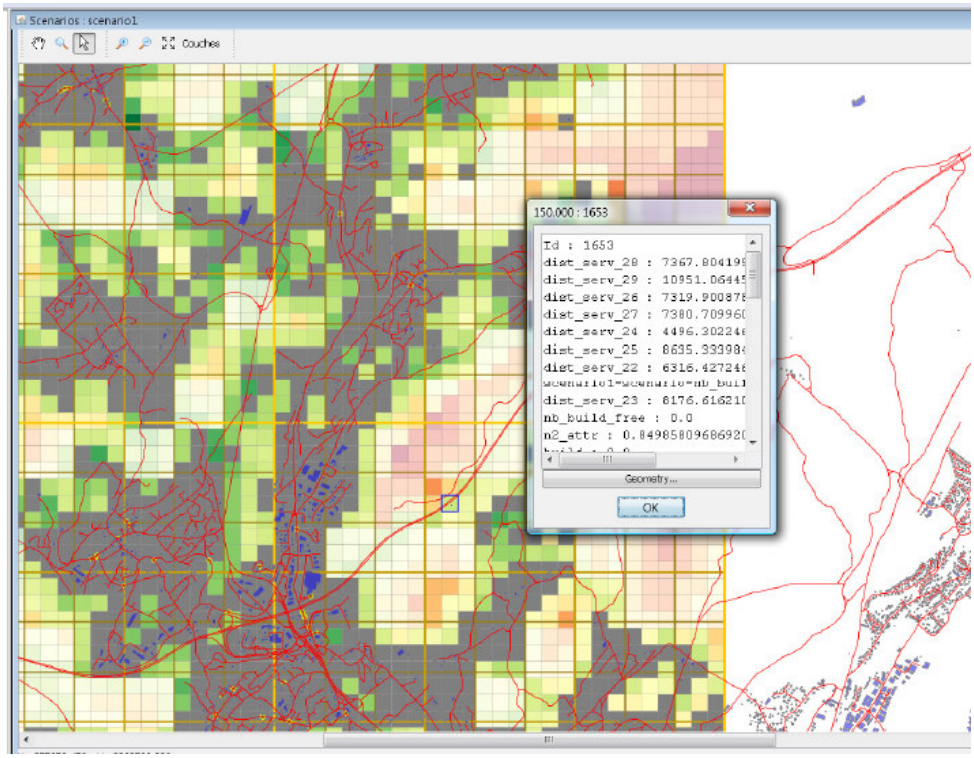

Figure 8: Example MUP-city: Evaluating a scenario based on the accessibility to services

This model not only simulates growth potential, but can also be used as an inverse model to identify areas with low accessibility for consolidation, revitalisation and demolition (e.g. shrinking cities and quarters).

In the present research context a more generalized approach has been developed. Instead of using a unique size of elements at each scale - the square-like meshes of a grid - we introduce the possibility to combine different sizes of squares, according to a multi-fractal logic. This multi-fractal decomposition allows the development of a more architectural approach, taking into account the different sizes of buildings. From a fractal point of view, it is then possible to have a kind of gradient from the centre to the periphery, where larger buildings tend to be localized in the centre. However, fractality allows buildings of different size to be combined in the different zones, thus avoiding monotony. Figure 9 illustrates this possibility, which shows, moreover, how in a multi-fractal approach, built-up areas and free spaces may be combined with regard to the different hierarchy level (centre, sub-centre). From this strategic multi-fractal decomposition, a masterplan is generated. The planning support system will take into account such tools.

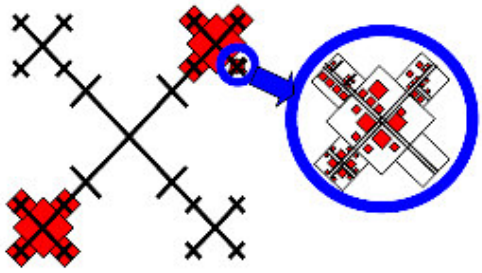

Figure 9: Strategic multi-fractal urban planning scheme (Frankhauser et al. 2005)

3.1.4 Architectural Model

Intensity of land use can be established by a) the morphology of built-up areas and b) a building height scheme (mass model). Intensity of land use regulates a plot's/block's/quarter's/agglomeration's population rank within a system (local to global, neighbourhood to region) and therefore has an impact on important economic and social forces.

A multi-fractal approach allows us not only to modify the size of buildings but also to take into account the intensity of land use, i.e. introducing the height of buildings. Hence, we can expect to develop a highly efficient distribution of built-up mass throughout the urban system, which can then link to a well balanced application of economic theories such as industrial location theories and their impacts on the built environment (centrality, accessibility, rent, landscape prise, capital, and costs). Figure 10 illustrates by means of a rather simple multi-fractal model how the intensity of land use can be modelled with a multi-fractal concept. We may imagine that the bars correspond to the spatial distribution of land use intensity along a street axis going from the city centre to the periphery. Figure 11 shows how different land use intensity factors (p1, p2 etc.) may be applied to different meshes of a grid for which we have chosen, for simplicity, the same size of meshes. These factors correspond to different heights. In further steps of decomposition, these factors are combined and hence a great diversity of intensity factors occur, respecting, however, the hierarchical logic which appears in figure 10 where only two intensity factors are combined.

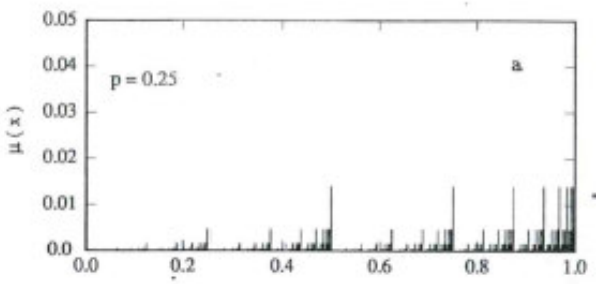

Figure10: A binominal multiplicative process is used for global height development (Feder 1988)

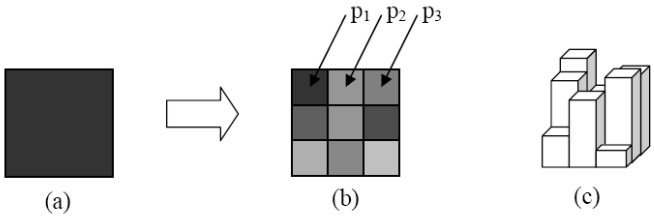

Figure 11: Schematic local height development based on a fractal operation (Frankhauser 2009)

The masterplan serves as the basis for an architectural mass model (3D). Based on its indicators (accessibility, centre hierarchy, closeness to services), each plot (of a cell) is multiplied by a certain height-factor retrieved from the present situation as well as demographic forecasts of the area under scrutiny. The planning support system will take into account this enlarged concept.

4 CONCLUSION

The multi-scale expert system supports regional planners, town planners and architects in developing sustainable scenarios (2D & 3D) for potential developments.

In addition, the multi-scale approach is used to control the intensity and density of land use and therefore economic forces. The new invention of this expert system is not only to use a multi-fractal approach for 3D modelling, but also to create stable and therefore sustainable and sustaining scenarios. This is only possible by addressing consistency through all scales based on functional geometric aspects:

- regional scale: agglomeration classification, street network including green and water areas, topography (2D)
- urban scale: masterplanning (2D + 3D)
- architectural scale: mass model (3D)

Only with an understanding of the interrelation of all interwoven scales on different zoom levels can thriving and sustainable communities, cities and regions be developed. According to requirements, the model is flexible enough to implement individual strategies in greater detail, without destroying the holistic and overall strategy. The expert system addresses the approach of new urbanism: walkability, connectivity, mixed-used-density, mixed housing, increased density where useful, green transportation and sustainability.

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4thNature – Ambient Assisted Urban Resources. Wie Green Cities nachhaltig befördert werden können

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6 ABSTRACT

Zur Realisierung Green bzw. Low Carbon Cities zeigen wir individualisierbare Wege auf, diese Ziele mit intelligenten Systemen + motivierten Bewohnern für Städte unterschiedlicher Entwicklungsstadien und Reifegrade zu erreichen. Mit der 3. Generation von Sustainable Development können Green Cities jenseits tradierter industriegesellschaftlicher Planung nachhaltig befördert werden. Green oder Low Carbon Cities bedürfen prozessorienterter Ziele, wie sie auf der Basis von Kultivierungsfeldern möglich werden.

Ein Denken in Lebenszyklen von Bauwerken, Infrastrukturen und Technologien führt idealerweise zu einer Mosaik-Zyklus-Kultur, in der unterschiedliche Entwicklungs- und Reifestadien nebeneinander einen kontinuierlichen Verbesserungsprozess ermöglichen.

Unter dem Begriff „4thNature“ denken wir Ambient Assisted Urban Resources zusammen.

7 URBANE METABOLISMEN

Weltweit werden große Anstrengungen unternommen, Green bzw Low Carbon Cities zu realisieren. In diesem Beitrag werden individualisierbare Wege aufgezeigt, diese Ziele mit intelligenten Systemen und motivierten Bewohnern für Städte unterschiedlicher Entwicklungsstadien und Reifegrade zu erreichen. Damit zeigen wir Perspektiven auf, wie Green Cities jenseits tradierter industriegesellschaftlicher Planungen (die ja Planungen des fossilen Zeitalters waren) nachhaltig befördert werden können.

Bevor Konzepten für künftige Veränderungen entwickelt werden, empfiehlt sich eine Ursachenanalyse:

Warum haben sich in der fossilen Ära so energieintensive Metabolismen herausgebildet?

- In alten Industrieländern?
- In Schwellenländern?
- In Megacities?

“Von den fünfziger Jahren an erfuhren der Energieverbrauch, das Bruttoinlandprodukt, der Flächenbedarf von Siedlungen, das Abfallvolumen und die Schadstoffbelastung von Luft, Wasser und Boden den für die heutige Situation entscheidenden Wachstumsschub. Die Gesamtheit der damit einhergehenden tiefgreifenden Veränderungen der Produktions- und Lebensweise wird als ‘1950er Syndrom’ bezeichnet.” (Pfister 1996) Die These des 1950er Syndroms postuliert mit den 1950er Jahren eine Epochenschwelle, welche unsere Zeit von weniger zerstörungsdynamischen Evolutionsformen des Mensch-Umwelt Verhältnisses trennt und betrachtet den langfristigen Rückgang der relativen Energiepreise in der 2. Hälfte des 20. Jhdts als eine der wesentlichen Triebfedern der seitherigen Entwicklung.

Die damit einhergehende energetische ‚Überdüngung’ unserer Städte hat diese Siedlungstrukturen insgesamt geprägt. Diese Prägung wird durch einen Umstieg auf Erneuerbare Energien nicht wie von Zauberhand verschwinden, sondern langwierige metabolistische Veränderungsprozesse erfordern.

8 SUSTAINABLE DEVELOPMENT 3.X

Ebenfalls gilt es, nachhaltige Entwicklung‘ nicht als etwas statisches, konzeptionell Fertiges zu sehen. Seit dem 18. Jahrhundert hat die Interpretation von „Nachhaltigkeit verständlicherweise Wandlungen erfahren. Sustainable Development ist, nach Generationen gegliedert, deutlich besser operationalisierbar.

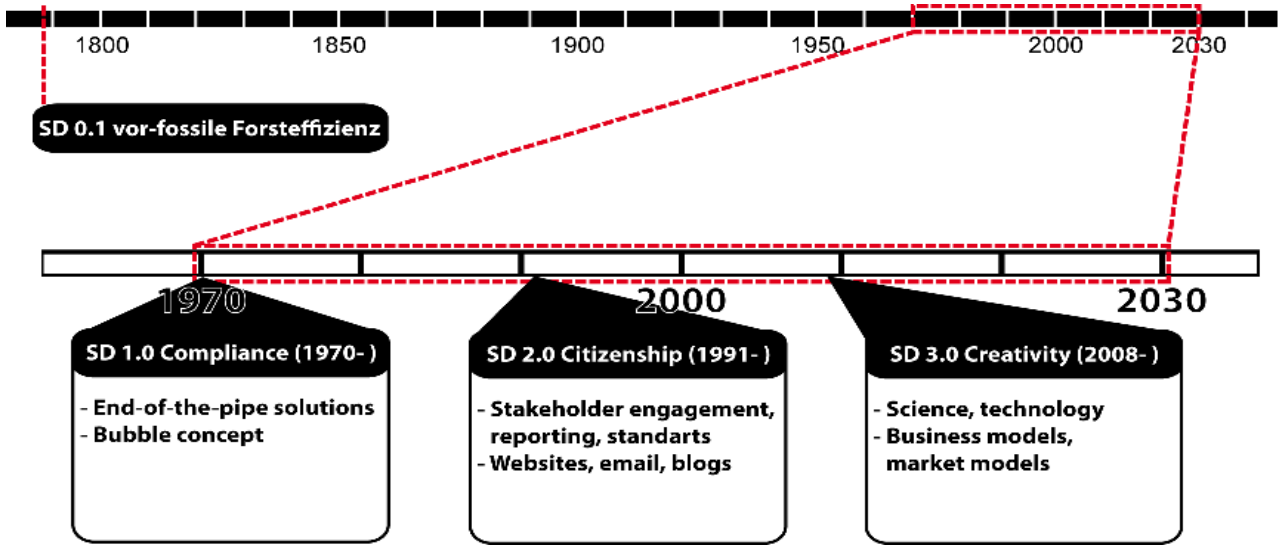

Fig. 1: Sustainable Development-Generationen Pietsch 2009

So sollte mit dem begrifflichen Ursprung in der vor-fossilen Zeit die Holzproduktion optimiert werden, im Ergebnis enstanden aber nicht nachhaltige Forsten.

Nach dieser Latenzphase SD 0.1. „Früh-Neuzeitliche Forstwirtschaft“ kann die Anfang der 70er Jahre des vergangenen Jahrhunderts beginnende Generation 1.0 auch als Pionierstadium interpretiert werden. Die Generation 2.0 entspricht dem, was nach Rio 1992 im Bewusstsein von Planern/-innen als Nachhaltigkeitsparadigma verankert ist.

Inzwischen, spätestens seit der 2007 beginnenden Finanzkrise, haben wir es mit der 3. Generation zu tun. In dieser Generation wird Sustainable Development vom Neben- zum Mainstreamphänomen. Für Politik, Wirtschaft und Gesellschaft wird SD im Kontext von Klimawandel und der Endlichkeit fossiler Ressourcen zur selbstverständlichen Realität, während der Planerstand noch mit den vergangenen Konzepten jongliert.

Bisherige und künftige Entwicklungen lassen sich auf einer Zeitachse angemessen veranschaulichen:

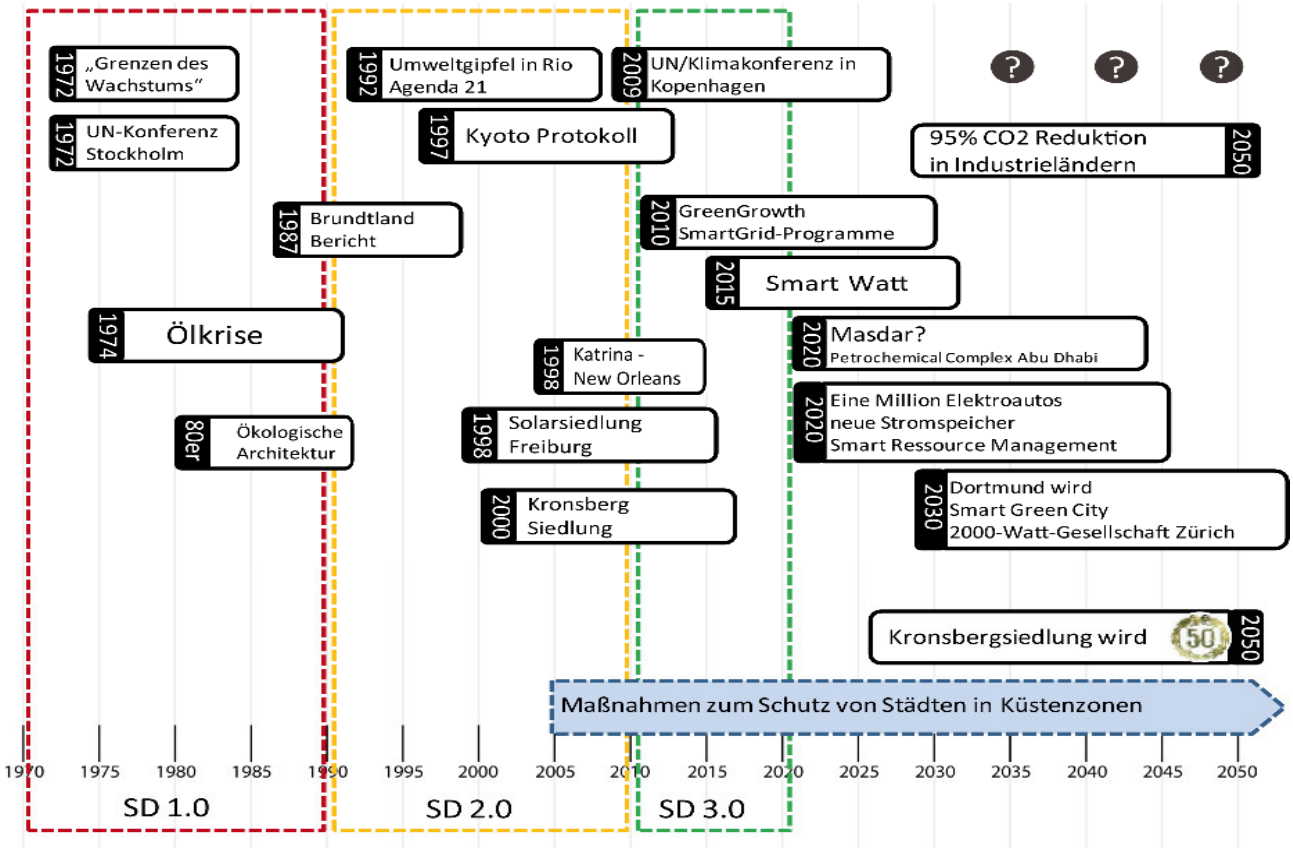

Fig. 2: Milestones auf dem Weg zu ‚Green Cities‘ Pietsch 2009

Wir gehen davon aus, das die ‚Kultivierungsfelder’:

- Postfossiles Ressourcenmanagement,
- Wissensgesellschaftliche Raum- und Infrastrukturen und
- Gesellschaft und Kulturen

geeigneter sind, nachhaltige Entwicklung zu operationalisieren als die traditionellen Säulen Ökologie, Wirtschaft und Soziales.

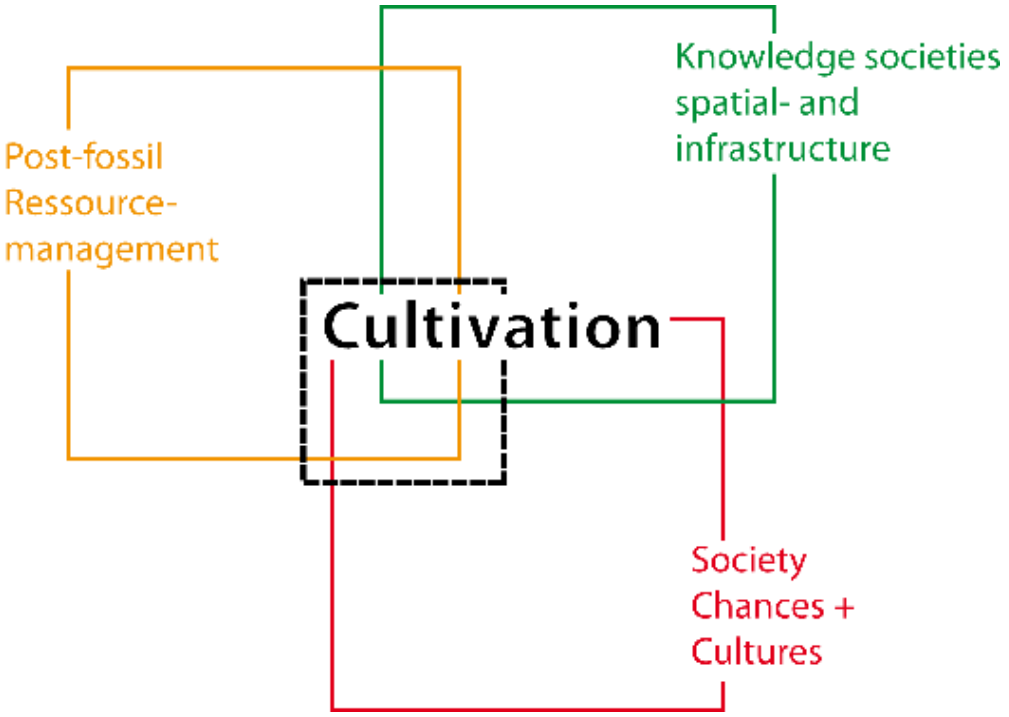

Fig. 3: Kultivierungsfelder Pietsch 2003

9 ZIELE UND OPERATIONALISIERUNGEN

Green oder Low Carbon Cities bedürfen prozessorienterter Ziele, wie sie auf der Basis der Kultivierungsfelder möglich werden.

Das im Umfeld der ETH Zürich konzipierte Konzept der „2000-Watt-Gesellschaft“ stellt sicher eine besser begründete Zielgröße dar als diffuse sogenannte Klimaschutzprogramme. Aber auch hier bedarf es ganzer Bündel von Lösungen, um diese Zielgröße zu operationalisieren.

Die angestrebte Energiewende stellt eine große technologische wie gesellschaftliche und kulturelle Herausforderung dar, die in ihrer Größenordnung mit einer neuen industriellen Revolution vergleichbar, mindestens aber als nächster Kondratieff-Zyklus zu interpretieren ist. Diese „Revolution“ kann nur gelingen, wenn dazu erheblicher Forschungs- und Entwicklungsaufwand betrieben wird. Dies betrifft sowohl die erneuerbaren Energieträger, die Infrastruktur, die Technik zur effizienteren Energieverwendung als auch die Bereitstellung des Wissens über Erhalt und Erweiterung von natürlichen Kohlenstoffvorräten und Senken.

Über die Hälfte des heutigen Bruttoenergieverbrauches werden direkt oder indirekt für die Erstellung und den Betrieb von Bauten benötigt - alleine 60% davon für den Wohngebäudebereich.

Die tradierten Siedlungsflächen-Typisierungen sind längst nicht mehr hinreichend, erst recht nicht für Green City-Konzepte. Hier schlagen wir eine vielfältige Kulturlandschaft aus „urbanen Ressourcenfeldern“ vor. Öffentliche und private Grünflächen fungieren zugleich auch als Ressourcenfelder für urbane Landwirtschaft, Urban Forests, Biomasse-Produzenten und Areale eines intelligenten Wassermanagements. Diese Ressourcenfelder sind ökosystemar zu verknüpfen, da der Umwandlungsprozess eine ökosystemare Betrachtungsweise erfordert, keine ressourcenverzehrende Plantagenwirtschaft wie bisher.

Ein Denken in Lebenszyklen von Bauwerken, Infrastrukturen und Technologien wird idealer-weise zu einer Mosaik-Zyklus-Kultur zur Bewirtschaftung urbaner Ressourcenfelder führen, in der unterschiedliche Entwicklungs- und Reifestadien nebeneinander einen kontinuierlichen Verbesserungsprozess ermöglichen. Ein Denken, welches bei Planungen wie für die Laborstadt Masdar noch nicht zu finden ist. Klimatisier-ungstechnologien unterliegen einem anderen Life-cycle als die Bauwerke, in denen sie eingesetzt werden. Die meisten der heute für Bauen, Wohnen oder Verkehr propagierten Nachhaltigkeitstechnologien sind Übergangstechnologien und werden in kurzen Abständen weniger Jahre noch mindestens bis zur Mitte des Jahrhunderts immer wieder durch bessere abgelöst. Damit notwendig zu verbinden ist ein anderes Verständnis von (Stadt-) Planung, welches das industriegesellschaftlich-fossile Denken überwindet, nicht nur ‚ideale’ Zustände fixieren will.

Eine Umfrage unter Raumexperten/-innen, durchgeführt vom Forum Wissenschaft & Umwelt im Oktober 2009, verdeutlicht leider, dass ausgerechnet die Fachcommunity die anstehenden Veränderungen und ihre metabolistischen Ursachen noch nicht antizipiert hat.

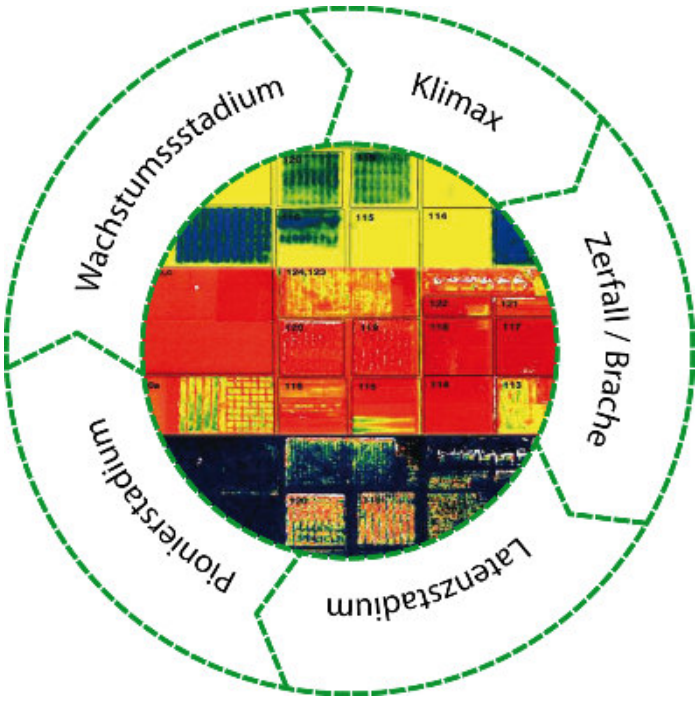

Fig. 4: Mosaik-Zyklus-Kultur zur Bewirtschaftung urbaner Ressourcenfelder Pietsch 2010

10 4TH NATURE

In Green Cities werden Wasserver- und Entsorgung sowie Speicherung, die Energiesysteme durch ein intelligentes, nutzeroptimiertes Ressourcenmanagement organisiert sein, dessen technologische Basis in diversen „Ubiquitous City"-Konzepten vorgedacht ist. Unter dem Begriff „4thNature" denken wir solche Ambient Assisted Urban Resources zusammen.

Zur Dimension: Cisco-Chef Chambers rechnet im Kontext von Smart Grids mit einem 10x höheren Geschäftsvolumen allein für das Internet der Energie. Korea hat am 25. Jan. 2010 eine bis 2030 reichende Nationale Smart-Grid- Roadmap definiert und will damit 500.000 neue Arbeitsplätze generieren.

All dies wird Auswirkungen auf die Gestalt der Städte, die Morphologie der Quartiere haben. Standorte, Klimazonen und Traditionen sollten individuelle Ausprägungen jenseits der vor-herrschenden ‚alles ist möglich', egal wo Haltung ermöglichen. Ein besonderes Augenmerk, auch in gestalterischer Hinsicht, wird den vielfältigen Energiespeichern zu widmen sein. Ein Ergebnis könnte als angemessenes Planungswerkzeug ein Navigationssystem für Roadmaps hin zu Green Cities sein.

Im 4thnature-lab des i-environments-Team der HCU Hamburg werden wir solche Werkzeuge entwickeln und erproben.

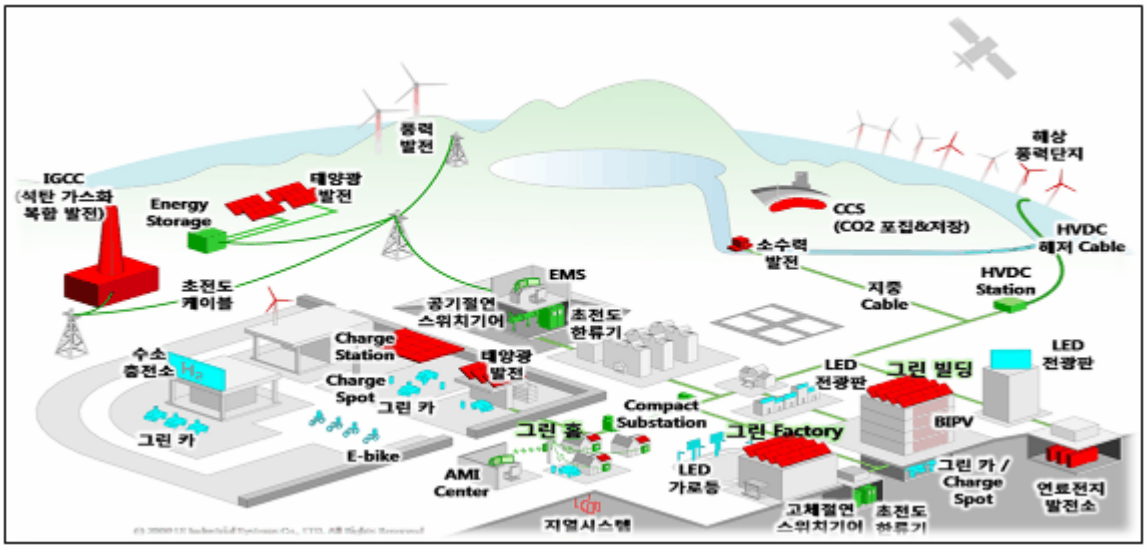

Fig.5: Smart Grid Korea

11 WISSENSAREALE ALS PIONIERE

Ideale Pioniere, um Low-Carbon-Prozesse im urbanen Raum zu erproben und zu testen, sind Wissensareale mit ihren ‚Nutzern'. Wer sonst, wenn nicht gut gebildete, lernprozessaffine Menschen sind als Verhaltens-pioniere geeignet? Dementsprechend befinden sich weltweit viele Universitäten in einem fruchtbaren ‚Sustainable Campus'-Wettbewerb. Als positives Beispiel kann das EAWAG-Gebäude in Dübendorf bei Zürich dienen. Dort erprobte Formen und Techniken im Umgang mit Energie und Ressourcen können dann in andere Stadtquartiere diffundieren.

Thesen:

- Intelligente Ökosysteme werden als „vierte Natur" von urbaner High-tech-Land- wirtschaft über Green IT bis hin zu Smart Grids ein wesentlicher Bestandteil nachhaltiger urbaner Kultivierungen sein.
- Die zu Green Cities führenden Trends und Tendenzen weisen über ‚Stadtplanung' bisheriger Praxis weit hinaus.
- Neue Wertschöpfungen, neue Akteure und Akteurskonstellationen, neue Technologien, aber auch neue (Wert-)Maßstäbe werden zu global hoffentlich vielfältig differenzierten Kultivierungen unserer Städte führen.

Dieser Beitrag ist ein Arbeitspapier des 4thnature-lab im i-environments-team der HCU Hamburg.

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A diagnosis tool for small and medium sized cities on their way to an InnoCité

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1 ABSTRACT

A diagnosis tool for small and medium sized cities on their way to an InnoCité

Kleine und mittlere Städte im Einflussbereich von Agglomerationen stehen vor der Aufgabe Strategien entwickeln zu müssen, um in dem vielschichtigen kommunalen Konkurrenzfeld bestehen zu können. Dabei ist es für die lokalen Akteure und Entscheidungsträger der Stadt- und Regionalentwicklung wichtig, eine zielgerichtete Situationsanalyse der Stadt und ihrer Einbindung in den Verflechtungsraum vornehmen zu können, ohne Datenfriedhöfe anzulegen. Diese Situationsanalyse soll es den Akteuren erlauben, schnell die wesentlichen Handlungsfelder und zentralen Stellschrauben für Veränderungen auszumachen. Vor dem Hintergrund, dass gerade in kleinen und mittleren Städten die Beobachtung gemacht wird, dass aufgrund der Ausstattung der Verwaltungen tagesaktuelle Aufgaben im Vordergund stehen und der Gesamtzusammenhang bzw. die Einbindung in eine integrierte Entwicklung darunter leiden, ist es essentiell, ein einfaches, transparentes und praxistaugliches Diagnoseinstrument zu entwickeln.

Die Partnerschaft des INTERREG IV B Projektes InnoCité im Alpenraum hat ein solches Diagnosemodell entwickelt und testet dieses derzeit in sieben Pilotregionen, auch um Hinweise für eine Überarbeitung des Tools zu sammeln. Dabei orientiert sich das Diagnosemodell an dem Ziel eine möglichst hohe Lebensqualität für die Bürger zu gewährleisten. Daher werden die Bereiche Beschäftigungssituation, Bildung, Wohnungswesen, Versorgungssituation, Erreichbarkeiten, Soziales Leben und Erholung abgebildet.

In dem Vortrag soll zum einen der Weg zu dem konsensualen Diagnosemodell der InnoCité-Partnerschaft beschrieben, das Modell selber dargestellt und erste Testergebnisse präsentiert werden.

2 DAS PROJEKT INNOCITÉ

2.1 Ziel der Projektpartnerschaft

Zunehmende gesellschaftliche, ökonomische und ökologische Veränderungen stellen die Kommunen vor neue Herausforderungen. Einhergehend mit sinkenden kommunalen Finanzmitteln, die den Handlungspielraum insbesondere kleiner und mittlerer Städte einschränken, gilt es innovative Lösungsstrategien zu entwickeln, um im kommunalen und regionalen Konkurrenzfeld bestehen zu können. Kleine und mittlere Städte, die im Verflechtungsbereich von Agglomerationen verortet sind, sehen sich einem besonderen Wettbewerbsdruck gegenüber den Agglomerationen ausgesetzt. Die überregionale Bedeutung von Agglomerationen als Arbeits-, Wohn- und Versorgungsstandort kann einerseits positive Auswirkung auf die Entwicklung von Kommunen haben. Andererseits birgt die geringe Distanz zu den Agglomerationen ein hohes Risiko des Bedeutungsverlustes als eigenständiger Wirtschafts- und Versorgungsstandort.

Innovative Strategien sollen die kleinen und mittleren Städte unterstützen sich im Gesamtraum zu positionieren, Vorteile, die sich aufgrund der Nähe zu den Agglomerationsräumen bieten, zu nutzen sowie Nachteile der Nähe zu minimieren. Dabei sollen die entwickelten innovativen Strategien an das endogene Potential der Städte und Regionen anknüpfen, eine möglichst hohe Lebensqualität gewährleisten und den Maximen der nachhaltigen europäischen Stadt, die in der Leipzig Charta[1] verankert sind, entsprechen. Unter der Einbindung lokaler Schlüsselakteure soll das Bewußtsein für die Stärken der Region geschaffen werden. Um an die Stärken anzuknüpfen und den Herausforderungen begegenen zu können, müssen diese ermittelt werden. Am Anfang des Projektes InnoCité steht deswegen die Erarbeitung eines Diagnosetools, das die wesentlichen Handlungsfelder offenbaren soll, an denen mittels der Entwicklung innovativer Strategien angeknüpft werden kann.

[1] Vgl. http://www.eu2007.de/de/News/download_docs/Mai/0524-AN/075DokumentLeipzigCharta.pdf, letzter Zugriff am 24.02.2010

An dem INTERREG IV B Projekt InnoCité sind acht Projektpartner aus den Ländern Frankreich, Italien, Slowenien, Österreich und Deutschland beteiligt.[2] Der Lehrstuhl Regionalentwicklung und Raumordnung, der Technischen Universität Kaiserslautern, übernimmt im Unterauftrag des Bayerischen Staatsministeriums für Wirtschaft, Infrastruktur, Verkehr und Technologie die Federführung des Workpackage 4, in dem die Erarbeitung eines solchen Diagnosetools wesentlicher Bestandteil ist.

2.2 "Positionsbestimmung" mit Hilfe eines Diagnosetools

Diese Herausforderungen stellen in erster Linie lokale Akteure und und Entscheidungsträger der Stadt- und Regionalentwicklung vor immer komplexer werdende Fragestellungen und Entscheidungsprozesse, die es im Sinne einer nachhaltigen und zukunftsorientierten Stadt- und Regionalentwicklung zu lösen gilt.

Problemlösungen sowie eine aktive Gestaltung von Herausforderungen setzen voraus, dass diese bekannt sind und an den richtigen „Stellschrauben" gedreht wird, um einen anderen Weg einzuschlagen. Nicht immer sind Ursachen für Veränderungen offensichtlich oder erschließen sich von allein. Dementsprechend ist es vorteilhaft bzw. notwendig verschiedene Themenfelder in einer Untersuchung, die sich mit den kommunalen Entwicklungen und Herausforderungen beschäftigt, zu betrachten.

An dieser Stelle kann die Frage gestellt werden, warum der Bedarf an einem solchen Diagnoseinstrument überhaupt besteht. Einerseits hat sich im Rahmen der Forschungsarbeiten des Lehstuhls Regionalentwicklung und Raumordnung an der Technischen Universität Kaiserslautern im Bereich der regionalen und kommunalen Entwicklung sowie in der Zusammenarbeit mit lokalen Akteuren gezeigt und bestätigt, dass:

- lokale Entscheidungsträger zwar die Stärken und Schwächen in ihrem Arbeitsschwerpunkt kennen, allerdings der interdisziplinäre und intersektorale Zusammenhang oft vernachlässigt oder nicht gesehen wird;
- langfristige sich anbahnende Entwicklungen vor dem aktuellen Tagesgeschäft in den Hintergrund treten[3];
- die Relevanz und Auswirkungen der Entwicklungen in vielen Bereichen nicht offensichtlich sind bzw. nicht in ihrer Gesamtheit erkannt werden;
- die Stärken der Kommunen/Regionen von lokalen Akteuren oft falsch eingeschätzt werden, d.h. frühzeitiger Handlungsbedarf die Stärken auszubauen zu spät erkannt wird.

Andererseits erfordern Motive, wie beispielsweise Kosten- und Personalaufwand, die Entwicklung eines einfach anwendbaren Diagnosetools für lokale Akteure und Entscheidungsträger.

Vor dem Hintergrund der Verbesserung der Wettbewerbsfähigkeit von kleinen und mittleren Städten im Alpenraum, die im Verflechtungsbereich von Agglomerationen liegen, ist im Rahmen des INTERREG IV B Projektes „InnoCité" ein solches Diagnosetool von der transnationalen Partnerschaft erarbeitet worden. Ziel ist es, lokalen Akteuren und Entscheidungsträgern die Möglichkeit zu eröffnen, eine zielgerichtete und querschnittsorientierte Situationsanalyse durchzuführen. Eine einfache Handhabung des Diagnosetools und ein minimaler Daten- und Erhebungsaufwand soll gewährleisten, dass die Anwendung mit einem geringen Finanz- und Personaleinsatz für die Kommunen verbunden ist.

2.2.1 Methodische Vorgehensweise

Folgende Leitfragen haben bei der Entwicklung des Diagnosemodells im Vordergrund gestanden:

- Wie stellt sich die Situation des Untersuchungsraumes im Vergleich zur Agglomeration dar?,
- Wie ist der Untersuchungsraum mit der Agglomeration verflochten?,
- Wie ist der Untersuchungsraum derzeit aufgestellt (Lebensqualität)?.

Im Sinne der Definition einer InnoCité und um die thematische Offenheit der Ergebnisse zu gewährleisten ist den oben angeführten Leitfragen das Thema „Lebensqualität" zu Grunde gelegt worden.

[2] Das Projekt wird konfinanziert durch den Europäischen Fonds für Regionale Entwicklung.
[3] Ein gutes Beispiel hierfür ist die demographische Veränderung von Kommunen, die sich vielerorts über einen langen Zeitraum entwickelt hat, aber erst mit dem „sichtbar" werden von lokalen Akteuren ernsthaft wahrgenommen und thematisiert wird.

„Lebensqualität ist als multimediales Konzept zu verstehen, welches materielle und immaterielle, objektive und subjektive, individuelle und kollektive Wohlfahrtskomponenten gleichzeitig umfasst."(Vgl. Huschka D., Wagner G.G., S. 2). Der äußerst abstrakte Begriff der Lebensqualtität kann sich häufig nicht den fachspezifischen Hintergründen der Forschung entziehen. Beispielhaft sei hier das Indikatoren-System zur nachhaltigen Entwicklung in Deutschland, 2008 oder die Indikatoren des Österreichischen Lexikon der Nachhaltigkeit[4] angeführt, das Lebensqualität mit Indikatoren, wie beispielsweise:

- Einkommensverteilung,
- Eigene Gesundheitswahrnehmung, nach Einkommensniveau,
- Beschäftigungswachstum, etc.

misst und beurteilt. Eine Vielzahl von Indikatoren, die das Niveau der Lebensqualität abbilden wollen, messen Indikatoren des Lebensstandards[5] und Wohlfahrtsindikatoren und/oder sind an fachspezifische, übergeordnete Themenbereiche/Auftraggeber gebunden.

Das Diagnosetool ist nicht darauf ausgelegt die vorhandene Lebensqualität zu erheben und zu beurteilen, was sich aufgrund dafür notwendiger qualitativer empirischer Analysen schwierig gestalten dürfte. Mittels des Diagnosetools soll daher geprüft werden, ob die Grundvoraussetzungen für eine hohe Lebensqualität im Untersuchungsraum vorhanden sind.

Im ersten Schritt des Erarbeitungsprozesses sind von den Projektpartnern die Grundvorausetzungen für Lebensqualität definiert worden, an denen die zu betrachtenden Bereiche anknüpfen. Es wird von der Annahme ausgegangen, dass Lebensqualität eng mit den Grunddaseinsfunktionen verknüpft ist, d.h. mit der Befriedigung der Grunddaseinsfunktionen wächst die menschliche Zufriedenheit und somit steigert sich die Lebensqualität. Aus diesem Zusammenhang heraus sind folgende Themenbereiche in dem Diagnosetool besonders berücksichtigt worden:

- Beschäftigung,
- Wohnungswesen,
- Versorgungssituation (inklusive soziale und technische Versorgung, Einzelhandel),
- Soziales Leben,
- Erholung,
- Mobilität / Erreichbarkeiten

und im Rahmen des Projektes InnoCité gewichtet worden.

Als nächsten Arbeitsschritt sind aus den einzelnen „Lebensqualitäts-Bereichen" Schlüsselindikatoren entwickelt bzw. abgeleitet worden, die in einem Abstimmungsprozess mit den Projektpartnern diskutiert und beschlossen wurden. Die erarbeiteten Schlüsselindikatoren sind den oben angeführten Leitfragen zugeordnet, denn eine Erhebung aller Indikatoren für die Agglomeration und dem Untersuchungsraum erwies sich in diesem Kontext als nicht sinnvoll.

2.2.2 Das Diagnosetool im Überblick

Neben der quantitativen Datenabfrage im Diagnosetool, sind ebenfalls qualitative, ergebnissoffene Fragen zu einzelnen Themenbereichen eingearbeitet worden. Ziel dieser qualitativen Erhebung ist es, dass der Nutzer ebenso Einschätzungen zu bestimmten Themenbereichen sowie deren Entwicklung geben kann. Mit der Mischung aus quantitativer und qualitativer Erhebung von den Indikatoren soll erreicht werden, dass sich der Nutzer des Diagnosetools neben den „harten" Fakten ebenso Gedanken zur derzeitigen und künftigen Entwicklung macht. Es geht bei dem Diagnosetool nicht nur um die Abarbeitung einer vorgegebenen Reihe von Fakten, die anschließend mit den polarisierenden Begriffen „Ja" / "Nein" und „gut" / „schlecht" versehen werden können. Vielmehr soll bei den Nutzern eine Sensibilität für die Entwicklungen, auch fachfremder Bereiche geweckt und die interdisziplinäre Kommunikation angeregt werden. Des Weiteren

[4] http://www.nachhaltigkeit.info/artikel/indikatoren_lebensqualitaet_747.htm, letzter Zugriff am 24.02.2010
[5] Niveau der Lebenshaltung, bezogen auf einen Raum und die Gesamtheit seiner Bewohner oder auf einzelne Gruppen oder Individuen. (H. Leser, S. 508)

kann das Diagnosetool, wenn es einfach und transparent gehalten werden soll, nicht alle Entwicklungen detailliert erfassen. An dieser Stelle kann sicherlich kritisiert werden, dass in diesen Bereichen keine objektive Darstellung der Sachverhalte möglich ist. Allerdings bildet das Diagnosetool einen Ausschnitt der wichtigsten zentralen Handlungsfelder ab, der durch subjektive bzw. untersuchungs-raumspezifische Ergänzungen erweitert werden kann. Durch die Einschätzungs- und Ergänzungsfelder wird die Identifizierung des Nutzers mit der Analyse erhöht, da er sich in den Themenfeldern abseits der datenbasierten Indikatoren wiederfinden kann. Ebenso entspricht dies der Tatsache, dass sich Lebensqualität nicht nur anhand einer statistisch-basierten Strukturanalyse wiedergeben lässt, sondern auch vom subjektiven Empfinden abhängig ist.

Das Diagnosetool ist in zwei Abschnitte gegliedert. Im ersten Abschnitt werden Daten und Einschätzungen zur Agglomeration abgefragt, die insbesondere bei der Bewertung der derzeitigen Situation des Untersuchungsraumes eine wichtige Rolle spielen. Im foldengen sind Bereiche der Erhebung sowie die Indikatoren dargestellt:

- Bevölkerungsentwicklung (Anzahl, Wachstum, Altersverteilung, Wanderungen, etc.),

INDICATOR	UNIT (collectable, comparable, measureable)	RELEVANCY
Basic data for the metropolis		
Population status quo and development		
Population in number of inhabitants	Number of inhabitants per year, 1991 - 2007	Size and importance of the metropolis
Population forecast	Percentage from 2000 till 2020	Assessment of the due to population challenges
Age distribution	Percentage, 2007 class divided in: under 18 years, 18 till 65 years, over 65 years	Metropolis affected by an aging population and the consequences
Development of migration (moving in and moving out)	Number of people moving in and out, 1991 - 2007	Attractiveness of the metropolis as location for living and working
Population density	Number of inhabitants per sqkm, 2007	Urbanity of the metropolis

- Wirtschaftliche Situation (BIP, Arbeitslosigquote, FuE-Einrichtungen, Immobilienmarkt, etc.),

Economy		
Gross domestic product	€ per person, 2007	Economical capacity
Gross value added	€ per person, 2007	Economical capacity
	per economical sector, 2007	Economical powers of the sectors
Average household income	€ per household, 2007	Economical situation of the inhabitants
Purchasing power per household	€ per household, 2007	Economical capacity of the inhabitants
Unemployment rate	Percentage, 2007	Assessment of the employment market
Real estate market	Price for living space in € per sqm, 2007	Price levels as reasons for migration of persons, enterprises
	Price for office space in € per sqm, 2007	
	Price for industrial zone in € per sqm, 2007	

- sowie Verkehrsverflechtungen zwischen Agglomeration und Untersuchungsraum (Anbindung, Pendlerverflechtungen,etc.)

Traffic from / to the metropolis		
Travel time from pilot site to metropolis	By car in minutes per km	Accessibility of the metropolis
	By train minutes per km	
Accessibility of the metropolis by public transport	Frequency of the public transport	Accessibility and intensity of the linkage between metropolis and pilot site
	Number of daily connections	
	Earliest and latest connection between metropolis and pilot site	
Commuter streams	Number of out-commuters of the pilot site to the metropolis	Assessment of the employment market streams, economical importance of the pilot site / metropolis
	Number of in-commuters in the pilot site from the metropolis	
	Number of out-commuters of the pilot site to surrounding cities	
	Number of in-commuters in the pilot site from surrounding cities	

Der zweite Abschnitt des Diagnosetools befasst sich mit dem Untersuchngsraum selber. Hier gilt es detailiert die Entwicklungen in den Bereichen:

- Bevölkerungsentwicklung,

II. Identification of the situation in the pilot site		
Population		
Population in number of inhabitants	Number of inhabitants per year, 1991 - 2007	Size and importance of the pilot site
Population forecast	Percentage from 2000 till 2020	Assessment of the due to population challenges
Age distribution	Percentage, 2007 class divided in: under 18 years, 18 till 65 years, over 65 years	Pilot site affected by an aging population and the consequences
Development of migration (moving in and moving out)	Number of people moving in and out per aging group, 2003 – 2007 (class divided in: under 18 years, 18 till 65 years, over 65 years)	Attractiveness of the pilot as location for living and working for the different aging groups
size of households	Average of persons per household, 2007	Assessment of the social structure and real estate market
Population density	Number of inhabitants per sqkm, 2007	Urbanity of the location, compare to agglomeration

- Wirtschaftliche Situation mit besonderer Berücksichtigung des Einzelhandels und Tourismus,

Economy		
Gross domestic product	€ per person, 1991 - 2007	Economical capacity (in 2007 compared to the metropolis)
Average household income	€ per household, 1991 - 2007	Economical situation of the inhabitants (in 2007 compared to the metropolis)
Educational level	Percentage of high school graduate school leavers, 2007	Assessment of the further potential of the pilot site and relation to the migration for apprenticeship
Employees per sector	Percentage of total employees, 1991 - 2007	Economical structure
Kinds of enterprises	Total number of enterprises, 2007 (class divided in: microenterprise, small-medium enterprise, large scale enterprise)	Assessment of the economical structure and vulnerability
Unemployment rate	Percentage of unemployed, 1991 - 2007	Assessment of the employment market, compare to metropolis
Tourism		
Seasonal times	Month with highest and lowest number of tourists	Assessment of the seasonality
Tourism relevance	Beds per 1.000 inhabitants, 2007	Assessment of the tourism as economical factor, utilization of the touristic infrastructure
	Overnight stays per 1000 inhabitants, 2007	
Secondary residence	Percentage of secondary residence of total inhabitants	Vitality of the pilot site
Commercial offer		
Sales area	Sales area food / non-food in sqm per inhabitant, 1991 - 2007	Structure and development of offer
Stream of purchasing power	Map with inflow/outflow streams of the purchasing power in €	Centrality of the pilot site as retail location
Vacancies in retail	Percentage of vacant space in retail, 2007	Assessment of the need of actions
Catchment area	Map and number of people, 2007	Centrality of the pilot site as retail location

- Erreichbarkeit/Anbindung,

Accessibility		
Car density	Cars per household, 1991 – 2007	Development of the mobility, traffic demand
Public parking spaces in the centre	Public parking spaces per 100 sqm sales area, 2007	Assessment of the parking space offer concerning the retail structure
Modal split	Percentage of traffic volume (class divided in: mobile individual transport, public transport, non-mobile individual transport), 2007	Assessment about the distribution of traffic volume
Public transport connection	Map with public transport connection in surrounding municipalities with frequency and number of connections, 2007	Accessibility of the surroundings by public transport
Internet connection	Percentage of households with internet connection, 2007	Appreciation of progress
	Percentage of households with low / high quality of internet connection (class divided in: Dial up access or ISDN, broad band connection), 2007	Availability and usage of new media

- Versorgung - technische und soziale Infrastruktur,

Services offer / social infrastructure		
Medical care	Number of doctors per 1000 inhabitants, 2007	Assessment of the medical system in the pilot site (offer and demand)
	List of medical specialists, 2007	
	Number of pharmacies per 1000 inhabitants, 2007	
Day care facilities	Number of places in day care facilities per 1000 children under the age of using public education, 2007	Family-friendly
Facilities for elderly	List of special offers for elderly	Assessment of an adequate infrastructure for the demographic change
Post	Availability: Yes / No	Availability of basic service
Bank	Availability: Yes / No	Availability of basic service
Library	Availability: Yes / No	Quality of life
Theatre	Availability: Yes / No	
Cinema	Availability: Yes / No	
Conference Centre	Availability: Yes / No	
Schools	Kind of schools (class divided in: primary and secondary schools)	Local supply with education facilities, centrality of pilot site as education location
	Number of schools	Centrality of pilot site as education location
	Pupils per teacher	Quality of education
Sport facilities	List of sport facilities	Quality of leisure activities
Museums	List of museums	
Administration level	List of administration higher than municipality level	Supra-local relevance of the pilot site

- Erholung / Urbane Situation

Urban situation		
Urban land	Percentage of urban land covered of the surface in 1997 and 2007	Development of land consumption
Land use	Area of land use in sqm from 1991 till 2007 (class divided in: residential areas, industrial area, recreational area)	
Real estate market	Price for living space in € per sqm, 2007	Price levels as reasons for migration of persons/ enterprises, compared to the metropolis
	Price for office space in € per sqm, 2007	
	Price for industrial zone in € per sqm, 2007	
Real estate property	Percentage of household living in own property, 2007	Structure of the real estate market
	Percentage of households living in rented accommodations, 2007	
Living space	Average size of living space per person in sqm, 2007	
Brownfields	Per function in sqm, location in city centre, 2007	Structural change, reserves of building land

- Umwelt,

Environment		
Recreational area	Sqm per inhabitant in 1991 and 2007	Quality of life, development of the land consumption
Smog days	Number of smog days per year	Impairment of nature and health
Environmental risks	List of the environmental risks	

zu untersuchen, wobei sich die oben definierten Themenbereiche der Lebensqualität in den einzelnen Unterkapitelnversuchen begrifflich anzupassen.

2.2.3 Anmerkungen zum „Entstehungsprozess“

An der Erarbeitung des Diagnosetools, insbesondere der Schlüsselindikatoren sind die acht Projektpartner beteiligt gewesen. Neben den InnoCité-Projektpartnern sind ebenso verschiedene Fachexperten in den Meinungsbildungsprozess integriert worden. Somit hat sich ein großer Pool an unterschiedlichen Meinungen zu den Schlüsselindikatoren und deren Einordnung in die einzelnen Themenabschnitte und Unterkapitel ergeben. Trotz der Darstellung der „Lebensqualität-Bereiche“ und der Einigung auf das Ziel ein thematisch breitangelegtes, offenes Diagnosetool zu entwickeln und fachliche Hintergründe und Belange an dieser Stelle außen vor zu lassen, war es schwer dies im Diagnosetool konsequent umszusetzen.

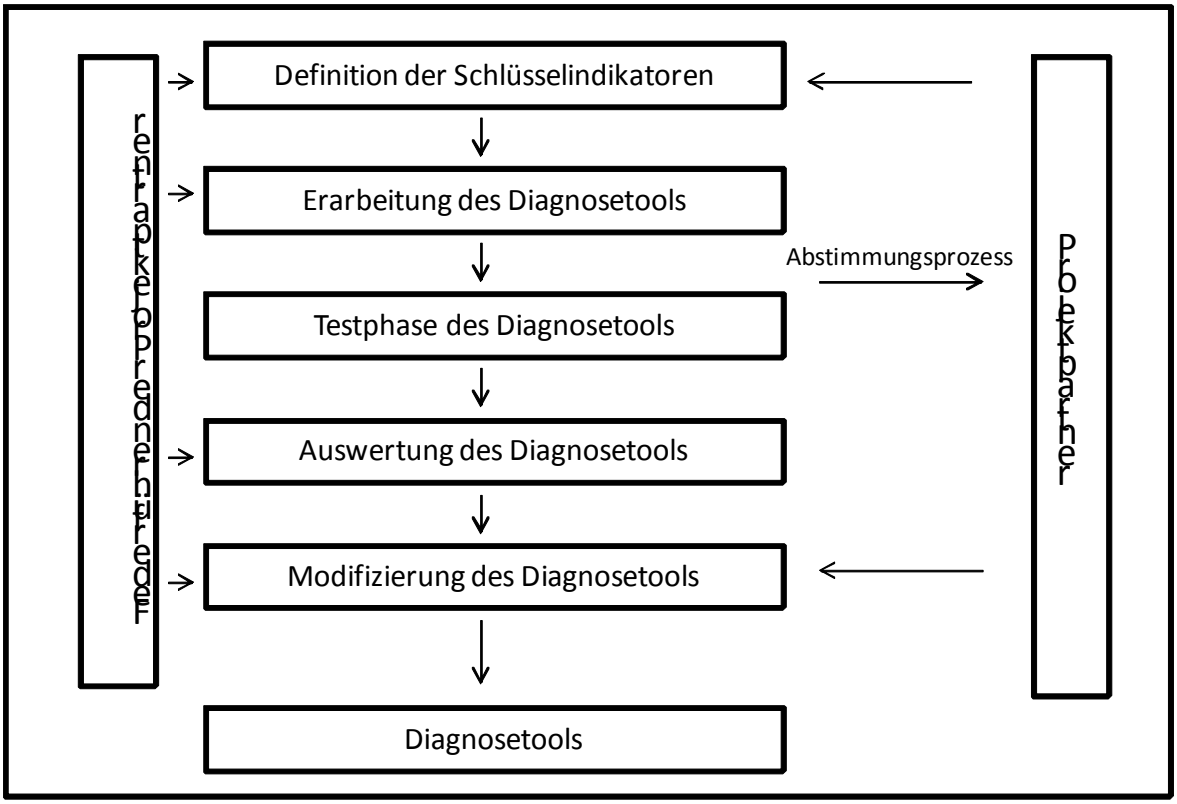

Fig. 1: Erarbeitungsprozess des Diagnosetools

Während des Entwicklungsprozesses zeigten sich ferner zwei Phänomene, die immer wieder das Anliegen eines neutralen und möglichst spektrenreichen Diagnosetools beeinflußten. Einerseits haben für die Projektpartner oftmals Indikatoren im Vordergrund gestanden, die in ihrem beruflichen Umfeld eine fundamentale Stellung einnehmen.[6] Anderseits haben die Projektpartner bereits Vorkenntnisse über die Testregionen und ihre Herausforderungen besessen, in denen das Diagnosetool getestet werden sollte. Diese Regionskenntnisse in Zusammenhang mit möglichen Problemen und Lösungsansätzen haben ebenfalls die Neutralität des Diagnosetools erschwert. Da es sich bei dem Diagnosetool um ein konsensuales Produkt handelt, spiegeln sich die aufgezeigten Phänomene teilweise wider. Ebenfalls erkennbar ist die starke Orientierung auf den Projekthintergrund. Die Fokussierung der innerstädtischen Entwicklung unter besonderer Berücksichtigung der lokalen Wirtschaft, wird beispielsweise darin deutlich, dass dem Einzelhandel und Tourismus mit einem eigenen Unterkapitel der gleiche Stellenwert eingeräumt wird, wie beispielsweise der Bevölkerungsentwicklung oder Wirtschaft.

Sprachliche Barrieren und ein vielfältiges Meinungsbild der Projektpartner haben zu einem längeren Abstimmungsprozess über die Schlüsselindikatoren sowie deren Kategoriesierung beigetragen.

Aus den Erfahrungen zur Entwicklung eines konsensualen Diagnosemodells in transnationaler Zusammenarbeit, lassen sich folgende Empfehlungen festhalten:

- Festlegung einer gemeinsamen Sprache: unklare, mehrdeutige Begriffe vermeiden bzw. in einem Glossar definieren;
- Kreis der beteiligten Personen möglichst überschaubar halten;
- Neutralität in den Köpfen der Beteiligten schaffen, d.h. Hintergrundwissen (problemorientiert, fachspezifisch) abstreifen;
- Nachvollziehbarkeit/Transparenz des Entwicklungsprozesses für alle Projektbeteiligten;
- Begleitung des Entwicklungsprozesses durch einen starken Moderator.

[6] Dieses Phänomen wird von Jung und Schönwandt in ihrem Aufsatz „problems first – eine Sichtweise von Planung und Flächenmanagement“ als die „professionelle Brille“ beschrieben.

3 ERSTE TESTERGEBNISSE

Das Diagnosemodell ist von zehn Pilotstädten in fünf europäischen Landern (Frankreich, Österreich, Italien, Slowenien und Deutschland) getestet worden. Nach dem Vorliegen der ersten Ergenisse, hat sich herausgestellt, dass einige der ausgewählten Indikatoren nicht die erwartete Aussagekraft besaßen. Dies ist zum Teil auf die unterschiedliche Datenlage sowie die Datenqualtät in den einzelnen Länder zurückzuführen.

Nach dem Testdurchlauf und dem Versuch die jeweiligen Testregionen untereinander zu vergleichen sind die Projektpartner zu dem Entschluss gekommen, dass das Diagnosetool entsprechend der Datenverfügbarkeit sowie der Aussagekraft der Indikatoren angepasst und modifiziert werden muss.

Es zeigten sich vor allem vier Hauptproblemfelder die jeweils auf individuelle Art gelöst werden mussten:

In einigen Bereichen sind Begriffe unterschiedlich von den Nutzern des Diagnosetools ausgelegt worden. So ist beispielsweise die Datenerhebung für die Agglomeration in den einzelnen Testregionen für unterschiedliche Flächenumgriffe erfasst worden. Während ein Teil der Partner die städtische Ebene als Grundlage verwendete, bezogen sich andere auf die Regionsebene. Nach Ansicht der Partnerschaft soll sich die Datenerhebung für die Agglomeration auf den metropolen Kern konzentrieren. Mittels einer genauen Definition unklarer Begriffe, können künftig solche Missverständnisse umgangen werden.

Einige Daten und Information sind mittels graphischer Darstellung erhoben worden (z.B. Pendlerströme mit Angaben der Pendlerzahlen). Für einen Teil der Nutzer gestaltete sich die graphische Darstellung schwierig, da entweder kein graphisches Material vorlag bzw. der Arbeitsaufwand zur Erstellung zu hoch gewesen wäre, oder die vorhandene Umsetzung der Datengrundlage in einer graphischen Darstellung keine bzw. nur eine geringe Aussagekraft besitzen würde. In diesen Fällen ist die graphische Darstellung um eine tabellarische Datenabfrage ergänzt worden.

Ausgewählte Indikatoren haben nicht die gewünschten Resultate bezüglich ihrer Aussagekraft erzielt. In diesen Fällen sind neue Indikatoren aufgestellt worden.

Ausgewählte Indikatoren haben in dem Diagnosetool keine Schlüsselfunktion übernommen. Diese, in Frage gestellten Indikatoren sind erneut mit den Projektpartnern diskutiert und abgestimmt worden. Entsprechend der Abstimmungsergebnisse sind die Indikatoren aus dem Diagnosetool entfernt bzw. beibehalten worden.

Im Anschluss ist das Diagnosetool gemäß dem Abstimmungsprozess modifiziert worden.[7]

Das Diagnosemodell muss sich erneut in der Praxis bewähren und gegebenfalls weiterhin überarbeitet werden. Als ein Ergebnis des Projektes InnoCité steht es künftig anderen kleinen und mittleren Städten als Instrument zur Verfügung.[8] Über Rückmeldungen, Anmerkungen und Erfahrungsberichte von weiteren Nutzern des Diagnosetools wären wir dankbar.

4 CONCLUSION

Das entwickelte Diagsnosemodell kann als ein Werkzeug für lokale Akteure und Entscheidungsträger der Stadt- und Regionalentwicklung gesehen werden, das die Stärken sowie die aktuellen und künftigen Herausforderungen für die Positionierung kleiner und mittlerer Städte stärker in das Bewusstsein der lokalen Akteure und Entscheidungsträger rückt. Die Sensibilisierung der Entscheidungsträger sowie das Erkennen von komplexen Zusammenhängen kann durch dieses Instrument gewährleistet werden, wenn sich der Nutzer über seine fachlichen Grenzen herauswagt. Nichtdestotrotz ist das bestehende Diagnosetool als „Prototyp“ zu begreifen, das im Rahmen weiterer Praxistests weiterentwickelt werden sollte. Ebenso müssen im Umgang mit diesem Instrument weitere Erfahrungen im Hinblick auf die Handhabung gesammelt werden. Zwar hat das Diagnosetool seinen ersten Testdurchlauf bestanden, dennoch bleibt offen, wie sich der Umgang von Projektexternen damit gestaltet. Ein weiterer notwendiger Schritt ist die Evaluierung, ob die Nutzer in der Lage sind die Ergebnisse des Diagnosetools zu interpretieren sowie die richtigen Schlussfolgerungen für eine zukunftsorientierte Entwicklung ihrer Kommunen zu ziehen oder ob es gegebenenfalls neben dem Hinweis zur Relevanz der Indikatoren weiterer Interpretationshilfen bedarf.

Im weiteren Projektverlauf von InnoCité werden Instrumente und Strategien entwickelt, die die Wettbewerbsfähigkeit der Testregionen fördern sollen. Diese knüpfen an den Ergebnissen des Diagnosetools

[7] Die dargelegten Änderungen sind bereits in der tabellarischen Abbildung der Indikatoren enthalten.
[8] Das Diagnosetool kann künftig unter www.innocite.eu downgeloaded werden.

sowie einer Stärken-.Schwächen-Analyse der Testregionen an. Unter Einbindung lokaler Schlüsselakteure werden diese Strategien und Instrumente in Form von Pilotprojekten getestet. Dabei stehen die nachhaltige Entwicklung der Untersuchungsräume sowie die Übertragbarkeit der entwickelten Strategien auf andere kleine und mittlere Städte im Vordergrund. Mittels eines partnerschaftlich erarbeiteten Evaluationssystems werden die Pilotprojekte von Beginn an begleitet und auf ihre Ergebnisse, bezüglich der lokalen Auswirkungen und den InnoCité-Zielsetzungen, überprüft. Den Abschluss des Projektes bildet ein „Handbuch“ für lokale Akteure und Entscheidungsträger der Stadt- und Regionalentwicklung, das sowohl Instrumente der Diagnose als auch innovative Lösungsansätze offeriert, um kleine und mittlere Städte hinsichtlich ihrer Attraktivität und Multifunktionalität zu positionieren.

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🏆 *reviewed paper*

Against the great divide between theory and practice: gated communities versus urban liveability

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ABSTRACT

The past few decades, have witnessed a theoretical transformation towards acheiving good urban form, which is mainly directed toward a more livable, sustainable, connected urban form. In practice, a reversed orientation toward gated communities and divided cities is taking place. Enclosed planned unit development (PUD) has been centers of concern for city planning and urban theory since the late nineteenth century. The relation between PUD and its contextual urban fabric is a preventive force toward a livable city form, a major part of the problem was the blurring of clear boundaries between settlements. This paper explores the differences and similarities between the contemporary theory of good community and the recent practice of gated communities in greater cairo region new towns. It also investigates how to develop lessons from history and theory to criticize and underpinning future practice of urban liveabilty in contemporary urban practice of gated communities?. It also explores systematically the ways in which these types of developments are collectively reshaping the public and private realms and accordingly shape the livability of the city at large, and wiith particular reference to the experience of a developing country like Cairo metropolitan area in Egypt.

Keywords: Theory versus practice - Gated versus open community - connected versus divided city- liveability - greater cairo region – Egypt

INTRODUCTION

Over the past few decades, Egypt like many other countries in the world, drawn in to a dramatic economic and social change toward free market economy. These changes lead to a transformation in the system of organization and governance and consequencly adabted policies that has reshaped development tools and methodologies and directed the trend of development toward the market privatization, and private sector control on development. This transformation occurred in all development branches, types, levels, especially in urban development.This process of privatization and orientation to private urban governance has begun to make its permanent impacts on the urban form and structure of greater cairo region, creating a new phenomena in micro scale known as gated communities, and in macro scale known as Divided City. this phenomena has reshaped the face of urban life and has a great influences on the evolution of metropolitan area in term of its form and structure causing in a harmful social, economical, cultural, urban effects, which exist in both micro and macro level, and has a harmful effect on urban sustainability and livability.

No doubt that future of Urban life is changing through some strong concepts. gated communities is one of these strong concepts that have the ability to make deeper changes in the built environments of liveability of the Egyptian city. Not only on micro level inside this communities but also on macro level for the entire city. While this is the reality of urban practice of gated communities in egypt, that brought different examples of divide unsustainable cities suffuring from loss of urban liviability. on the other hand, a reversed theoritical trend toward amore sustainable, healthy, and connected city has emerged. This paper, therfore, question whethere the new development pattern is good urban form than the traditional urban forms of egyptian cities and obey contemporary theory of good city form, Or not?. The answer seems yes, however, this is not actually true when looking on the overall macro urban form of these cities. The paper asumes that these new trends in developing new cities would create various urban, functional, social, and economical problems.

Government use of gated communities in Greater cairo region new towns, ignored the traditional princibles of cairo earlier stages urban development. and it ignored the vast amount of theoritical trends about sustainable, healthy, livable, and connected urban form. The matter that explore weakness of spatial stratigies, that adobted by egyptian government for new settelments in the overall point of veiw of the whole city livability, sustainability, social equity. Therfore This Paper Aims at exploring the differences and similarities between theory of good community and recent practice of gated communities in greater cairo region new towns, especially in the relation between city parts and the wholeeness of the city.

Besides, how to develop lesson from history and theory of good city form to criticize and underpinning future practice of urban liveabilty in contemporary urban practice of gated communities?. This research explores systematically the ways in which these types of developments are collectively reshaping the public and private realms and accordingly shape the livability of the city at large, with particular reference to Greater cairo region new towns. getting better understanding of the production of egyptin suburbans new towns, which central on gated communities as a dominant residential morphology in suburban landscape. Stressing the issue of efficiency of public authorities in understanding and directing this phenomena to conferm urban development through a comparison with contemporary theoritecal orientation.

METHODOLOGY

In order to answer these questions, the study first need to define communities in its relation to the city, then compare between open and gated communitie in its relation to the city. Second, study theiories to rediscover the traditional and theoritical relationship between micro and macro city urban form. third, to define the extent to which the urban form in the new cities has been distorted. Thus, answering these queries may be achieved by using documentation and reviewing the literature that touched this echo in historical traditional egyptian city, and theoritical classical and contemporary theories of good city form. Yet, identifying the sustainability, continuity, integrity of the current or future urban form in the new Egyptian cities and indicating the role of internal external relationship open or gated on their liveability are not well covered in academia.

GATED COMMUNITIES AND THE CITY

For the porpose of this paper, we used England Newhorizon project defenition of gated communities:

Walled or fenced housing developments to which public access is restricted, often guarded using CCTV and/or security personnel, and usually characterized by legal agreements (tenancy or leasehold) which tie the residents to a common code of conduct. (Atkinson, R., Blandy, S., Flint, J. and Lister, D. (2004))

Gated communities as a pattern of urban development are physically separate a specific area from its context and create areas that are restricts access inside urban fabric. These patterns of planned unit development have reshaped the relation between micro and macro scale urban product behavior, and have isolated itself out from the overall image of the city, the matter that affected the public life in modern Egyptian cities.

This change in its relation with the city have not only affected the micro urban fabric inside these communities, but also affected the overall patten of the city fabric, that Change macro pattern of the city from connected one to a divided one. Gated communities have affected the overall pattern of development creating city of walls, which lead to a transformation of the urban form that shape the built environment surrounding human live inside the city changing it to merely some zones and walls, that motor paths have penetrated it. Which draws a Frustrating picture for society Caged inside the walls, its parts has been divided from each other and away from the overall image of the city. Gated comunities and its relation to the city, necessitate a theoritical need to discover and explore the relation between micro and macro urban form, what is the need for micro urban form to have a connection and relation with its outer context and the city? what is the need of the city to have its parts to be connected?.

6 A NEED TO A THEORY FOR MICRO-MACRO RELATIONSHIP BEHAVIOUR

In this part a theoritical comparison between both gated and oped urban patten in both way of creating relation with its broader city is Conducted. An analysis through physical, functional, economic, and social interaction should be redicovered. Through three levels: first nature of gated development versus open development, second micro-macro relationship for both cases, finaly, nature of divided patterns versus connected one.

6.1 Nature of gated development versus open development

Throgh analysis its apparent that gated communities usualy try to isolate itself out from its broader city context, so they use lolibobos and col-de-sac as a common tree street pattern. This pattern decreases connectedness and increase isolation from every thing else. while, in the oposite, open communities, usualy try to connect itself with its broader city fabric, so it uses grided and radial as a common network pattern. This pattern increase conectivity and continuity with its broader urban fabric. Increasing relation and

corelation with its context. Gated communities reinforce the splintering of communities with social separation and physical walls Fig. (1). In the suburbs gates are the logical extension of the original "suburban" drive. In the city, gates and barricades are also sometimes called "cul-de-sacization" – a term that reflects the design goal to create out of the existing urban grid a street pattern as close to the suburbs as possible, with the added benefits of control and privacy as well (Blakely and Snyder1998).

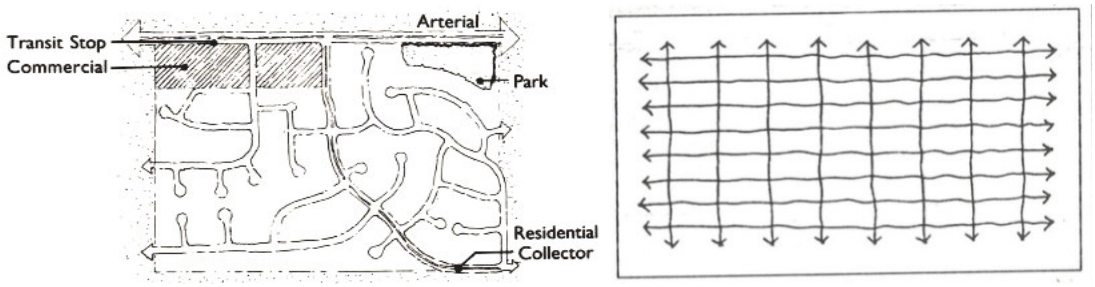


Fig. 1: comparison between grided versus treed street network pattern: Left: Laddered street system. Right: Gridded street system.

Peter Calthorpe, a new urbanist cited that gated communities Physically denotes the separation, and sadly the fear, that has become the subtext of a country once founded on differences and tolerance. Politically it expresses the desire to privatize, cutting back the responsibilities of government to provide services for all and replacing it with private and focused institutions: private schools, private recreation, private parks, private roads, even quasi-private governments. Socially, the house fortress represents a self-fulfilling prophecy. The more isolated people become and the less they share with others unlike themselves, the more they do have to fear. To this extent privatization is a powerful force in the marketplace that directs the home building industry and our land use patterns (Calthorpe, 1993).

Nature of micro-macro relationship of gated development versus open development

Through the formulation of internal pattern, gated or open community interact with its neighbours and with its brouader city. A relation between the new development and its existing context determine its way of social, economical, political, and functional interaction.

Internal pattern of street network and its relation to external surounding discourge or promotoe connectivity and accssibility. Street network blends with adjacent network Fig. (2).Open development Is physicaly connected to each other, so it characterizes in micro level by encourging community, connectedness and integration, foucsing on public releam. While in macro level enable accissilbility, permiability and continuity in the overal urban fabric Fig. (3-a).While gated development is physicaly restricted and isolated from each other and from the overall image of the city, encourge some internal features on the expense of other coasts on macro level. Encourge segregation, not only urban put also functional, social and economical segregation, focusing on the pot-public space features Fig. (3-b).

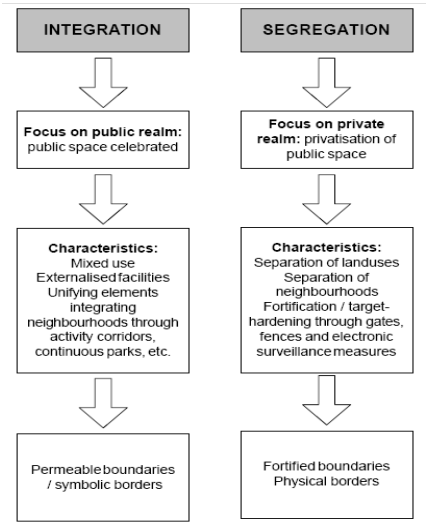


Fig. 2: Application and outcome of integration and segregation approaches to urban design (landman 2006)

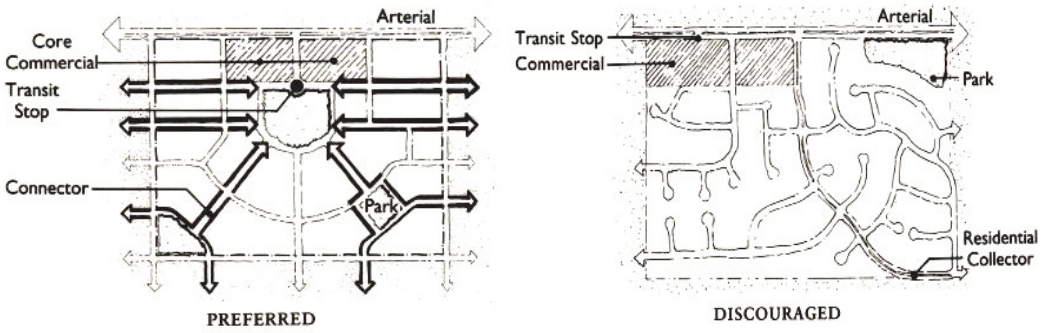


Fig. 3: comparison between gated and open development. Left (A): open communities. Right (B): gated communities.

Nature of divide city development versus connected city development

Private sector through the practicing of gated communities, witnesed a transformation in the structure of city form public road network to a structure of super-block.

Fig. 4: Transformed urban fabric on micro internal scale. Left: Proposed public road network and urban form In new Cairo city macro urban fabric. Right: Transformed road network and urban form In new Cairo city, from public fine grain to a gross urban fabric and a structure of super-blocks

By closing off a large number of neighbourhoods, the existing urban form and road network, are severely affected and transformed. Large areas are now changed into isolated and inaccessible super-blocks, with little resemblance to the original fine-grained urban form. Through-traffic is also limited to a few major arterials that often lead to increase congestion and travel times (Karina landman, 2004). A macro pattern appeared on macro level, divided city, or city of walls Fig. (5).

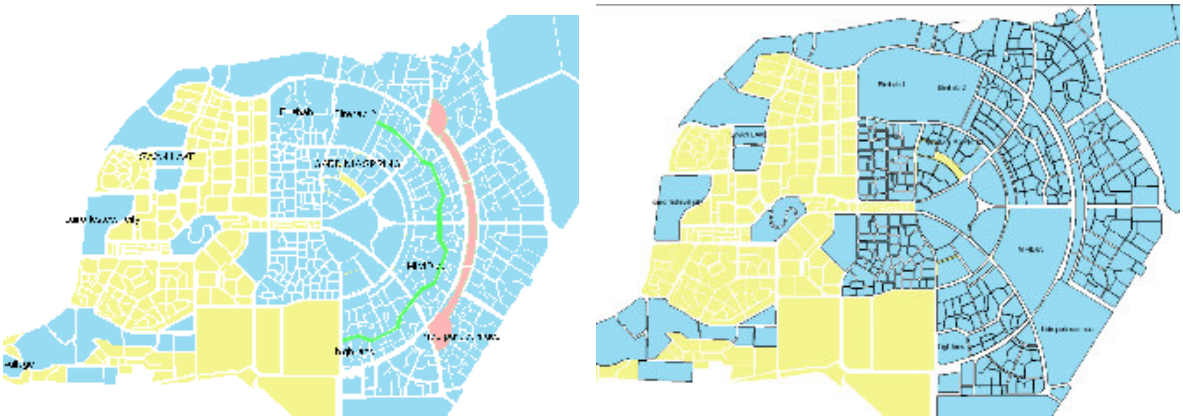


Fig. 5: Transformed urban fabric on macro scale (from connected city to divided city)

This physically separates the specific area from its surrounding environment. It also creates zones or pockets of no/restricted access within the urban fabric, leading to a very coarse grain. In addition, it forces travelers, both motorists and pedestrians, to take an alternative route, hich in many cases can prove to be much longer and more time-consuming. Gated communities, therefore, not only have an impact on the daily activity patterns of people, but also on the urban form and functioning.

CONNECTED CITY AND URBAN LIVIEABILITY

A city's life comes from its connectivity (Dupuy, 1991), Urban connectivity, permeability, integrity are a major echoes in formulating urban liveability. A livable city has to exert a degree of visual, geometrical, functional and path connections. Gated communities a new development pattern has destructed the relation between different parts of the city, destroying the concept of permeability and connectivity, hence remove the liveability from our city Fig. (4).

While Nikos A. Salingaros see that the degree of "life" in a city or region of a city is tied to the complexity of visual, geometrical, and path connections. There is an optimal distribution of connection lengths in a living city, and violating this distribution removes life from the urban environment. Alternative parcellations of a living city reveal the complex structure that is required to generate human contact, which is the basis for city life.(Salingaros 2003).

Gated communities create inaccessibile areas inside urban fabric, reducing the degree to which"ability to access" and possible benefit of services, amenities and urban environment is accessible by as many people as possible. Gated communities creates restrected inaccessibile areas increase the extent to which urban forms restrict movement of people or vehicles in different directions, severing neighbourhoods, reducing Permeability.which discourage movement on foot and encourage longer journeys by car. Street networks should in general be connected. Connected or ‘permeable’ networks encourage walking and cycling and make places easier to navigate through.

gated communities isolate its residents away from every thing, to go any where one must leaf and get out the gate and go on collector road its boundaries just a wall, which pedestrian walks are long, inconvenenient and unsafe, so residents should have there cars for any daily needs increasing car dependency, And generate traffic cognition in the outer city that should harmful to sustainability. Which affect movement pattern of all community in the city, Walking or bycing in the city, become a big problem, to walk from a point to another it talks to longer pathes which consumes more distance and time. Even all passes turned into artaeil roads that donont have any use, only some fences which increae street criminality and reduce sence of safty, hence discourge walkabilbility.

focusing on the development of public transportation as one of the determining element of the sustainable, liveable city, Public transportation, need connected permiable street network, and need accessbility to bus stop isnide these gated gcommunities, which is not acceptable, hence public transportation is not practicale transportation option. Only private car is the available way for moving inside the city, no walking, bycing or public or any alternative transportation options, Only private car.

Gated communities has a big role in reshaping urban life, rather than encourage connectivity and continuity, public rights to reach services amenities and urban space, street liveability, pedestrian, pickles and car alternatives’ and so Support public life in the city, and enforce sence of community. on the contrary, it showed a lot of harmful bad effects not only on the direct environment, but also in the overall image of the city, it impacts city attractiveness, sustainability, continuity, liveability. This would affect social behaviour in new cairo "When people or entire communities turn inward, it forces people to lose a sense of responsibility to their city or region" (Lang and denudes, 1997), “which in the long term threatens values of democracy diversity, class, mobility, and racial integration” Low (2001).

THEORIZING THE MICRO MACRO RELATIONSHIP:

The relation between parts of the city and the overall city is a critical echo in post modern city liveability. Accordingly, Internal external relationship behavior should be discovered. A comparison between classical and contemporary theories of good communities in one hand, and practice of gated communities in the other hand could help to discover this relationship.

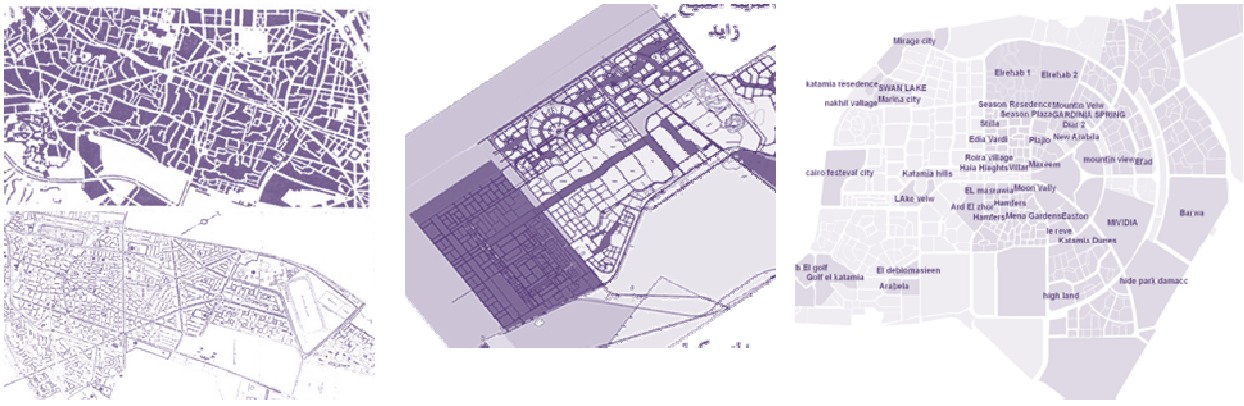
Historical prespective of micro-macro relationship in Egyptian urban form

Looking for typical egyptian city urban form, reveals that a connected pattern is the common form for all historical stages .Throgh history of cairo physical urban form, reminds us of connectivity, permiability, overal socity and community. These characteristics structured the relationship between micro and macro urban form has not seen such a clear division, in historical periods, this type of relationship have witnessed overlay, overlap, connectivity and integration between the micro and macro urban form led to the secretion

pattern of connected cities. This period witnesed practice of gating as a tool for defending against anmies but An important characteristic of these walled cities was that the wall enclosed the entire town or village and therefore served to enhance and emphasize a sense of unity Fig. (7-a).

But as a reaction to modernism which left important marks on our cities, through the evolution in science of roads, and a change to separate land usage patterns, zoning planning depend on a clear separation of land use, urban intensification of densities, modernism recall image of construction, society, community, permanency, and similarity. All were motivated to start thinking about changing this relationship and emerging trend toward neighbourhood implementation. The first half of the twentieth century, have witnesed the first change in the relationship between the micro and macro urban form of the city Fig. (7-b).

In contrast, post modernism lead to deconstruction, ethnicity, locality, pluralism, and diversity. Contemporary cities confronted with a process of privatization of there space. a new stratigies of urban development in zonning depending on planned unit development, reftected contemporary trends in neoliberal deregulatory policy, and contemporary socital change, toward elitism, exclusivity, social class, fear of crime and desire to be protected. This changes lead to loss of public spaces, sence of communitiy, belonging and identity. As a response for all this, developers sought to produce divide urban development units, that seprated totally from the city. Which extends the concept of separation between micro and macro urban form in the city Fig. (7-c).



A: Traditional gridded pattern B: Modern pattern (6 October) C: Post modern post public pattern

Fig. 7: A change from public highly connected micro urban pattern of historic gridded connected towns vs. recent divided postpublic suburban forms of divided city

These recent Change in micro macro relationship of urban form threatened some concepts of good city form like integration, social justice, urban coherence, sense of community, sense of belonging, and public releam. This relation would be discoverd Through a comparison between theoretical classical and contemporary good city form theories, with the reality of practicing gated communities, with particular reference to the role of government in shapeing the practice of this phenomena.

Theoretical perspective:

After discussing the historical prespective of the relation and interaction between micro-macro context in cairo traditional stages of urban development, a theoritecal study through classical theory of good city form of Christopher Alexander (city is not a tree), Kevin lynch (theory of good city form), Jane Jacobs (death and life of great American city), and contemporary theory of good city form of new urbanism, smart growth, livable city, sustainable urban development, should be explored in its veiw to the internal external relationhip.

6.1.1 Classical theory:

Jan Jacobs in The Death and Life of Great American City cited that "Neighborhoods that worked best had no beginnings or ends. A major part of their success depends on their overlapping and interweaving"(Jacobs ,1961). While Kevin lynch in Good City Form cited that "Planning a city as a serious of neighborhoods was either futile or would support social segregation, because any good city has a continuous fabric rather than a

cellular one" (lynch 1980), he stressed on vitality, sense, fit, access, effeciency and justice(lynch1981). He stresses how to make livable environments function at various scales in the city(lynch 1984).

While christopher Alexander cited that City is not a tree “A living city is modeled by a mathematical semi lattice, in contrast to a dead city, which is modeled by a tree. A semi lattice has a vastly larger number of internal connections than a tree of comparable size has. Not only are there many connections in a semi lattice, but there is a great variety of them; by contrast, trees have unique connections. To be liveable, we must advocates a return to more traditional and natural states of place-creation, aplace must generate a sense of belonging in its users, participatory, self-created.

6.1.2 Contemporary theory

International scientific and practical organizations and design movements have published its manifestos and conferences to shape practical theories about good and livable communities, A Livable City, New Urbanism, Smart Growth, and Sustainable Urban Form.

New urbanism, has pointed out the many ways that gated communities are flawed. To many proponents of New urbanism, gated communities are the antithesis of their vision. The principles of New Urbanism range from a single building to an entire community, and strive to build communities that are public, interconnected, promote mixed-use developments with a range of housing types, has a network of mass transportation and pedestrian-friendly designs, and is sustainable over time.

New urbanists see gated communities as enclaves that shut the city out. And therefore as anathema. While new urbanism advocates diversity and mixing, gated communities’ projects promise homogeneity and separate residential uses behind aviel of privilege (Grant ,2003).

Peter Calthorpe, a new urbanist claims that gated communities are manifestations of the growing imbalance between public and private space in American cities and suburbs: The gated community is perhaps the most blatant and literal expression of the trend [toward increased private space and the disappearance of public space]. (Calthorpe, 1993). The key-differentiating element between New Urbanism and gated communitiy is the emphasis on public space. Residential interaction is promoted by having more venues for social contact. In other words, interaction enables people to build communities, to commit themselves to each other, and to “knit the social fabric” (Beem, 1999). Gary Pivo, an urban planning professor at the University of Arizona, argues that when people or entire communities turn inward, it forces people to lose a sense of responsibility to their city or region (Lang and Danielsen, 1997), which in the long run threatens American values of democracy, diversity, class, mobility, and racial integration (Low, 2001).

Amirican institute of architects (AIA) cited that gated communities as much as harmfull to liveability in the city. It developed 10 criteria for livable communities which is encorging the mixed use development, Three of the ten principles are as follows: First, encourage mixed-use developments: Integrating different land uses and varied building type create vibrant, pedestrian friendly and diverse communities. Second, use vary transportation options of walking, biking and using public transportation, in addition to driving, reduces traffic congestion, protects the environment and encourages physical activity. Third, build vibrant public spaces to stimulate face-to-face interaction, collectively and mourn, encourage civic participation, admire public art, and gather for public events.

International making cityies livable (IMCL) conference established by suzanne crowhurst- lennard and henry linnard in 1985 in vinice to disscus ideas a bout livable places. This conference put Principle of (IMCL) for liveability are found in concept of traditional urbans, with particular reference and emphasis on the city as aholistic social entity, that requires a network of phyical meeting groups to encourge people to communicate, learn from each other, and enjoy the public life of the city. Sustainable design strives for compact development, environmental protection, citizen participation, equal access to services, concern for all members of the community, public spaces to bring people together, and architecture and zoning that promotes a sense of place.

All these trends streeses new development, First: to include mix of uses, to create a livable urban city. Second: encourage Social Interaction by including mix of housing levels, Pedestrian circulation, Traffic calming, Sheltered space for public interaction. Third: encourge variable alternative transportation options, to reduce car dependency and increase urban livability and sustainability. Fourth: increase public urban space, that increase urban, functional, social, political connectivity. Through this analytical comparative study,

between theory of good city form and practice of gated city form, its clear that, Gated communities stand short when measured to these good city form principles. On the conturary, gated communities is single use, eliminate public life from the city, dicourge transportation altarnatives, depend completely on motor car for every day needs, do no encourage civic participation, are not accessible, and fail to be diverse. so it is harmful to urban livability, connectivity, sustainability of our cities.

Key Echoes on the Relation between Micro Macro Relationships:

Through historical and theoretical analysis of micro-macro relationship. Gated community's highlighted many debatable echoes between internal urban pattern and external urban fabric, on social, economic, urban and functional levels:

- Debate on Sense of community, gated communities stressed the micro sense of community on the expenses of sense of being part of bigger community of the city.
- Debate on Safety security, gated communities stressed the micro internal safety on the expense of safety of the bigger community of the city.
- Debate on urban sustainability, gated communities strives for internal sustainability on the coast of external overall sustainability.
- Debate on Urban liveability, gated communities increased internal urban liveability on the expense of macro city liveability which transformed into merely continuous set of walls, have no life.
- Debate on Functionality, gated communities converted the city into a large number of clubs that are restricted to its residents, no public access to services or urban space. And which accumulatively affect the overall functionality of the city.
- Debate on Social relations, gates stress social cohesion on the cost of large social division.
- Debate between internal accessibility and external permeability on the coast of external division.
- Debate between internal multi-activity and external no activity.

7 LOCAL CONTEXT

Egypt has transformed its economy to a free market economy (Bayoumi 2009). the government followed laissez-faire policy (Bayoumi 2009) where the private companies put forward their design principles and ploy governmental regulations. The government sold large portions of public desert land to real estate developers to finance housing development(Khalil 2007), leaving the arena of developing these towns in the hands of private developers (Bayoumi 2009; Stewart 1996; Stewart et al. 2004). The new satellite cities around Greater Cairo, therefore, are now home to a growing number of resorts, golf courses, theme parks and amusement parks that offer tremendous entertainment facilities (Saoud 2002). The construction of privately planned gated communities has become a mass trend in new town urban developments on the outskirts of the Greater Cairo Region since the mid 1990s. They contribute to reshape the suburban landscape of GCR's new towns (Meyer 2000). Figure (8) shows the magnitude of this flourishing phenomenon(Yosry 2009).

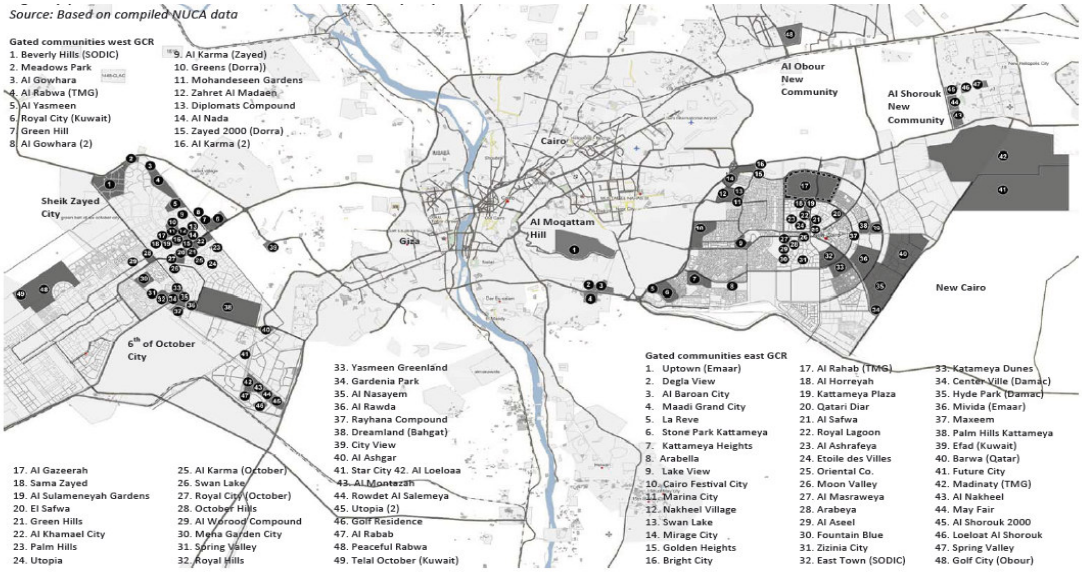


Fig. 8:Gated communities flourishing in GCR, source(yosry 2009)

7.1 Tracing gated developmental on plans of New Cairo city and impacts of urban livability

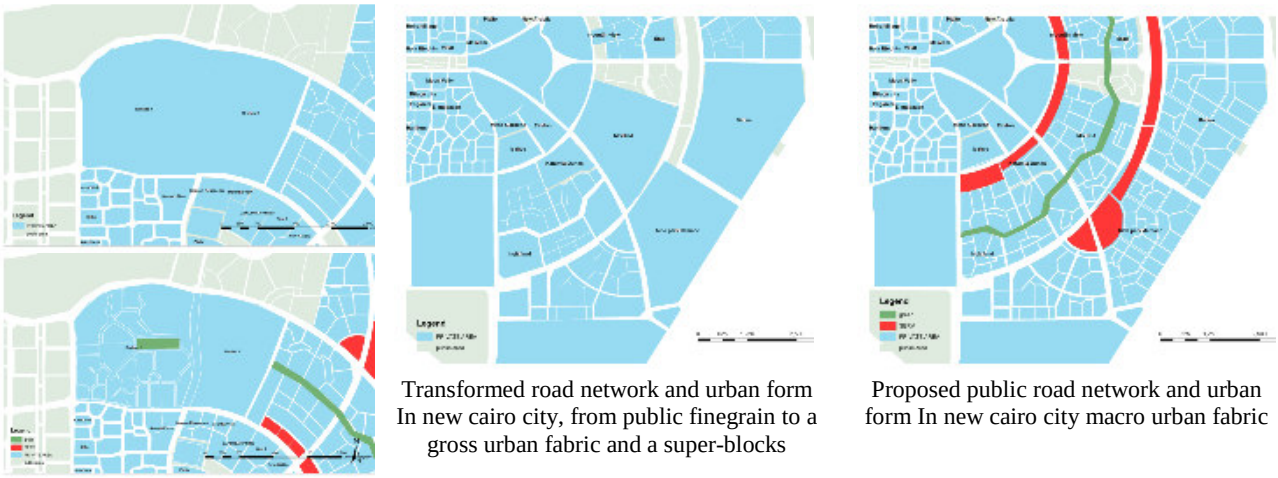
New Cairo city one of GCR new towns, has developed accumulatively on inconsistency manner in five different sequential master plans at 1985, 1995, 1999, 2001 and 2007, respectively (wael fahmy2009). last stages, reflected market driven forces, and flurishing of gated privatized areas. Planning polices and master plans, leading to dividing urban form and massive trend to enclosing large areas of land inside the city creating city of walls. This has bad effects on the liveability of the city. Isolating public streets from its life, and converting it to merely some zones and walls, that motor paths have penetrated it. Which draws a Frustrating picture for society Caged inside the walls, its parts has been divided from each other and away from the overall image of the city.

Fig. (6): Contemporary image of New Cairo city, (city of wall).

7.2 Planning response

A local authoritization trend shaowed some kind of un awareness of this effects on the city, the municipalitie, did not have a specific policy in dealing with this phenomena, especially land subdivition and

master plan approval. It didn't have a development control to control these phenomena for the sack of total development. It showed the lack of awareness of physical pattern and its consequences on the city.



Transformed road network and urban form In new cairo city, from public finegrain to a gross urban fabric and a super-blocks

Proposed public road network and urban form In new cairo city macro urban fabric

Fig 10: Transformed urban fabric in micro internal scale

many transformations have been done without coution to its effects, the government obayed developers pressure allowing him to make changes in urban fabric, changing its urban form and structure, for example el rehab 1&2 have been combined and gated area increased, also many projects like barwam mividia and hyde park increasing what is proposed in previous developed master plans. This change transformed urban fabric of new cairo city from public road network to a structure of super-block. Government have big role in the developing of this phenomena, rather than encouraging the new development to be part of the overall image of the society it increases fragmentation, and hence affect the public life in the city.

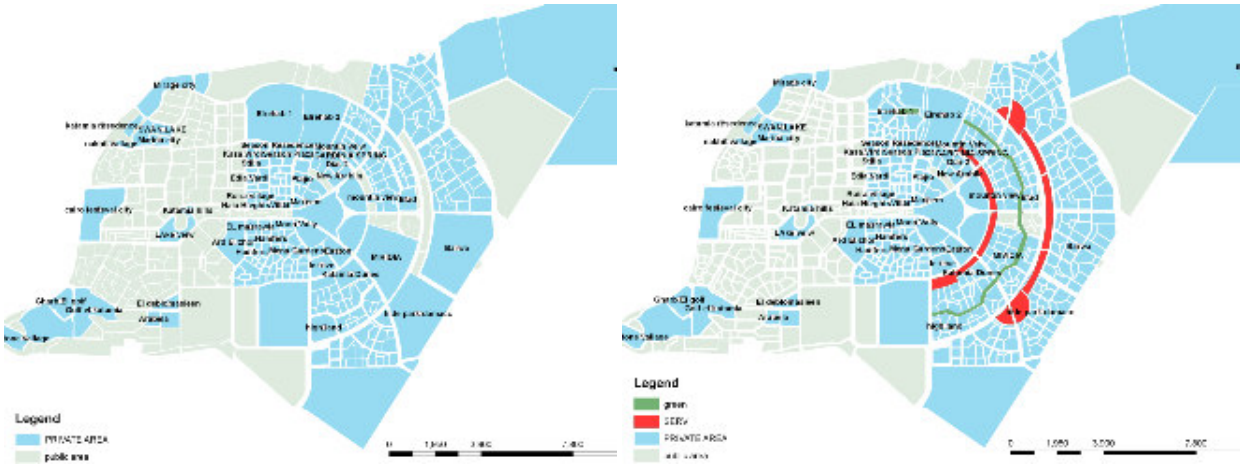


Fig 11: Authorities didnot has any strict strategy to deal with this development pattern, Transformed urban fabric in macro internal scale (from connected city to divided city)

CONCLUSION

Gated community generally and especially in Egypt, witnessed a great division between theory and practice, this division existed in the relation between gated communities and the overall city. Practicing Gated communities witnessed a second division, stressing the micro needs on the expense of greater macro effects on the overall city.

Throgh This study it is apparent that gated communities is not a holistic approach to community growth and can elminate public life, sustainability, integrity, continuity patterns of development. There is a need to reconnect the city for the good of connected, livable, sustainable city for every one. There is a need to find the connection between theory of good city form and practice of gated city form.

Practice of gated communitites	**Theory of good communities**
concern for ellite members of the community	concern for all members of the community
Single separate use development	strives for compact mixed development
lack transportation options (only private car)	Strives for alternative transportation options
Unconnected un permiable urban life	Connected permiable urban life
Walls and fences	Environmental protection
Do not encourage civic participation	Citizen participation
Not accessible	Equal access to services
Post public spaces elminated the public life	public spaces to bring people together
Just walls that shape public urban life	Architecture and zoning promotes a sense of place

City liveability against gated communities is one of the most important goals a state can seek. There is no single strategy to achieve this result. Rather, an interlocking set of initiatives in areas such as integration, accessibility, mixed land uses; environmental quality, diverse housing types, and boundary urban design can help promote livable internal external communities. Meeting livability needs will require the state's governmental jurisdictions, political leaders and businesses to move beyond individualism and self-interest to seek common goals and take collective action.

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Albania in Transition: International Assistance for Roads but not Public Transport

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1 ABSTRACT

It is well known that international financing of enormous road projects in developing countries, justified primarily on "economic" grounds, has fueled the rapid growth in private automobile use with grave environmental consequences. During the transition to a market economy after the fall of communism, Albania has been the recipient of substantial amounts of foreign assistance in the transport sector, which has taken two forms in the capital, Tirana: (1) Technical assistance and funding for the preparation of numerous urban transportation plans and studies, mostly by foreign consultants (2) Financial aid for the implementation of various road infrastructure projects but not for public transport. This paper reviews the outcomes of this assistance.

2 INTRODUCTION

It is well known that international financing of enormous road projects in developing countries, justified primarily on "economic" grounds, has fueled the rapid growth in private automobile use with grave environmental consequences (see Hook 1994; Gutner 2002). While the World Bank's (2007) self-evaluation of the assistance to the transport sector during 1995-2005 concluded that past performance has been effective especially for intercity highway construction and rehabilitation, it also concluded that in the future transport lending must focus on issues such as traffic congestion, environmental damages, safety, efficiency, and affordability.

In the case of Albania, during communism (1944-1990) private car ownership was forbidden and public transport was poor. As of 1990, Tirana, Albania's capital, was a very compact and flat city with a population of 300,000. Its streets were virtually free of motorized vehicles and most travel was on foot and by bicycle. Buses, which were the only form of public urban transport, were used for voyages that would have required more than one half hour of walking. There were no intercity highways and travel around the country was very slow.

Since 1990, Tirana experienced a population explosion to well over 800,000, owing to rural-urban migration, and now contains almost one third of Albania's population. In this process, a dual city was formed, with the inner city becoming much denser and taller and the peripheries expanding in all directions with squatter settlements, almost entirely devoid of infrastructure. In addition, big box retail and light industrial sprawl emerged along the main intercity roads. During this period, car ownership skyrocketed. Now approximately two thirds of the households in the inner city own a car, but substantial portion of households that own cars limit their use to recreational travel on weekends. Tirana has been transformed into a city choked with automobile traffic and pollution and treacherous pedestrian conditions. Bicycle use has been reduced to a minuscule level and is perilous. However, most daily travel is still on foot and the main mode of motorized travel is still by bus (Figure 1 and 2).

Fig. 1: Traffic jams in Tirana's central area.

Fig. 2: Buses stuck in traffic in Tirana.

During the transition, Albania has been the recipient of substantial amounts of foreign assistance in the transport sector, which has taken two forms in Tirana: (1) Technical assistance and funding for the preparation of numerous urban transportation plans and studies, mostly by foreign consultants (2) Financial aid for the implementation of various road infrastructure projects but not for public transport.

Most donors' funds in the 1990s were allocated for intercity infrastructure because the national road network was in worse conditions than the urban road network (World Bank 2004). One consulting team reported that up to that time investments in urban road infrastructure had corresponded to the typical level of low-income countries in Southeast Asia and sub-Saharan Africa (PADCO 2002). Meanwhile, government operational subsidies to the public bus company ranged from $500,000 to more than $1 million per year representing 30-50% of its income (TECNIC and Transurb 2000).

Since 2000, the local government income in Tirana has increased considerably. In addition, large earmarked grants and credits were received from foreign donors. As a result, substantial urban improvement projects have taken place in the last decade. However, the bulk of transport investments has been for roads. At the same time public bus lines in Tirana (with one exception) were privatized (by Albanian companies) and subsidies for public transport are now limited $200,000 year for the one remaining publicly-owned line. Overall, the locally-based subsidies for public transport have been tiny relative to the substantial international funds, which have been allocated for road infrastructure (see Table 1 and Chart 1).

	Allocated Funds Yearly Average (1996-2000)*
Sidewalk repairs	$13,818
Traffic signs and signals	$314,000 (1998)** $23,000 (2000)
Road maintenance/repair	$1,089,682 (average) $71,800 - $2,075,000 (range)
Public works total (including road and sidewalk repairs and traffic signs and signals)	$5,320,000
Public transport	$760,000
Other (including trade, culture, administration, public health, education)	$12,920,600
Total average yearly budget 1996-2000	$19,000,000

*100 Lek ~ 65 US cents (2000 exchange rate)

** Including the establishment of a traffic signals enterprise

Source: City of Tirana, reported in T.E.C.N.I.C. and Transurb 2000.

Table 1. City of Tirana budget, 1996-2000.

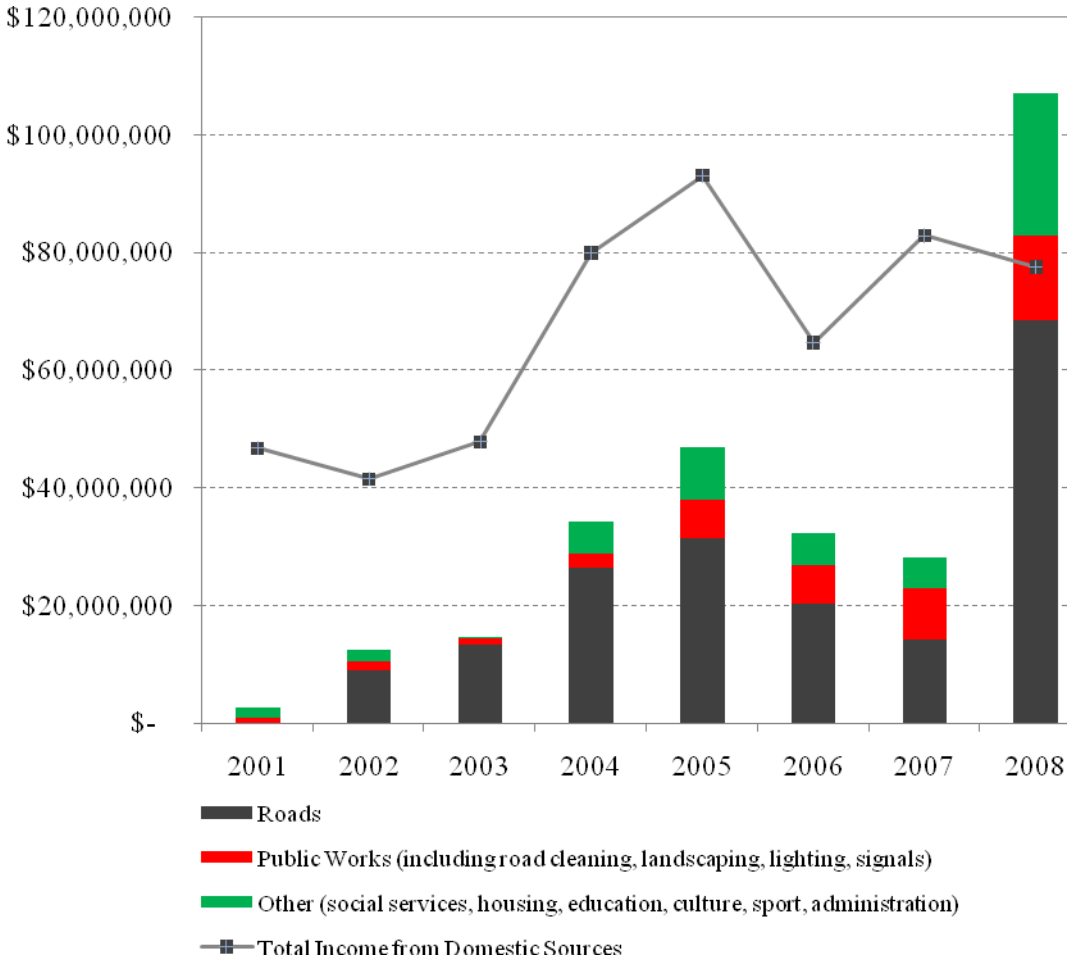

Chart 1: City of Tirana budget 2001-2008.

3 FOREIGN TECHNICAL ASSISTANCE AND FUNDING FOR PLANS AND STUDIES

Since the beginning of the transition, foreign donors have funded no less than ten urban transport plans and studies for Tirana, prepared mainly by foreign consultants (in some cases invited by the City, in others hired directly by the donor organization). In most cases, the principal recommendation of these studies was to strengthen the public transport sector.

- In 1993-1995, a Brussels-based transportation planning firm, Transurb Consult (now Transurb Technirail), prepared a study on the reorganization of the public bus system in Tirana, funded by the European Commission PHARE program.
- In 1995, Regional Consulting, a Vienna-based urban planning firm funded by the Austrian government, prepared a master plan for Tirana, which contained a large transport element.
- In 1997-1999, the French transportation company CGEA (now part of Veolia Transport) funded by the European Commission PHARE program, led a technical assistance program in Tirana, which sought to help transfer institutional and financial authority for public transport from the central government to the City of Tirana.
- In 2000, T.E.C.N.I.C. Consulting Engineers, a Rome-based firm, and Transurb Consult prepared a large comprehensive transport study for Tirana (TUTIS), funded by the World Bank.
- In 2005, AlbanianTech Project (an Italian-Albanian cooperation) funded by the United Nations Development Program prepared an urban development strategy, which included a number of transport recommendations for Tirana.
- In 2006, Peter Guest, a British parking consultant, prepared a detailed parking study for Tirana.
- In 2007, an Albanian urban planning non-profit organization, CoPlan, carried out a comprehensive study of public transportation services in the Tirana metropolitan area, funded by the SOROS foundation.
- In 2007, the European Commission and FIAB, an association of bicyclists in Bari, Italy, provided 166,700 Euro for a one year training program in transportation planning for the City of Tirana staff, in the framework of the MO.S.T. Programme for sustainable mobility
- In 2008, the Albanian chapter of an international non-profit environmental organization, the Environmental Center for Administration and Technology (ECAT) in collaboration with a German consultant (Rainer Graichen), prepared a new “sustainable urban transportation study”, funded by the EU LIFE program, the German Ministry of the Environment, and the European Bank for Reconstruction and Development (almost 300,000 Euro).
- In 2008, in the framework of the New Neighbohood Programme Italy-Albania Interreg/Cards 2004-2006, the Transportation department of the Polytechnic University of Bari in Italy, in collaboration with several Albanian partners, prepared a study on the future sustainable planning of urban transport in Tirana, focusing on the optimal positioning of an intercity bus station.
- The World Bank and the Dutch government offered $1.7 million (credit) and $1.5 million (grant) respectively for the preparation of the Tirana Regulatory Plan, which is currently (early 2010) awaiting approval. The regulatory plan was prepared by a Swiss company, Urbaplan, and CoPlan.
- This year (2010) the City of Tirana will release for public review a new “Masterplan for Sustainable Urban Transport Development” that, in the next twenty years would create 100 km of new segregtated public transport lanes, including about 20 km of at-grade tram lanes, as well as introduce many innovative traffic management devices. The details on costs, consultants, and funding sources have not been made public yet.

These studies contained detailed recommendations. Some of earlier studies focused on the reduction of government subsidies in the public transport sector, through the gradual introduction of competitive mechanisms and, eventually, full privatization, with the City acting as a monitoring authority. Consultants also provided assistance in drafting contracts between the City and private operators and standardizing financial and audit procedures. Other regulatory and institutional reforms in the public bus sector were also proposed, including the creation of local and/or regional bus transport associations or agencies in charge of service coordination and the increase and/or liberalization of public transport fares. Several studies proposed

the introduction of pricing mechanisms in urban transport, such as the application of parking charges in main streets and in residential neighborhoods. The 2006 study by Peter Guest, in particular, provided detailed guidelines in this respect, based on the example of other European countries.

In addition, the studies also made many recommendations for physical interventions, with the purpose of supporting public transport and non-motorized modes, the principal of which was the creation of exclusive bus lanes, starting with heavily used corridors such as the Ring Road and the main Boulevard and creation of exclusive pedestrian areas in the center. The 2008 sustainable urban transportation study, in particular, was a strong proponent of the creation of a Bus Rapid Transit system in Tirana (25.3 km at first and another 12.2 km in a later stage, with an estimated total cost of 97 million Euro). A few studies mentioned the introduction of light-rail in the main urban corridors and in corridors leading to the newly formed suburbs.

These plans and studies provided valuable recommendations on sustainable transport development, consistent with international concepts. However, in large part the studies mainly reiterated what had been set forth in earlier studies and most of them were not implemented (Punavija 2008). In most cases, funding was secured only to prepare the studies, with no provisions for implementation.

Some studies focused on road improvements, TUTIS in particular (which estimated that $60 million were necessary for road upgrades), including recommendations such as: construction of a small ring road around the center (which would allow the center to be pedestrianized) and construction of a third ring road, which would serve as a by-pass for heavy-traffic.

Unfortunately, studies and plans were not widely circulated and most were not even translated into Albanian. Commonly, current public administration employees are unaware of their existence. Despite recent freedom of information laws in Albania, the study reports are not easily obtained and commonly treated as confidential and often cannot even be found (epic efforts were required in procuring some of the studies).

The reasons for the failure to implement these plans were multiple. Several consulting firms noted in their reports a number of challenges that they feared would undermine successful plan implementation. The principal problem was that the City simply did not have the resources to carry out these plans. Other problems included: excessive centralization and scattered institutional responsibilities among public sector agencies responsible for urban transport; lack of motivation of the Albanian staff due to low wages; low levels of concern about environmental issues; lack of staff trained in transportation planning; and an inadequate legislative framework (Regional Consulting 1995; CGEA 1999; T.E.C.N.I.C. and Transurb 2000; Peter Guest 2006; ITS 2006).

4 FOREIGN FINANCIAL ASSISTANCE FOR PROJECT IMPLEMENTATION IN TIRANA

The three main foreign donors in Albania have been the World Bank, the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB).

Albania joined the World Bank in 1991. World Bank's total commitments to the country to date (for all types of projects, not just transportation) total approximately $925 million. Support for the capital's transport sector has included the following:

- In 1993, the World Bank initiated a countrywide "Transport and Infrastructure Project", which was meant to (a) assist the Ministry of Transport and Communications and transport organizations to adopt market based transport policies; (b) accommodate the expected growth of road traffic by rehabilitating and completing/extending main roads and by improving their maintenance and safety. By 1999, $18.5 million had been disbursed. The Tirana component of this project included assistance in road maintenance through the provision of equipment.
- In 1998, the World Bank committed $15.86 million (credit) for an "Urban Land Management Project", to provide essential urban infrastructure (including roads and other infrastructure and services, but not public transport) to underserviced or neglected areas in Greater Tirana and to strengthen the institutions responsible for the delivery of urban services at the national and local levels.
- In 2002, the World Bank approved a $30 million loan for a country-wide "Road Maintenance Project". By 2005, $18.7 million had already been disbursed, with the Tirana urban roads component absorbing $1.83 million.

- In 2005, the World Bank approved a $20 million loan for a countrywide "Transport Project". The Tirana component of this project included the rehabilitation of 3.5 km stretch of the Middle Ring Road and a pilot traffic management program, which provided for improvements in signs and signals, intersections, pedestrian crossings, and road pavement.
- In 2008, World Bank approved a $20 million loan for a "Secondary and Local Roads Project" which targeted mainly rural areas, but also provided some funds for urban roads (1,000 – 1,500 km of roads in total). The project was also meant to support the introduction of the private sector in road maintenance on the road network.

The European Investment Bank (EIB) has financed various sectors in Albania since 1995; its investments have reached 304 million Euro in total; of these, 138 million have been for national roads construction and upgrading. The only program that will benefit the Tirana transport sector is a national "Secondary and Local Roads Program", for which EIB is offering 50 million Euro in total. As of 2009, the program is still under appraisal.

The European Bank for Reconstruction and Development has been very active in Albania's transport sector as well. Its investments that affect Tirana's transport sector include:

- In 2006, in the framework of the "Tirana Municipal Transport Project", the EBRD approved a €14.6 million loan for the widening and upgrading of various Middle Ring Road stretches (3.5 km), the rehabilitation and development of other priority components of Tirana's municipal roads, and the construction of an interchange on the intercity highway. By 2008, EBRD had already provided 4.5 million Euro for the Middle Ring Road upgrades.
- In 2007, the EBRD provided a 500,000 Euro credit for the creation of a computerized traffic management center.
- In 2009, the EBRD provided a 24 million Euro loan and a 400,000 Euro grant for the construction of a 5.75 km section of the Outer Ring Road stretch (which will cost 40 million Euro in total) and an overpass at a city exit point.
- As of 2009, the EBRD is considering providing a 24.0 million Euro long term debt facility for the construction of a shopping mall in the outskirts of Tirana, with a gross leasable area of 39,000 m2. The project is part of a general plan to develop a chain of shopping and entertainment centers across Albania, following the development of another suburban mall in 2005 (Qendra Tregtare Universitare). The project will be required to comply with national and EU environmental, health and safety standards and requirements.

5 CONCLUSION

The substantial international support for travel within Tirana has largely bypassed the needs associated with the vast majority of travel within the City. Foreign funds for Tirana's transport sector were provided for road construction and improvements rather than public transport, notwithstanding the fact that all the internationally funded studies highlighted the need for assistance in this sector.[1]

The reasons for this disparity within the same constituency have not been publicly stated. However, several factors emerge as likely factors. International organizations and governments prefer to fund one-time projects with discrete visible outcomes, meaning roads, rather than improving ongoing operations, such as bus systems. On the national level, elites have more concern about improving the conditions for car travel, than public transport.

However, some of the international financial institutions that are active in Tirana have provided public transport financing for other East European cities, which were perhaps more active in requesting funds for this purpose.[2] In Albania, on the other hand, despite the democratic forms of government since 1990, the

[1] Foreign funds have mostly been loans rather than grants, which make Albania dependent on outside providers through debt repayment for lengthy periods. In addition, a large share of the funds has found its way back to the donor community through expert fees for planning.

[2] For example, for EBRD's public transport financing in East Europe see the following EBDR web pages:
Lviv, Ukraine http://www.ebrd.com/projects/psd/psd2009/39299.htm (up to 38 million Euro for the public transport company, currently under evaluation)

absence of longer political traditions or precedents for popular representation still hinders the effective conversion of public desires into public policy. A general distrust of government institutions of all levels still persists and there is no public belief in any possibility of successfully pushing for change (Pojani 2010). Therefore, the reasons why transport problems have not been tackled at a sufficient level are mainly political rather than technical and financial.

Naturally, an adequate road infrastructure is an important component of a good public bus system. Many necessary road repairs, upgrades, and construction in Tirana would not have been possible without foreign financial help. However, the public transport system also deserves its share of attention and funds considering its poor condition in comparison to other European countries and its importance and high usage in Tirana. A relatively small portion of the overall international funding for transport may have had a major impact on the adequacy of public transport, preservation of the ability to travel by bicycle, and the conditions for pedestrian traffic.

Tirana is in a very favorable position in the sense that its transport problems and adverse transport externalities may be substantially alleviated without exceptional public investments due to the high density, moderate population size, and flat terrain of the city. As a result, much urban travel could be conducted on foot, by bicycle, or with short bus rides. Strategies with a high impact but moderate cost are set forth below:

1) Making street conditions friendly to pedestrians,

2) Pedestrian only zones in central areas,

3) Traffic calming in residential neighborhoods,

4) Exclusive lanes for busses and bicycles, which are adequately protected from car traffic,

5) Reasonable parking fees,

6) Scrap programs for old, polluting vehicles,

7) Adequate taxation to encourage the use of “clean” vehicle technologies.

Investments in public transportation should focus on improving the bus system (rather than introducing high cost rail systems). A second step would be the creation of Bus Rapid Transit (BRT) system. These are financially realistic and environmentally sustainable strategies. The Albanian public sector must play an active role in requesting funds for these specific purposes rather than be conditioned by the requirements and ideologies of donor organizations.

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An Operational Model towards Playful Public Participation

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1 ABSTRACT

After a brief review of e-participation potentials, principles and practices, this paper develops an operational framework for the conduct of playful public participation experiences. The operational model captures the key elements of traditional planning processes, but uses technological-driven decision making tools techniques as well as a "playful" approach designed to capture the motivations of both public administrators and the participating public. The playful participation model is parameterized using both SWOT analysis and a Logical Framework Approach. The last part of the paper illustrates the operational model in a case study conducted in a South Italy city, Potenza, over the past 7 months, concerning planning of public spaces for young people.

2 INTRODUCTION

Participation process arises from the necessity to break down cultural barrier both for administrators, like subjects placed before, in an institutional way, take a decision, and for subjects involved in participation process.

The administrators show mistrust of participation process because they are afraid that it could be cause of conflicts and because they generally do not want renounce to be the privileged decision supporters, retaining that their choice is the best decision, in fear it could be modified by participation process.

For subjects involved in participation process, instead, it has been noticed an insufficient and unrelevant use of active participation, that it can be translated into a general mistrust, caused by lack of participation culture.

In order that participation could be effective, it is necessary a cultural change both from administrators and from subjects involved in participation process; this change implicates ability and will to work in team, to make roles transparent and to share information in efficient way, but above all to debate and think back to own opinions and chooses.

To build this change it is important consider several aspects: in particular, what kind of tools to use, where to "participate", how to participate.

Concerning tools, it has been noticed that decision making tools, and in particolar technological ones, are effective to create a common knowledge base and to organize and manage the process, making it transparent and making possible to repeat in the time. In a reality like this, they can definitely help in order to manage communication and participation, even if they cannot - and they must not - replace contacts and relationships that can be created among people demanding direct connections and costant dialogue in the time.

Concerning where to participate, it is important to choose right place: comfortable environments where people can talk and have a confrontation; where it is possible to organize meetings, with different kind of people, making everyone at oneself ease; it is important organize special events in place where people live, finding local speakers; above all, it needs to do coherence to all these meetings, succeeding in making a coherent project, by different kind of input.

Sharing moments have to take into account, preferring an informal approach, based on the concrete representation and exemplification, in order to illustrate concepts and themes concerning the discussion; during these moments, it should take into account also maps and plastic models, and all kinds of communication that do not need complex texts reading.

Finally, in many cases, it is useful a ludic approach, that for instance takes into account moments for voting different alternatives through coloured coupons, or it considers simple simulation tools able to show "what happens if…".

In light of these remarks, Playful Public Participation seems to find rich soil; it seems to be the most suitable approach to make close subjects involved in planning participation process. Even if Playful Participation is a good method to participate, and even if it could be effective in order to break down the mistrust barrier, with this paper we affirm that it is not enough in order to guarantee the effectiveness of participation process

itself; we propose therefore a new way to make planning and to make participation, a way that could join the rational planning approach, starting from context knowledge frame, to problems and objectives identification, and intervention policies predisposition, arriving to define intervention strategies, showing future and possible scenarios, with the Playful Public Participation approach.

The paper is organized in three sections: the first section starts with a brief review of partecipation and e-participation concepts, where we discuss about the new era of participation process; this section continues debating on a renovated approach in rational planning, introducing two methodological tools able to identify problems and objectives, to predispose intervention policies and to define intervention strategies, showing future and possible scenarios. The second section is the main section, because it's just in such part that we propose the new way to make planning and to make participation, a way that joins the traditional approach with playful approach, in the convinction that this "wedding" brings subjects involved in participation process near to planning. The third part of paper illustrates a case study, conducted in a South Italy city, Potenza, over the past 7 months, concerning planning of public spaces for young people. In the end we presents results, as a discussion focused on the integration between traditional and innovative way to make participation, through the reading of case study results.

3 PARTICIPATION PROCESS IN WEB 2.0

The increase of importance of communicative aspects in urban planning has been led the participation, and moreover the e-participation, to hold a role more and more decisive in planning process (Hajer, 2001). In the "Information Society", Public Administrations use new technologies more and more often, with the purpose of establishing a rapid, direct and transparent relation with citizens…or, at least, they are trying to do it! The Information and Communication Technologies (ICT), therefore, play a fundamental role into building consensus in democratic processes, giving more relevance to citizens in need to be involved in decisional process (Tambouris, et al, 2007).

All around the world, e-participation projects are on-going increasing, and many Administrations are actively engaging in the use of new technologies in order to involve citizens in democratic processes; although this positive tendency, public participation quality is still making better.

Citizens involvement in policies is not easy as it seems to be. First of all, an effective participation has to be based on correct information that poin out rebounds on territory by scenarios building, able to simulate different choices.

The use of new technologies in urban planning processes, with the aim of improving communication quality and widening interation between all stakeholders, could, without doubt, enhance use of bottom-up approach (Knapp and Coors, 2008). It tries to stimulate less involved part in the process in acting and partecipating, with collaborative behavior. Citizens, who feel involved in planning process development, as shown in Tilio et al. (2009), feel that their initiatives could be appreciated and approved; various alternative solutions, elaborated thanks to practical sense that tipically characterizes city user, could be identified from every citizen.

Now then so, participation process successful is attributable to citizens involvement in policies. Since 1969, when Arnstein developed his theory about Citizen Participation, it was introduced public involvement concept, as a way to redistribute decision-making power and as a key to determine whether public involvement is meaningful.

If participation process is devised and if citizen takes part in participation process, then there will be benefits for entire community.

In a participation process it is necessary to involve people at a very early stage, so as to create a dialogue between them. And just this dialogue allows participants to reach a consensus on something. Moreover citizens can identificate themselves with the project, because they have taken part in working it out. This can improve the preparation and realization of the measures (Krek, 2009).

Participation is something of objectively good for all community; mentioning Arnstein (1969) thinking, "The idea of citizen participation is a little like eating spinach: no one is against it in principle because it is good for you!". Or else, following Krek (2005) thinking, the word participation in general means something

positive; it implies that someone is cooperating, "playing" along with the group or an individual, working with others in order to achieve a common goal.

In a pilote study led by Conroy and Gordon (2004) it has been verified an higher popularity level in a meeting where participants used advanced technolocigal tools, as GIS-based ones, compared to traditional public meetings. The measure in which information is really perceived from citizens and, thereby, the possible participation rank could be due to way in which information is presented (Simmons, 1987). A participation environment, where it uses internet technology like a tool to involve public part, is, as a consequence, an environment that facilitates knowledge and information storage; visual systems as maps and imagines are mainly recognized from participation processs members (Conroy and Evans-Cowley, 2006). The studies led by Conroy and Gordon (2004) demonstrate how e-government tools go on a promise to improve public participation opportunities; with passing of years and, consequently, with improvement and diffusion of technologies, that promise becomes more and more achievable. Like observed by Thomas and Streib (2003), citizens visit more and more websites, perceived as the principal mean to collect information and interact with Public Administration. According to Rodotà (2007), "Internet is the biggest public space that humanity has known a place where all people can express themselves, gain knowledge, get ideas and not only information, deny, dialogue, partecipate to common life and so, build a different world where everyone could feel equally citizens".

Nowadays, infact, online social networks or communities have created a multitude of virtual spaces on which people can socialize (Facebook), share content (Flickr, YouTube) and expertise (Wikipedia). Through this virtual space it is possible exchange digital information and facilitate social interactions between users and organize different types of groups (Apostol, 2008).

More in general, Internet and World Wide Web are generating radical changes in the way we are able to communicate. Our ability to engage communities and individuals in designing their environment is also beginning to change as new digital media provide ways in which individuals and groups can interact with planners and politicians in exploring their future (Hudson-Smith et al, 2002). While citizens are becoming e-citizens (Prosperi, 2004), government must enable citizens to increase participatory skills through Internet, contributing to growth of references to e-society, e-democracy and cyberdemocracy: we assisted, in yers, in "collective intelligence" (Lévy, 2002).

Public participation based on online communication is become, in the last ten years, a real research field, and the innovative impulse in web-based application field, due to ICT, lead to new form of communication among citizens, planners and public authority. New generation tools are a lot and, if used opportunely, could lead to a good level of effectiveness; we can think to chatrooms, forum online, web surveys, workshops and virtual conferences, e-mails and discussion exchanges through online maps. An integration of geographic information systems (GIS) and public participatory tools represents one of the latest innovations in this area (Krek, 2008).

Therefore, the new technologies and the new way to partecipate to planning choices feel the effects of deep change, innovate themselves, get rich in contents and experiences and evolve towards the new era of the web 2.0, that seems to be attractive to promote participatory practices among citizens, because its tools are becoming more and more familiar to them, and just this familiarity could greatly increase potential participation (Lanza and Prosperi, 2009).

A concepts, proposed by research group of HafenCity University of Hamburg, that open the way to quality and effectiveness of participation process in urban planning is Playful Public Participation one. The key idea of Playful Public Participation (PPP) is to generate pleasure and joy for the citizens involved in public participatory processes, in particular for the interaction between citizens and planning experts. [1]

With Playful Participation it is possible use the game as a stimulating computer-based tool that can potentially involve citizens in serious public participatory processes (Krek, 2008).

Following Huzinga (1995), who asserted that one of the most significant (human and cultural) aspects of play is that it is fun, with playful participation, discussions and comparisons can be stimulated, offering to all stakeholders a tool for "play to build" intervention alternatives through combination of action proposals.

[1] See http://www.hcu-hamburg.de/geomatik/digitalcity/research-ppp.html, last access on February, 2010

In the playful public participation concept, the union among dialogue, comparison, design and fun is the secret and special ingredient to let really involve people in public participatory process.

4 TOOLS FOR A RATIONAL APPROACH IN PLANNING

Until now we have exposed teorie about ICT tools, claiming how it is useful and fundamental a participation process in a decision making process and supporting Playful Public Participation principles. Well, we are convinced of this, we believe in this way to make participation. Nevertheless, our urban planning training impose to jump back into the past and retrieve some concepts that are at the early stages of a participation process: that concepts are connected to rational planning.

In the last decades, social processes have been changed, and interest in public decision sphere has been enhanced; "face-to-face interactions in the real time is the new model of planning" (Friedmann, 1993), and the new planning is transactive, that is it asks for interaction between two kind of knowledge, that one of experts and technicians subjects and that one tested. Tested knowledge, that planners have to make explicit, is citizens'knowledge, important because citizens live experiences, situations and contexts.

Decision in planning is developed in a process where knowledge about ambitions and objectives is growing and where stakeholders and "les agis" (Roy, 1985) influence directly or not directly the choice, considering the importance of objectives and alternatives for each one. To address decision toward an optimal solution, respecting public interest, and considering the three principles of planning, that are equity in choices, effectiveness and resources preservation, concept of plan rationality is central (Las Casas and Sansone, 2004).

Rationality in planning supports the planning process in all its phases with several techniques and methodological approaches; in our vision, the reference term is to consider plan as a decision process, and to adopt a procedural approach (Faludi, 1987), where knowledge grows in an incremental way, considering logical consequences and linking decision evaluation to the strict process itself.

4.1 The Logical Framework Approach and the SWOT analysis as methodological tools for public decision

Planning process is based on objectives and problems identification, strictly connected to the context kwnowledge: the preliminary analysis of context becomes a fundamental element of planning process, and the urban survey carries out a double role: if on one hand survey is the technical essential requirement for plan, on the other hand it can be considered a learning moment concerning town problems recognition and a tool to re-build history, tradition, culture, starting from which designing future development (Fera, 2008).

4.1.1 The SWOT analysis

Urban survey can be carried out adopting analytical procedure, as SWOT analysis, in order to detect spatial and/or social situations relevant in planning process, enabling participation to analysis process and helping in problems and objectives identifications.

SWOT Analysis is used in business administration since 50s, to support choices through a rational approach and a transparent decisional process, and it is common also in public administration since 80s, to build possible economic development scenarios. Today, according to European Commitment Regulations (Guijt and Woodhill, 2002), evaluation of plans and programs must consider a SWOT analysis.

The name is the acronym of the main components of the analysis itself: Strengths, Weakness, Opportunities and Threats are the evaluation dimensions. The identification of these components, in the better way, and possibly with a large involvement of actors, is preparatory to the definition of strategies and actions necessary for the accomplishment of defined objectives. In fact, the four components of SWOT allow to highlight the characteristics of the analysis'argument and to understand the internal mechanisms to modify, and at the same time they allow to take into account the external context, able to influence the fulfillment of objectives; strengths and weaknesses have to be interpreted as the endogenous variables, face to the external ones, represented by opportunities and threats. This distinction is important because it allows to identify the elements on which it is possible to intervent and the elements not directly controlled. The SWOT matrix, containing the identified components, is the results of a detailed context study, often based on quantitative data, but simply achievable in a participatory context, where involved subjects can discuss about evaluation

dimensions. Moreover, today it is usual to represent spatially the SWOT analysis, identifying on maps, with help of GIS, the evaluation dimensions themselves, obtaining maps with high communicative potential: we speak about "geo-SWOT ".

4.1.2 The Logical Framework Approach

Starting from SWOT output, decision process needs a hierarchical organization of problems, in order to define a structure where objectives, intended as problems removal, are connected to actions, attended results and spent resources. From this point of view, the Logical Framework Approach (LFA) represents a useful tool. It is commonly used as a tool for management of development plans and it was initially developed in the "management by objectives"; recently, European Commission adopted LFA to manage international cooperation interventions.

LFA supports the analysis and understanding of components of program and plans, highlighting the logical processes that join them. In particular it allows to consider in an integrate way the following elements:

- Project's objectives, distinguished in four levels: goals, purpose, output and input;
- Relations between cause and effect among the above mentioned levels;
- Analysis of external factors to justify the relations;
- Objectives verifiable indicators (OVI) and related tools to verify, manage and evaluate objectives' fulfilment (Gasper, 1999).

With this structured approach it is easy establish priorities and determine attended results from a projects, considering a logic series of phases:

1. Identification phase: existent conditions are analysed, project pertinence is investigated and objectives and strategies are identified; this is an analysis phase, during the which several kinds of analysis are carried out. In particular, a stakeholders analysis, in order to identify and characterize potential major stakeholders and to assess their capacities; a problem analysis, in order to determine cause and effect relationships for identified key problems; an objective analysis, in order to develop solutions from the identified problems, and with relevant importance to means and end relationships; finally, a strategy analysis, in order to identify different strategies to achieve solutions and select the most appropriate one.

2. Formulation phase: project is prepared, through declaration of clear objectives and measured results; this is a synthesis phase, characterised by three main activities; first one, logical framework matrix is developed, so that project structure is defined, and risks and its internal logic are tested, indicators are formulated; the activity scheduling determines the sequence and dependency of activities, and supplies information about their estimated duration and the assigned responsibility; to complete, the resource scheduling develops input schedules and a budget.

3. Implementation phase: negotiation, operative phases and monitoring are controlled;

4. Audit phase: decision making process can be opportunately synthesized, and objectives achievement can be evaluated.

The approach promotes stakeholders participation and so negotiation (Coleman, 1987).

5 HOW TO GET BETTER PLANNING PROCESS? "RATIONAL+PLAYFUL" APPROACH

Into strategic-rational planning processes, knowledge represents a fundamental condition to define plan actions; in this strategic-rational vision, it is considered as "experted" knowledge, exclusive planner'heritage. On the contrary, into the strategic participated model, knowledge is produced into an interaction process between several actors. Consequently, context analysis can be considered as a result of expert scientific knowledge and reality-made knowledge, tested by citizens. In a community planning process, collective experiences and technical analysis interchange and interact continuously, and in reason of nature of community planning process, that is addressed toward the action, analysis methodologies are structured so to supply useful information in order to identify objectives and strategies. (Fera, 2008).

Therefore, we can consider on one hand a methodological approach to context analysis and strategies definition, that we can call "rational approach", and on the other hand, a not formal approach to participation

in planning, that we can ca ll “playful approach”, borrowing the term that Hamburg HafenCity University group has coined.

Here, we want to compare these two methodologies, starting from the idea that their combination can give strenght and effectiveness to planning process, and, moreover, to the choices definition process. This is our convinction, this is our methodological proposal to tackle a participated planning process.

So, we are persuaded that the two different approaches, rational and playful, could become the new frontier into urban planning system: to analyze a urban context, identify one or several problems, define the objectives (like dual of problems) to reach, identify and carry out some strategic actions in order to solve identified problems. In all this process we think that citizen has a key role, because he could be fundamental in problems’definition (as a real user of the city and so of its problems), and at the same time fundamental to take a decision about strategic actions (as future real user of city and so of its benefits carried out from the identified actions).

Figure 1 makes explicit our proposal: in a simplified way, planning process is schematically presented in its two macro phases: context analysis phase, more formal and structured (via SWOT Analysis and Logical Framework Approach), and participation phase, free and less formal (via Playful Public Participation).

Fundamental phase in a community planning process, is starting phase, that asks care and deepenenig, in reason of its being preliminary to planning process. But the question is: when does planning process start? It starts when a social subject (public or private), on the basis of observations, problems, instances, considers convenient to develop a transformation process, and he becomes promoter of transformation initiative.

And what about participation and its role in this planning process framework?

It is necessary activate participation process since planning process starts, when planners think about scenarios and visions of future. Participation, in fact, can not be limitated to attuate already defined strategies: citizens have to be involved when strategic options start to be discussed. However, usually a great part of conflicts born during the transit from strategies to realization of strategies themselves, so that it is important that participation process is still alive in all process phases, also actuation and management ones.

In order that we can really talk about participation, so, it is fundamental that not all choices are yet done.

Public participation is an important part of urban development. If people are being integrated into planning process, the planner is able to see through different perspectives and gets to know new ideas and opinions, thus conflicts can be solved more efficiently. Furthermore citizens acceptance towards new developments and ideas increases (Krek, 2009).

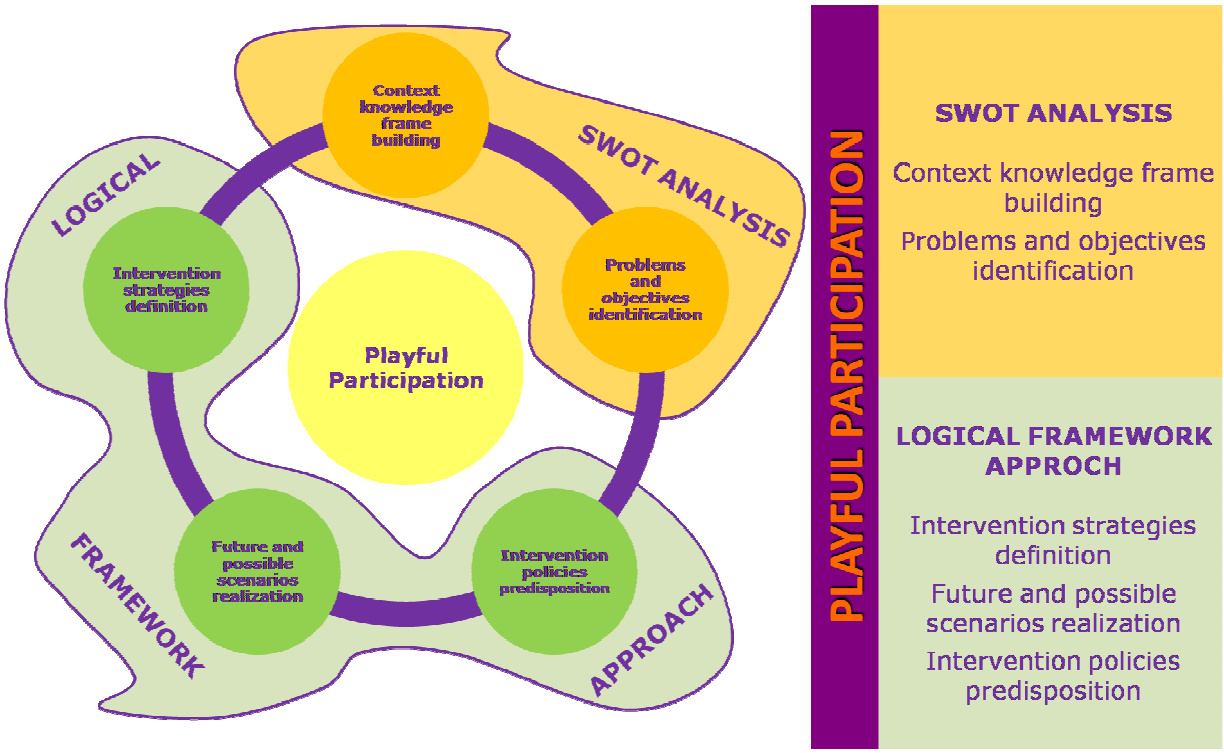

Fig. 1: Scheme for a "Rational+Playful" approach

Our thesis is to not consider the participation process as ex ante or ex post process, but as an on-going process, that must go with all the planning process; we intend planning process considering the traditional phases (context knowledge frame building, problems and objectives identification, intervention policies predisposition, future and possible scenarios realization, intervention strategies definition) as essential, but inserting in the core of the process playful participation, embracing all the phases; moreover, we would include in the process the use of traditional but always current methodologies, SWOT Analysis and Logical Framework Approach, as the way to introduce and guarantee rationality of process.

5.1 Case study: planning public spaces for young citizens

In this paragraph we describe an interesting study case concerning planning of public spaces for young people in a little town in South of Italy, Potenza. Research started from the detection of not coincidence between request and supply, in terms of spaces, from and for young people: relating to the presence of some public spaces for young people, not really used, and at the same time the discontent of young, not satisfied of life in the town, researchers rhetorically ask if there is a problem in planning so that results are not effective. In order to answer to the question, and, more important, in order to define a methodology to carry out a rational and effective planning in the context of young citizens needs, researchers have involved young people and several operators in the context of young policies into a simulated planning process.

Involvement required definition of several interaction forms; starting from light interactions forms, suitable in particular in brief and not strongly structured participation process (Fera, 2008), researchers planned a set of surveys, the creation of a focus-group, with the organization of several meetings, and the support, for all these activities, of social networking website.

Choosed social network has been Facebook. If in general this kind of virtual communities allows people to connect and interact with each other (Murray and Waller, 2007), Facebook has been considered the most suitable in reason of its spread diffusion, its daily consultation from main part of users and its nature of multi-sharing-functions (i.e. possibility to share moods, links, photos, events and so on). Researchers have created a facebook group, where they posted all information about the planning process, they communicated events, they published photos and videos registered during the events, and thanks to the pervasiveness of social network itself they succeeded to obtain a number of members on about 800 people, that is not negligible dimension in the study case context. According to Chiu et al. (2008), participation in online social

networks becomes a new communication and interaction phenomenon, so, Internet has been used as a communication tool in a group decision-making process (Hanzl, 2007).

Through the Facebook group, members have been invited to answer to an on-line survey, powered by Google-docs. Survey'aim was to better define the detected problem, considering the opinions of young people, divided into three different groups, in relation to their age. Concerning their needs, their customs and their capacity to express opinions, young people, considered from 15 to 35 years old, has been divided into three groups: 15-19 years old, 20-24 years old, 25-35 years old. Survey answers, presented during focus group meetings, helped into context analysis, in particular they have been the basis for the SWOT analysis.

Fig. 2: Activities for light interaction forms: focus grouop meetings, web-survey, Facebook group

During focus group meetings, SWOT analysis has been lead, highlighting the main aspects of problem and identifying the main instances to evaluate in planning process. Participants played to relate elements on their territory, and after a review of problems with the help of a bulletin board and a big number of post-it (of different colours, one for each element of SWOT), they used google Maps to localize. Relating the identified elements to tackle, avoid, exploit and transform (that is, the strengths, the weaknesses, the opportunities and the threats of a SWOT analysis) to concrete objects on territory, and building maps give more emphasis to the analysis, and make more effective the involvement of actors, thanks to the power of visual component into the process (see Figure 3).

Bullettin board and post-it have been used also to build problem tree and objective tree; after discussions, comparisons and observations, post-it have been finally positioned so that key-problem and key-objective have been identified. The prosecution of methodology was connected to the fulfillment of Logical Framework Approach through identification of strategies, interventions and actions.

The involvement into the understanding and evaluating process of subjects, as young people and operators in the context of young policies, able to contribute to discussion with a justified opinion (Grea, 2000) has been the essential requirement for the efficacy and utility of developed activities. Research conclusion and results interpretation are described in the following paragraph.

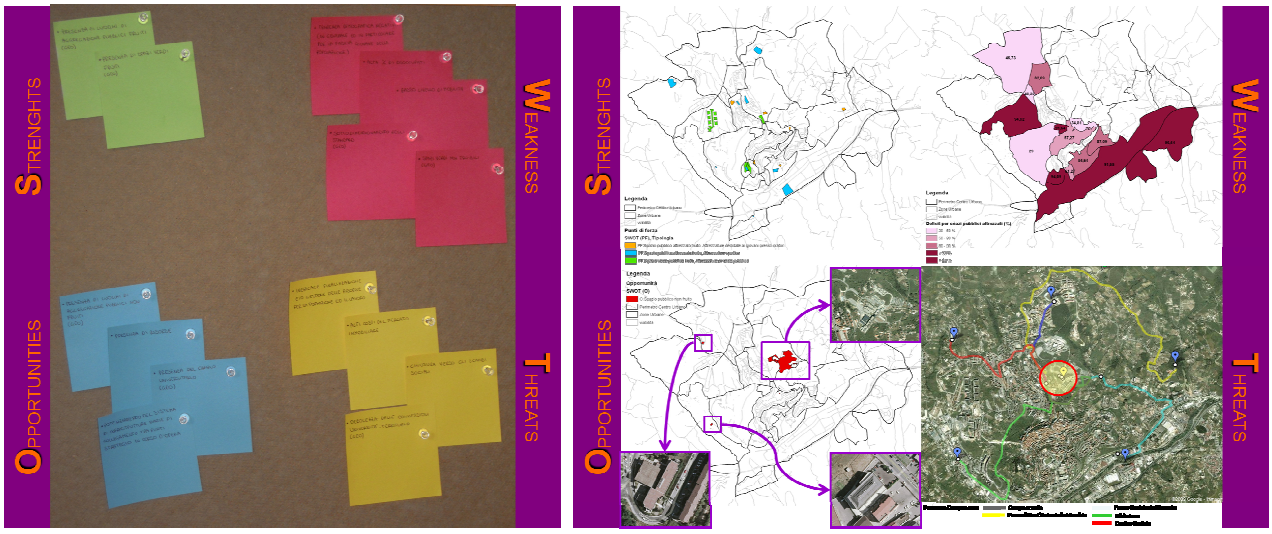

Fig. 3: From "post-it SWOT" to "GEO-SWOT": experiment in a focus group

6 RESULTS AND FURTHER WORK

The result of the simulated process, at this moment, has been the formulation of a set of five strategies that, on the opinion of focus group, must be adopted to improve quality of young people life in the town. Surprising result is that participants have underlined that Public Administration can not work alone, but need the contribution of citizens themselves; young people have been positioned at the centre of strategies but, more important, at the centre of planning process. Participants expressed the opinion that their engagement can be strategic for success of planning activities.

Moreover, thanks to the friendly environment where focus group meetings have been held, thanks to the pleasant mood of meetings, thanks to the introduction of enjoy into participation activities, they seem persuaded into a future involvement in planning processes.

This planning process simulation shows that citizens (young citizens in particular) strongly contributed to the initial phase of planning process, when moderators guided and helped them into the context analysis, built through technical analysis (such as quantitative measures and so on) but also through citizens'tested knowledge; moreover, citizens followed planning process and became strategic actors into participation phase. In fact, they where involved at the start point of planning process, they were conscious of process itself, thanks to the involvement in initial phases, they felt free to act into participation process, built in a not-formal environment, with characteristics of a play. Synthethically, citizens felt better and contributed to plan building more and better than with traditional participation forms.

The research has tested the interest of young people toward participation in planning process, also with a rational approach, normally considered boring and strictly technical. Experience highlighted the possibility to make amusing this rational approach, and his effectiveness thanks to the creation of a playful climate and the support of web 2.0 tools. Starting from this result, the future development of research will be the involvement of young participants into Playful Public Participation activities, with organization of role-playing games, experiences of planning for real, building of future scenarios, but also the use of Internet for electronic vote to evaluate strategic alternatives. It will be in that moment that we could start to experiment the "rational+playful" approach in participated planning processes.

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Are Cities in Poland Ready for Sustainability? Poznań Case Study.

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1 ABSTRACT

The ideas of innovative urban planning are not strange in Poland. Good practices from Western Europe and USA are known to architects, urban geographers and other professionals. Discussions about urban planning are not only pragmatic, but also strongly ideological. However, the everyday planning experience is far away from sustainability path. We often ask ourselves a question, why is it so difficult to make cities in Poland more liveable? Apparently they are still to strong rooted in the past to move forward to the future. Although many things have changed in the last 20 years, a comprehensive, long-term urban planning is missing.

In this paper we identify some processes characteristic for contemporary urban development in Poland. We argue that these processes – being usually results of developers' activities rather than urban planning - do not lead towards liveable cities, but rather towards socially segregated and unsustainable cities. We also suggest some solutions to improve the urban planning system. Polish cities need a new applicable planning approach, because the current one fails to coordinate large public and private investments.

Our methodological approach is case study analysis. We have chosen the city of Poznań, the fifth-largest city in Poland and the third-largest academic centre. Poznań, as one of leading national economic centres, is changing its spatial structure very rapidly, but there was surprisingly little research on that field. We believe that the results of our analysis can be transferred to other second-order cites in Poland and perhaps to other Central European cities as well.

2 POLISH CITIES AND THEIR CHALLENGES

At the beginning of the second decade of 21st century the major Polish cities face a continuous and serious competition for the second (behind Warsaw, the capital of Poland) position in a range of most attractive places to live and work in Poland. However, since the accession of Poland to the European Union (2004) this very race to the new, better position has become no more local but, in fact, global. In a new political and economical configuration literary every city, aware of the global positioning game, must consider its own present status, dynamics and destination of development and choose the right strategic methods to reinforce its own advantages, eliminating shortcomings at the same time. In the case of Poznań, a city of one of the most dynamic economic growth of last years, yet most expensive conditions of living, the situation is not entirely clear. Even recently declared official Development Strategy 2030 does not define properly its present condition, desired destination, instruments or possible threats. The city of Poznań begins this race being once a true leader, but already an overrated veteran who believes that perpetuating its own legend is enough to win the competition.

In the following paper we identify and describe several processes which are crucial for the current stage of urban development in Poznań.

3 HOUSING MARKET – IS HOUSING AFFORDABLE?

Liveable cities are cities where people of different income and social status live next to each other in the same neighbourhoods (Jacobs 1993). In order to achieve this social mix, it is necessary to provide subsidised housing (also called social or public housing) to the low- and middle-income groups, who cannot afford a dwelling at full price. Although it is arguable, whether a more regulated or more liberal form of subsidised housing is optimal (Hackworth 2007), it is generally agreed that it is a necessary supplement for commercial housing.

Many Polish cities have problems with insufficient housing supply, which date back to the socialist times. Under socialism, the state-controlled and inefficient housing market could not cover the demand, which was rapidly increasing due to industrialisation and inflow of workers from the rural areas. At the same time the old pre-war housing stock was underinvested and was gradually falling into decay. Housing shortage poses a serious problem, even many years after the fall of socialism. In the year 2002, 13 years after the political

change, there were in average 117 households for each 100 dwellings in Poznań. Many families live in small, overcrowded dwellings, because the average size of a dwelling is only 64 m2 and the living space per person is 27 m2.

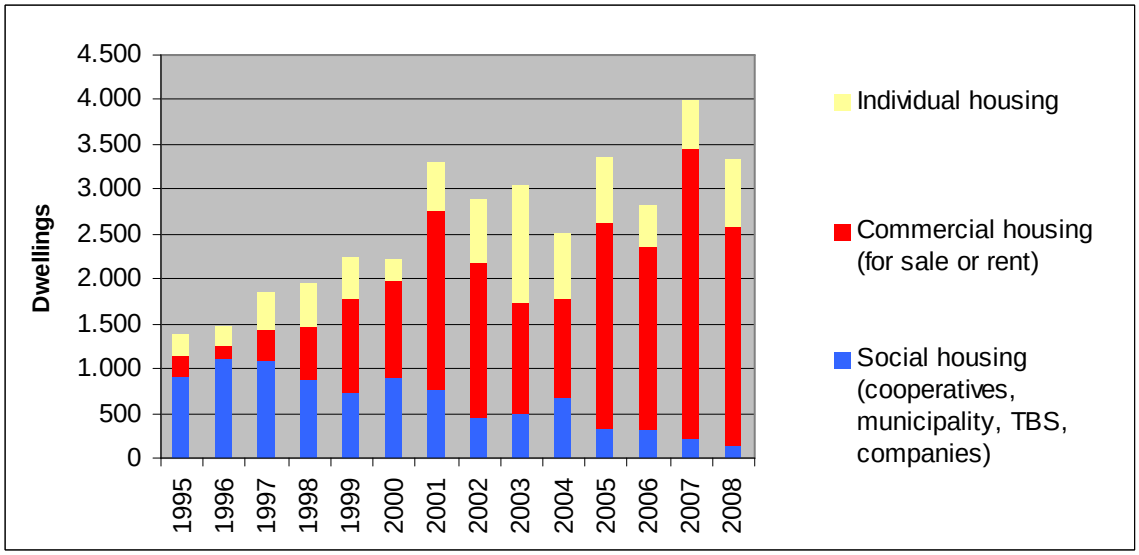

Fig. 1: Supply of social, commercial and individual housing in Poznań (1995-2008) Source: Polish Central Statistical Office (GUS).

Poznań has got vast demand for housing, because of its growing economy and the high share of young people (20- and 30-years old). The supply of housing has greatly increased in the last years, but so the prices did and are much higher than a few years ago. At the moment, it is very difficult to find affordable housing in the city. Housing supply in Poznań in the years 1995-2008 consisted of 25% social housing (including cooperatives, municipal housing, housing provided by companies to the employees, and TBS), 53% commercial housing (provided by private property developers), and 22% individual housing (self-build). In the last years the housing supply has increased, but only in the commercial sector, while the share of social housing is decreasing (Fig. 1). What are the reasons of this decline?

On one hand, some forms of housing supply, which were popular in socialism (housing cooperatives, dwellings for workers built by companies) have lost their significance after the political change. New forms of social housing are municipal housing and TBS (Social Housing Associations). TBS are owned by the municipality. The construction cost is partially covered by future tenants and partially by a preferential state credit. For that reasons, TBS used to be popular among young families and other middle-income households. Unfortunately, the construction costs have increased during last few years and it is very difficult for TBS to obey the cost limits (written in the law), so their market-share is decreasing.

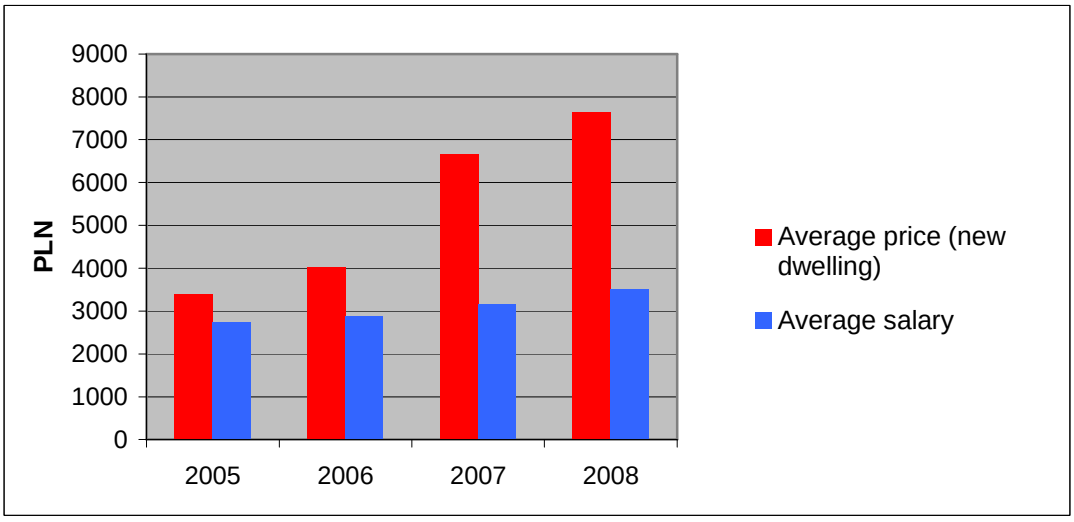

Fig. 2: Average housing prices and salaries (PLN) in Poznan (2005-2008). Source: GUS (salaries) and RedNet Consulting (housing prices).

On the other hand, the commercial housing developers are currently in a very good condition. High demand for housing is caused by young demographic structure (the baby boom generation of 1970s and 1980s is now in the matrimonial age) and increased buying power (economic growth, higher salaries, but especially easily available mortgages). Commercial developers can dictate the prices, which have rapidly increased for the last years, especially between 2005 and 2007. Unfortunately, in the same time, the average monthly salary has only slightly increased (Fig. 2). Whereas in the 1990s, the purchase of a dwelling was financed mostly by cash, today the mortgages have become more popular, but they usually contain high interest rate.

Since there is actually no supply of subsidised housing anymore, there are not many options for those who cannot afford a dwelling at market price. Rental market in Poland is small and, especially in university cities like Poznań, it is dominated by the students. Because of housing shortage, there are also not many dwellings on the second-hand market, and their prices have also increased considering last few years. Moreover, second-hand dwellings are mostly small dwellings in the post-war prefab housing estates, so they usually have only 2 or 3 rooms, or in the old pre-war housing, which have not been renovated since many years. Because of housing shortage, many young people and young families live together with their parents.

Last changes on the housing market stimulate residential segregation. Because of extremely high housing prices and decline of social housing, only the well-off households can afford a new dwelling in Poznań. Low income households (the elderly, the unemployed), which often live in very bad conditions, are actually excluded from the housing market, and the middle income households usually move to the suburbs, where the price levels are lower. Poznań has got a strongly negative migration balance with its suburbs, and the suburbanisation process is gaining momentum (Beim 2009).

4 URBAN RENEWAL AND REDEVELOPMENT – A FORGOTTEN ISSUE?

Urban renewal in Poland is an urgent issue, which has been neglected for many years. There is a huge renovation gap, because during the socialist period there were actually no renovation principles for the pre-war housing stock. Private owners could not afford renovation, because the state-regulated rents were extremely low.

Urban renewal, after the fall of socialism in Poland, is a very slow and difficult process. Unlike in Eastern Germany, where most of old housing stock has been renovated already for the 1990s (thanks to large money transfers from the well-developed western part of the country), for many years after transformation there was no financial support for urban renewal in Poland. This situation changed a little when Poland became a member of the EU and received support from the structural funds. Many cities have prepared special revitalization programmes in order to receive European funds. Among them, Poznań passed the revitalisation programme in 2006. However, EU funds are available only for specified projects, except for housing. Apart from the EU funds there is no other chance for significant financial support, so the urban renewal is, in fact, a marginal subject within the local policy.

The maintenance of old municipal housing stock is expensive. Thus, many dwellings have been sold to the tenants during last years. The tenants could afford the ownership status, because they were granted a large discount off the regular price. However, many of them will not afford renovation because of low income. The city of Poznań renovates its housing stock very slow and inefficiently; renovated dwellings are rented or sold at the market price, while the former tenants are moved to other (mostly peripheral) locations.

The inner city of Poznań has maintained (continually) a mixed social structure, but the filtering process has already begun. Wealthy households are constantly moving toward new suburban housing complexes, while the elderly, the unemployed and other low-income households stay in decaying old houses. The City of Poznań estimates that about 20,000 people moved out of the inner city during the years 2000-2005 (Miasto Poznań 2006).

Surprisingly, plenty of high-quality housing projects have been released within the inner city of Poznań during last years. A similar trend has been observed in the Western Europe, where it was called “new build gentrification” (Davidson, Lees 2005). However, in the case of Poznań, this process is not a mere continuation of gentrification. It is rather a kind of substitute for it. Beim and Tölle (2008) pointed out that the main factor behind the decision of moving into new owner-occupied dwellings in the inner city of Poznań is not the inner city milieu, but pragmatic reasons. A displacement of residents from old housing

districts has not taken place so far because of the ownership structure (many dwellings are owner-occupied) and because the construction of new dwellings is more profitable (for developers) than renovation is.

Some parts of the inner city are especially desired by developing companies: the surroundings of Old Market Square, the banks of Warta River (Fig. 3), and specific areas surrounded by parks. New housing often contrasts with historical pre-war brick houses and its derelict surroundings. New inner city housing complexes pose a sign for growing inequalities and segregation. The so-called "apartments", sometimes equipped with exclusive facilities such as swimming pools and fitness centres, are emerging next to historically valuable, but decaying old houses.

Fig. 3: Gated community at the bank of Warta River in the inner city of Poznań (in the background the cathedral). The fence not only isolates the inhabitants from their neighbours, but also separates the public from the river. Photo: A. Radzimski

It is difficult to predict what the future of inner city in Poznań will be like. One should not expect large financial support for urban renewal in the next few years, except for support from the European funds. Private capital is more interested in new construction, which is more rentable, than in renovation of old buildings. Population decline did not cause large vacancies so far, as many dwellings have been rented by students, or converted to offices and shops. However, in the long term this demand will decline and more vacancies may appear. The worst possible scenario presumes old housing to be demolished to vacate a construction site for new apartments.

In the year 2008 the Old Town of Poznań was announced by the President of Poland as a monument of history. This declaration means that the Old Town should be protected with regard to its historical and architectural values, to mention only a few: Poznań was one of the first capitals of Poland in the medieval ages, from 15th to 18th century an important centre of trade and culture, and a centre of independence movement under the Prussian occupation. However, current neoliberal policy, which neglects old housing stock and blindly approves new large projects poses a threat to the historic legacy.

5 MAIN STREETS VERSUS SHOPPING MALLS

Poznań represents one of the most interesting urban layouts of nearly ideal, oval city centre designed under restrictions of 19th century Prussian polygonal fortress. Main city streets and squares remain to present day the most recognizable and legible elements of urban composition. In the socialist period there was an attempt to radically rebuild the existing city centre, which was in a half destroyed during WWII, and - what was even more important - to alter its image in a modern manner. Once the deconstruction had begun, it has never ultimately been completed within designed range, mostly because of financial shortcuts. After the end of the socialist era there were no urban interventions of such scale and impact up to present day. In fact, during last 10 years there were significant improvements and renovations of main city squares (except for the most important one – the Old Market Square, where an architectonic competition was held in 2008, but no 1st

prize was appointed). Public space improvements can be characterized within three categories: technical and aesthetical improvements (infrastructure and surface replacements, public green refinements) – Ratajski Square, Wielkopolski Square; conservative and prestigious improvements (restoring the pre-war functional and formal layout of public space) – Liberty Square; formal and legislative improvements (creating formal plans without proper formal tools and financial background to realization) – Spring of Nations Square. None of these implied any wider spatial context or general revitalization purpose.

Moreover, several distinctive municipal buildings were refit due to European Union funds, but it has not implied any real, general revitalization of the city centre as a whole. There was neither clear and consequently implied strategy for renovation of building substance and improving spatial-functional integrity nor any systematic efforts leading to functional improvement or reorganization of transportation network and public space enhancement. All of this along with the situation of considerable free market influence upon the spatial design of a city and its agglomeration (urban sprawl) and visible symptoms of city centre depopulation led to significant loss of competitiveness of inner city areas. There were some remarkable architectural landmark realizations (e.g. Old Brewery Business and Art Centre) which (in some sense) altered the hierarchical order of the most important destination points of the city centre, but did not cause revitalization "chain reaction" within their direct urban neighbourhood, as it was frequently claimed and somehow expected.

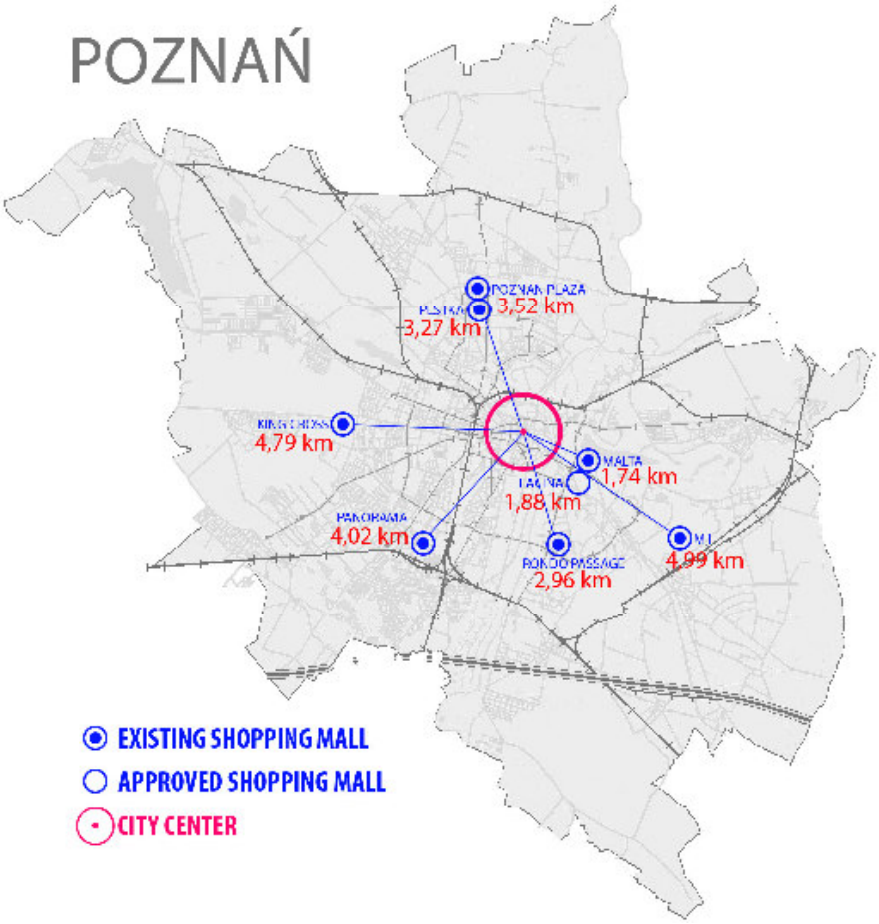

Fig. 4: Approximate distance between the biggest shopping malls and the city centre (town hall tower). The two closest ones (Malta, Łacina) placed within 2 km perimeter. Food discounts and construction markets were not included. Source: own compilation.

However, in contemporary conditions, there are significant but unplanned transformations of public realm in terms of functional alterations. This particular phenomenon is manifested by progressive but inevitable relocation of retail shopping and entertainment from the inner city into huge shopping malls, which are planned and built too close to the core of the city (Fig. 4). Hence, the influence of the big box stores on the functional domination of the city centre can and will be tremendous. For example, in only 500 m distance from the up to now biggest in Poznań "Galeria Malta" (54 000 m2., source: neinver.com) an even bigger "Galeria Łacina" (108 000 m2., source: lacina.pl.), was approved by local authorities. Such "synergic" effect in combination with lack of commercial rent policy and control in the centre caused the interchange of

commercial and shopping services (along main streets) into mainly banking agencies. These were the last ones, which could bear extortionate rent claimed by downtown tenement owners. For the same reason, high specialized stores, hobby centres, pubs, antiquarian bookshops, antique shops, small theatres or small designer stores and studios are consequently disappearing from the main streetscape. This phenomenon, along with lack of smart transportation policy within the city centre, and of an operational revitalization program, might be spatially, functionally and demographically devastating for the character of urban core. According to the new development strategy, an exclusion of selected main streets from downtown traffic will not be released before year 2040, while full bicycle route system could be implemented not earlier than by year 2025.

Although the concept of connected and vital public space network remains underinvested and diminished, there are noticeable declarations to redevelop former transportation and post-industrial areas (brownfields). In the first case (west part of the city centre) a vast enterprise of redeveloping old central city train station simultaneously with train (active) area – designed as the Integrated Communication Centre – would be an asset to the long lasting integration of main city train station and civic areas of the city. The declared term of realization (the European Football Championships 2012) may be difficult to keep, considering a conceptual stage of the project. In the second case (east river bank downtown area), a degraded post-industrial infrastructure (old gas-station facility) were declared as a potential new cultural centre (with the realization budget of approximately total 500,000,000 PLN) as a key enterprise in complicated process of restoring degraded river banks in Poznań centre area. Unfortunately, there is little chance to realize this one, without a serious (or total) share of private sector.

6 TRANSPORT POLICY – TOWARDS AUTOMOBILE DEPENDENCY

Automobile has become the most popular mean of transport in Poznań. The last traffic analysis done in 2000 shows that 53% of trips have been done by car. Modal share of public transport is 37%, pedestrian traffic 8% and bicycle traffic 2%. It is assumed that present modal share of automobile traffic is much higher because the number of local public transport passengers has fallen and the number of automobiles has grown up. The motorization level in Poland has been regularly growing up since the beginning of free market economy in Poland. In 1990 the motorization level in Poznań was 222 cars per 1000 inhabitants. During the transformation the motorization level has increased to 345 in 2000 and 496 in 2008. The fastest motorization growth was observed during five years after the fall of communism. Then the motorization level stabilized and started to grow again since 2004, the moment of EU accession. However, the tax-free import of old cars from Germany should not be perceived as the main cause of this growth. The main reason seems to be huge suburbanization and changes in living and transport behaviours.

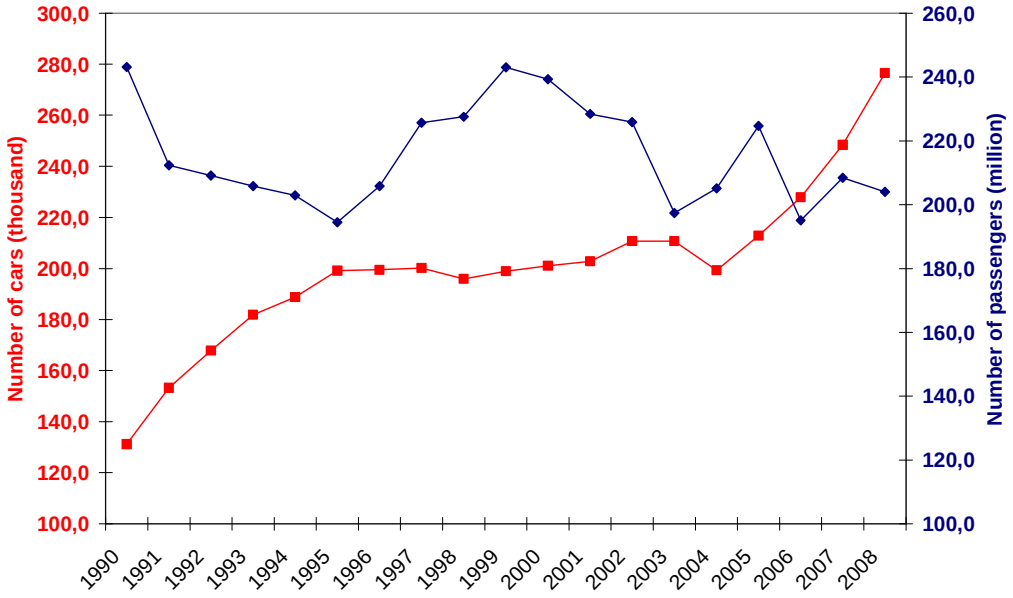

Fig. 5: Number of cars in Poznań and number of passenger of Poznań urban public transport a year. Source: own compilation based on GUS.

Since 1999 Poznań has had a formal transport policy. Although the main goal of Poznań transport policy is sustainable development, this document does not designate measurements of sustainability and does not specify particular tasks to perform in detail. The term "sustainable development" is usually interpreted in Poland as "balanced development" or "even development". Whatever the case, real policy is actually more car-oriented. With the exception of the old town area there are privileges for automobile traffic, and more amenities for cars are planned. The city's plans to develop public and bicycle transport infrastructure are incommensurate with road infrastructure.

Misunderstanding of the idea of sustainable development has severe implications for municipal budget and investment processes. For several last years the average expenses for development and maintenance of roads were on level of 400 - 500 million PLN, while expenses for public transport were about 150 - 200 million PLN (the netto sum – a difference between incomes from tickets and costs of maintenance). Main part of road expenses are investments (about 70-80%, depending on particular year), while main part of public transport expenses are subventions for local public transport. Only several percent of this amount (10% - 40 %) have been spent for new investments. Ticket sale revenues cover approximately 45% of public transport costs, and this share is decreasing. Yearly expenses for new cycleways (constructed apart form new road investments) are on a level of 1 - 2 million PLN. Half of this sum has been spent for new pavements, usually within new districts.

Rising motorization forces municipal authorities to continuous improvements of car traffic. It is continuously being done by two ways: the development of new roads and "small improvements", like intelligent traffic lights or extensions of existing intersections (new lanes, etc.). In some cases intelligent traffic lights improve capacity of streets by 30%. In 2007 alone, Poznań had about 200 traffic light installations. On almost 50 intersections, traffic lights give priority to the public transport. Intelligent traffic lights can be an important tool for sustainable development, but they can be used for car-oriented transport policy as well. In Poznań this system was applied with two main goals in mind: to improve road capacity for automobile traffic, and to improve conditions for public transport on some intersections, which are mostly overcrowded by trams or buses. The main losers of the intelligent traffic lights system in Poznań are usually pedestrians and cyclists.

The city has other plans for many small improvements for cars, for instance new parking lots in the city centre (officially, but inadequately called "Park&Go"), new roads to new settlements and surrounding communes. However, the most controversial and enormously expensive planned investment is a third bypass for the city, which is designed as an expressway (the "third ring"). If the General Directorate for National

Roads and Motorways (GDDKiA) had not taken the decision to construct of a fourth ring located outside the city limits, and what is even more important – outside dense development and residential area, the third ring would have had its advantage. Nevertheless, the city municipals have not changed their decision; what is more, parameters and localization have remained the same, but now instead of being a bypass of the city, the third ring should improve car traffic and ensure that each trip between any points of city would take no more than 25-30 minutes. Since no public transport will be allowed on the new bypass, it will even worsen modal split and privilege automobile traffic. In order to cover the estimated cost of the 36 km long third ring, which is up to 9 billions PLN, the city would have to largely increase the municipal debt.

In the case of public transport, the city plans to extend two tram tracks: to a huge shopping mall in Franowo district, and a relatively short extension of Poznań Speed Tram (PST) to the main rail station. First investment is needed to build a new tram depot, because the old one, located close to the city centre, was sold to a private developer, who is planning to build a shopping mall and apartments. The extension of Poznań Speed Tram allows to bypass three overcrowded intersections in the city centre and fasten trams going to southern districts of the city.

The only restriction for the automobile traffic (excluding closure of some Old Town's streets) is a paid parking zone introduced in 1993. In 2003 it was broadened and covers at the moment about 7,000 parking places. There are some plans for a further extension in 2011. The biggest disadvantage is that drivers do not have any alternative, because the introduction as well as the extensions of paid parking zones were not followed by new measures like Park&Ride system, cycle facilities in city centre or others.

7 SUBURBANISATION – DREAMING ABOUT OWN HOME AND GARDEN

Poznań metropolitan area has been witnessing a self-sustaining suburbanization process for at least two decades. All the characteristic features of suburbanization process can be identified, including: population decline of the inner city accompanied by population growth of the entire metropolitan area, negative migration balance of the central city accompanied by positive migration balance of suburban communes, and a dynamic growth of housing development outside the city limits. Additionally, residential mobility is also observed within the city limits, from the central districts to the peripheral ones.

The suburbs of Poznań are witnessing the features of urban sprawl. Many new estates are established without connection to existing settlement structure. Delivering public transport service to them will be very difficult (if not impossible) in the future, due to their random location, low density and the existing road system. Moreover, the metropolitan area attracts a growing number of new single-function facilities, e.g. shopping malls, industrial zones, technology parks. Private cars are the only means of transport assuring efficient and rapid transfer between these spread sheds and compounds.

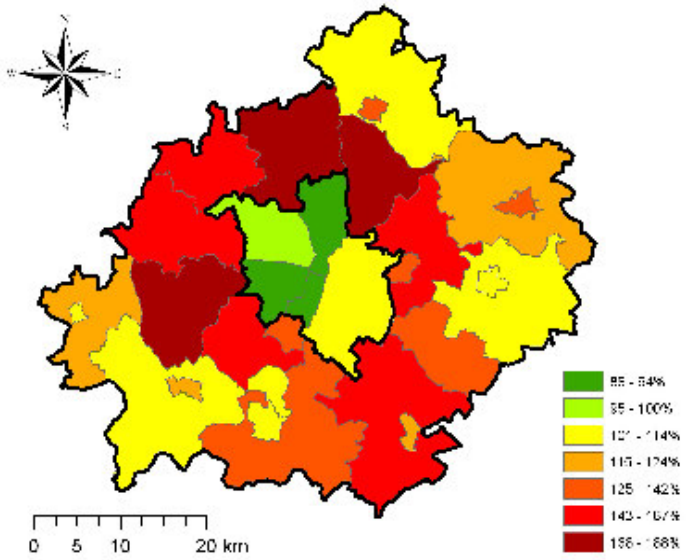

Fig. 6: Population changes in the Poznań metropolitan area 1990-2008. Source: own compilation based on GUS.

The period from 1990 to 2008 could be divided into three characteristic phases of suburbanization. The first phase (mid-1990s) concerns migrations resulting from completing large socialistic investments in multi-

family housing commenced back in the 1980s. The second interval occurred in the mid-1990s when housing market witnessed a downturn: the number of new flats for sale dropped by 50% against 1990, hitting the lowest level in 1995. Housing development slowdown triggered weaker population growth in all communes of Poznań agglomeration, which persisted until 2000. Since then, unlike any time before, the number of inhabitants in the satellite towns has been growing rapidly.

Fig. 7: "Change your neighbour – change your address" Advertising campaign of a mortgage bank (2007). Photo: M. Beim.

According to statistical surveys (Beim 2009), the main reason for migrating to the suburbs of Poznań was inadequate housing space – usually too small. The decision of moving out was also affected by high noise level in the former dwelling as well as improved financial situation. Further, the change of dwelling resulted from high costs of living, air pollution in Poznań and changes in family situation (like marriage or birth of a child). Other factors, like relations with neighbours and safety in the former place of living, were of little importance.

Suburbanization in Poland is strengthened by a new culture pattern of a young family, which has an own home with garden and uses cars for literary each trip. This pattern is deliberately repeated in most popular Polish serials, women's magazines as well as developer's advertises. Simultaneously, the disadvantageous image of old districts and public transport is promoted. Suburban house has become one of the biggest dreams for Polish yuppies. The only exception from this is a gated community.

8 CONCLUSION

In May 2007 the ministers responsible for urban development from all EU member states committed themselves to support sustainable development of cities (cf. Leipzig Charter on Sustainable European Cities). After three years, however, this document remains (at least in several countries, like Poland) only a declaration. Modernisation pattern of Polish cities is driven by urban sprawl and automobile dependency, which are accompanied by inner city decline, privatisation of public space and growing residential segregation. Of course many of these problems (if not all of them) have occurred before in Western European and US cities. It seems that the best way to learn is to learn on mistakes (in fact, own mistakes).

Poznań is a figurative example a city which does not use all of its development chances. At the moment there is no long-term, sustainable and integrated development policy in Poznań. Development decisions are driven by demand for land, or in other words, dictated by developers, without paying much attention to the existing urban structure. Inner city buildings and public space are falling into decay, while the outskirts and suburbs are filling with urban sprawl, accompanied by rising automobile congestion.

The most important impulse for changes in the model of urban development in Poland was the socio-economic change that took place after 1989. It included liberalisation of building regulations and making the purchase of a car more available. First symptoms of change were new shopping centres, open in mid-1990s. They were located within the city limits or in surrounding communes. They showed the real power of individual motorization and the potential of suburbs. But still, the number of people and shops moving to the suburbs was not very high - until the late 1990s.

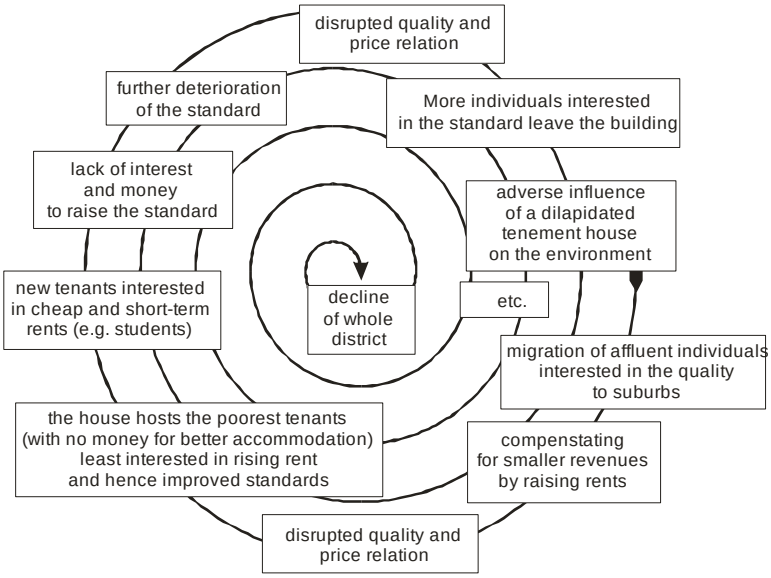

Fig. 8: The relation between the more affluent social groups' migration to suburbs and decline of a district. Source: Beim 2009.

Residential migration was followed by increasing motorization, thus contributing to mounting transport problems and ensuing further deterioration of environmental conditions. Urban sprawl, which is currently taking place, is destroying one of the greatest advantages of old urban planning: "the city of short ways", and results in higher modal share of automobile traffic. The inhabitants of suburbs do not have any real alternative, because there is no comparable (in terms of efficiency) public transport. The growing number of journeys by car has been topped by longer commutating routes after migrating to the suburbs. All of this leads to growing automobile congestion in the city and surrounding communes. This, in turn, contributes to further deterioration of environment, especially in the city centre, what induces even more individuals to change their place of living. Hence, a change in their transport behaviour patterns is initiated. City becomes increasingly sprawled. A model of this process is presented in Fig. 8.

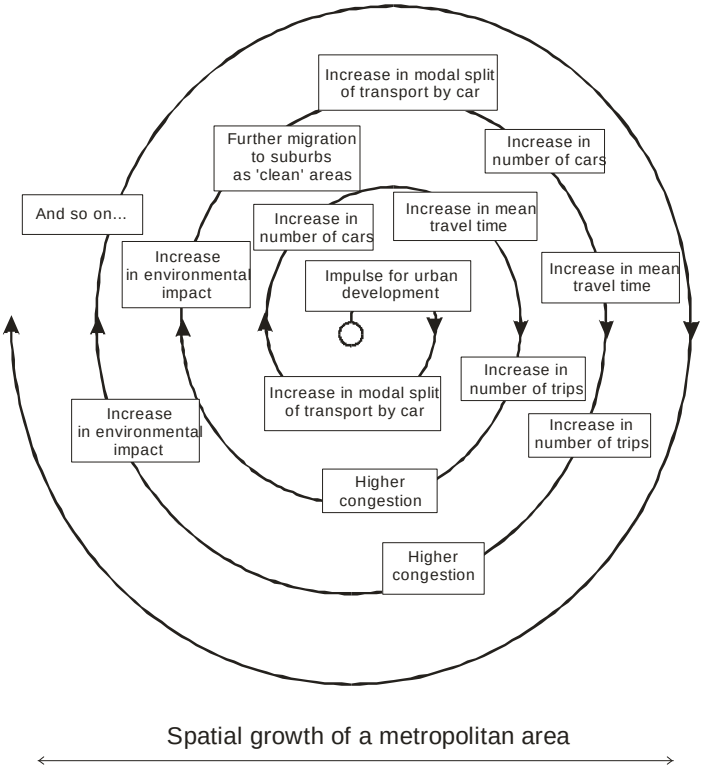

Fig. 9: Connection between the development of suburbs and growing traffic congestion. Source: Beim 2009

Spatial development of suburbs boosts commuting costs, and thus the costs of living; on the other hand, the depopulation of tenement houses and blocks of flats leads to ever worse living conditions and increases rent. The owners, unable to meet operating costs or to find new tenants, often raise the rent for remaining lodgers,

thus forcing another group of people to move out, usually to the suburbs. As a result, the old districts are settled by groups of short-term occupiers, e.g. students. They are not interested in improving the quality of flats and houses, as it leads to higher rent. They are trapped in a vicious vortex. Growing costs of living in the city centre offsets the effects that the rising costs of suburban living (e.g. travel costs) could have for curbing growth of the suburbs (Fig. 9). Similar relation can be shown for retail trade within main streets. The tenement owners would like to compensate looses and rise up the rent. More and more shops move to shopping malls, or simply close down. After several months vacant places are rented for cheep groceries or for trade not welcomed in shopping malls.

9 POLICY RECOMMENDATIONS

Many changes are necessary in order to make Polish cities more sustainable. First of all, it is necessary to change the planning law. There is a need for long-term comprehensive planning instead of short-term demand-oriented planning, which is currently a common practice. Many instruments, which proved to be successful in other countries, could be also applied by Polish cities, for example urban growth boundary, transit oriented development, urban codes, and regional planning. There is a need for cooperation with communes of Poznań agglomeration in the field of housing and transportation planning, but there are practically no instruments of regional planning in Poland at the moment.

However, during last years Poland has been witnessing a public debate concerning liberalisation of planning law. The lobby of developers aims to make planning rules more liberal, although the current act from 2003 is much market-oriented. For example, there is a regulation called “good neighbourhood rule”, which allows to build a house or a housing complex in the absence of local land use plans. The location decision is approved on the base of few basic parameters (for example, access to public road, plot coverage), even if it does not comply with the masterplan of the whole city. Local land use plans usually cover only a minor part of the city, so the “good neighbourhood rule” is being abused, contributing to urban sprawl. More than 80% of new housing in Poznań during the years 1999-2007 was built without local land use plans, i.e. without comprehensive long-term planning. As a result, the vast majority of new housing does not have direct access to public transport and other facilities (Radzimski 2009). It is very probable that in the next years the short-term demand-oriented planning paradigm will be still dominating. Because of developer lobbying, the parliament voted in 2008 for easier conversion of agricultural land into building plots, although this decision was criticised by planning experts and vetoed by president Kaczyński.

Poznań, which is a young and dynamic city, needs a long-term development strategy aimed at reducing suburbanisation and promoting in-fill development within or adjacent to existing urban structures. Students, who are a huge demographic potential, should be encouraged to work and live in the city after degree. Today many young people are pushed out of the city because of extreme price and rent levels, so more social housing is necessary. It could be built in cooperation with private developers, but on municipal land. Social housing would reduce price levels and increase affordability of housing, since there is a shortage of ca. 17,000-22,000 dwellings in the city. However, extensive single-family housing cannot be a successful solution to the housing question.

Parallel to the housing programme, the attractiveness of inner city should be raised by improvements of public space and reduction of automobile traffic. To make inner city streets more liveable, local authorities should encourage social and cultural use of vacant buildings in cooperation with landlords. Local and national authorities should concentrate on the problem of inner city decline and grant financial support for urban renewal and redevelopment. High property taxation of derelict land in the inner city should discourage owners from speculation and promote investment. On the other hand, land value tax should discourage from development in the distant suburbs.

Last but not least, there is an urgent need to redefine the way how the urban planning students are taught. The academic practice shows that what students actually learn about planning is how to make plans for greenfield investments. One can expect that the graduates understand planning as a technical activity, not as a process. Therefore, new elements need to be introduced into the courses, for example: urban renewal, public transport planning, and traditional neighbourhood design.

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reviewed paper

Assessing the quality of life (QOL), its significance in urban planning and the feasibility of establishing a Quality of Life Reporting System (QOLRS) in cities, the historic city of Esfahan as the case example

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1 ABSTRACT

Quality of life (QOL) represents the level of welfare as recognized by the people. Its key concept is the recognition of every single individual's expectation from life and its quality. Besides, the QOL introduces the differences between the hopes, wishes and expectations of individuals as against the opportunities and limitation of each society. In this paper the QOL concept, the community trends approach and methodology of launching a Quality Of Life Reporting System (QOLRS) are applied not only to assess the QOL and its impacts on the urban planning system in the historic city of Esfahan, but also to test the feasibility of launching a QOLRS in the city chosen as the case example, i.e., Esfahan. To reach this aim, information about the measures and indexes of QOL are obtained from two different streams, one from the official sources and the other through the direct contact with the citizens. After analysing the results, this assessment revealed the fact that the differences in the quality of employment, population resources, and community affordability measures were higher. While, despite a high degree of difference between the applied QOL measures, the difference in community stress, community participation and community safety measures are noticeable. The results also indicated the possibility of establishing a QOLRS in this city based upon the information sources used in this study, as well as the prospects of enhancing the urban development planning and management procedures through setting up an adapted process of organizational framework and control mechanism, production of planning visions and goals based on community agreements and evaluation and decision taking processes. Also it was deduced that the QOLRS can produce an appropriate blueprint for reaching consensus and a common language between citizens, planners and urban decision takers in a sectoral and centralized planning system of this city. The paper emphasises the necessity of reaching an integrated urban planning and management system through a well devised set of improvements to the inter-organizational relations and structure of the cities in general and this case example specifically.

2 INTRODUCTION

The view of enhancement of QOL has been used in urban planning and urban development, in many countries, particularly the more advanced ones. The emphasis on the importance of human resources as the most important capital of a society is the highest characteristics of this view. Different countries according to their economic, social, cultural and environmental pecularities have used different methods to utilize the concept of QOL and its enhancement in their society. In this article with the use of the concept of QOL and QOLRS its attempt to investigate the QOL and its effect on urban planning in the city of Esfahan. The expecting aims are:

- Recognition of the concept and approaches of QOL and its application in urban planning.
- Assessment of measures and indicators of QOL in the city of Esfahan.
- Study on applicability of creating a QOLRS in city of Esfahan.
- Evaluation of the effects of QOLRS in the improvement of plan producing process, and urban management of Esfahan.

In this paper the QOL concept, the community trends approach and methodology of launching a QOLRS are applied not only to assess the QOL and its impacts on the urban planning system in the historic city of Esfahan, but also to test the feasibility of launching a QOLRS in the city chosen as the case example, i.e., Esfahan. To reach this aim, information about the measures and indexes of QOL are obtained from two different streams, one from the official sources and the other through the direct contact with the citizens.

In this regard, at the first stage the necessary informations and indicators to measure the QOL in Esfahan from formal anf informal sources and also through questionnaires from the residents of this city about their views were collected and compared with the information from Iran and also a developed country with ample experience in the field of QOL assessment and establishing a QOLRS, i.e., Canada.

At the second stage, the effects of QOL concept in the stages of a plan-making process which are affected most will be studied. The similarities of the plan prepared for Esfahan with the structure that is affected by the QOL concept and the adopted approaches have also been studied. At the last stage - with the integration of the results of this stage with the results obtained from the evaluation of the Esfahan's QOL, the possibilities of creating an appropriate QOLRS in this city - which has a centralized and sectoral planning system - will be examined. The result can be used as a device to strengthen the interrelation between not only the organizations but also all the stakeholders in a decision-making arena, to achieve an integrated urban planning and management system.

3 QUALITY OF LIFE CONCEPT

The QOL is the translation of social and environmental considerations in the process of urban plan preparation and implementation. The QOL concept can prompt the sustainable development and increase the sensitivness to carrying capacity of the earth and also the human capacity. This concept is the symbol of answering the needs of post modern era and follows a common ground to counter the spatial disparities. On the other hand, enhancing the level of the QOL is turned to be an appropriate device to achieve a better situation in the economic competition cycle, causing a move from a sole economic competition toward the competition of cities. The improvement of QOL in the cities can be considered as a condition in which the needs of societies to human resources and technological progress are achieved.

Within a planning framework, QOL represents the level of welfare considered by the people, and a key concept of it is the recognition of the expectations of every individual from life – in general - and from its quality. QOL represents the level of enjoyment of a person from the social and welfare services prepared for upgrading the QOL and consists of satisfaction and the opportunity to reach a situation which a person enjoys his/her life and also the disparities of hopes, wishes and expectations of an individual and his or her experiences from what is considered to be an acceptable QOL. Therefore the more the positive aspects and QOL, the more the level of satisfacation will be. (Smith, 1994; liu, 1974; Rogerson, 1998; cobb, 2000)

4 COMMUNITY TREND APPROACH

The existing approaches reletaive to the application of the QOL concept are "livability comparison approach", "personal well-being approach", "community trends approach", "wage differentials approach" or "market/resident approach". Among these approaches, some are based on the principles of economics, some on social sciences in general and also requirements of the ideology and also the practical aspects of planning. The urban decision makers which are pursuing the aim of correcting community relations that affect the QOL use the personal well-being approach. The economists and those groups advocating the economic development use the wage differentials approach and livability comparison approach, and those that hope to plan for upgrading the QOL of communities, use the community trends approach.

Urban and regional planners can use all the four approaches as introducted above, but it seems that community trend approach can fit better in planning and can better assist the planners. The reason for this is that first, this approach evaluates the trends and priorities of a community through time and consider these trends and changes as part of an ongoing process of development in any society. The second reason is that this approach encourages the discussions about the QOL indicators by the interest groups. Third reason is that the data used and applied by this approach from the facts concerning the QOL of the community can be considered as a set of appropriate foundation for decisions taken by all sectors of each comminity.

The foundamental prerequisities about the QOL issues of each society -based on community trend approach- are as follows:

- People are attracted to the places they like, and change the local conditions through time
- Mostly, people compare the QOL during a period of time and also compared with other places
- The political issues about the QOL and dicision making occurs within the boundaries of each urban area or each urban region
- The results of studies could only be valid if it is according to the ideas and views of local people of any community

Based on the aforementioned principles and prerequisites of this approach, the process of achieving favorable results in evaluating the QOL are summarized in five basic stages as shown in figure 1 (Myers, 1988).

Fig. 1: Five basic stages for measuring the QOL, source: Myers, 1988

5 LAUNCHING A QUALITY OF LIFE REPORTING SYSTEM(QOLRS)

In this paper an attempt has been made to utilize Federation of Canadian Municipalities (FCM) experience in Canada which comes below:

In 1996, FCM commissioned a study of how changes to the funding structure of federal transfer payments would affect municipal governments. FCM concluded these changes would have an impact on growing municipal responsibilities, but members lacked the tools and the data to debate this and other policies on behalf of their communities. To ensure a more effective voice in the future, the largest urban members of FCM recommended the creation of a reporting system to monitor the QOL in Canadian communities. FCM immediately began developing the QOLRS. By providing a method to monitor QOL and aspects of the social, economic, and environmental health of communities, as a tool to (FCM, 2001; FCM, 2002):

- Identify and promote awareness of issues affecting QOL
- Better target policies and resources aimed at improving QOL
- Support collaborative efforts to improve QOL
- Establish municipal governments as a strong and legitimate partner in public policy debates

5.1 Focusing on the QOL

The QOL measures reflect important dimensions of daily life at the community level. Public confidence in government and institutional leadership requires a focus on the QOL. QOL measures cross over sectors, programs and policies, putting the impetus on policymakers to make a link between what popular reports show and the experience of individuals and families. The QOL approach measures outcomes in "people terms" to encourage better communication between governments and communities, greater program transparency and greater accountability for results. The QOLRS is built conceptually on the initiatives outlined above (FCM, 2001).

5.2 Focus on outcomes

For the most part, the QOL concept is focused on measuring outcomes. Outcomes measurement is part of a public sector response that emphasizes accountability of public policy and transparency in the operations of public institutions. Leading-edge analysis is focusing on QOL indicators, assessing what actually happens to people as a result of social, economic and environmental changes (and, of course, of their own lifestyle choices), and on how well public policies serve to improve their life situation (FCM, 2001).

5.3 Information sources

Where possible, the information used in this reporting system has been obtained from national sources. Where special data runs were prepared, relating national measurements to community boundaries, the source notes indicate "Special Tabulations". The result is a powerful database for monitoring QOL, evaluating

policy outcomes, and researching evolving needs. The information in this report is only the surface of the database(FCM, 2001).

5.4 Information attributes

The establishment of a comprehensive QOL monitoring system is complex. The information has to be meaningful at the community level; available annually and on a nationally consistent basis; and be easily understood. Indicators have to reflect the various dimensions of living reality, and use the substantial existing research that has identified consistent relationships among those dimensions (FCM, 2001).

5.5 The QOL Measures

Eight complete sets of indicators are used for the QOLRS. A summary of the indicators follows (FCM, 2001):

- Population Resources Measures (PRM)

This is a profile of population characteristics, population growth, education and literacy levels, cultural diversity, immigration and the age structure of the population. It provides a basis for the monitoring of long-term demographic changes.

- Community Affordability Measures (CAM)

These measures compare levels of income with the cost of living. A higher affordability measure occurs when average incomes are relatively higher than average costs of living.

- Quality of Employment Measures (QEM)

These measures monitor employment dimensions and trends, such as equity and the distribution of employment, partial employment and unemployment among population groups.

- Quality of Housing Measures (QOHM)

These measures include the affordability of housing to rent (relative to prevailing incomes), percentage of homes in need of repair, vacancy rates and housing starts.

- Community Stress Measures (CStM)

These measures reflect social problems and they examine variables related to vulnerable groups. They include the incidence of low income, the incidence of lone-parent families, and the incidence of crisis calls, bankruptcies and suicides.

- Health of Community Measures (HOCM)

These measures reflect the rate of premature deaths (before age 75), infant mortality, the percentage of babies born with low birth weights, and workdays lost due to illness or disability.

- Community Safety Measures (CSFM)

These measures reflect rates of crime and violence, youth crime, and the rate of unintended injuries.

- Community Participation Measures (CPM)

These measures reflect the involvement of citizens in their community, and include political participation (voter turnout), daily newspaper circulation, charitable giving and support for community projects as measured by contributions to the annual United Way campaign.

6 QOLRS STRUCTURE AND ITS ESTABLISHING PROCESS IN ESFAHAN

QOLRS consist of subsystems of input, output, organizational structure, data processing and information transformation. These subsystems by itself are divided into parts. They have mutual relations with each other and have different inputs and outputs, and interact with each other with coordination. The inputs to the system are the information and data about the measures and indicators of the QOL which are obtained from different sources, and its final product is the report of the QOL. In every stage of this system returning to the previous stage and making necessary correction is possible (Fig. 2).

The condition for appropriate function of this system is the right relation between the parts of the system and true data and information entry. Continuation of different implementing stages, and a real reporting from the existing situation without any personal interference in the reporting of the QOL improves the efficiency of the result of the system and provides the study of changes in QOL in a single community and shows the positive and negative trends.

To commence the operation of QOLRS in Esfahan, seven consecutive stages were designed, as follows:

- To study the concept of QOL and getting acquainted with its special features
- Establishing different sectors of organization subsystem structure and coordinating them
- Collection of the QOL measures and its related indicators, considering the local conditions
- Creating the data and informations analysing subsystem
- Developing a saving opportunity and recycling and updating of indicators analysis results
- Preparing the QOL report
- Creating informations giving of QOL report and their interrelations

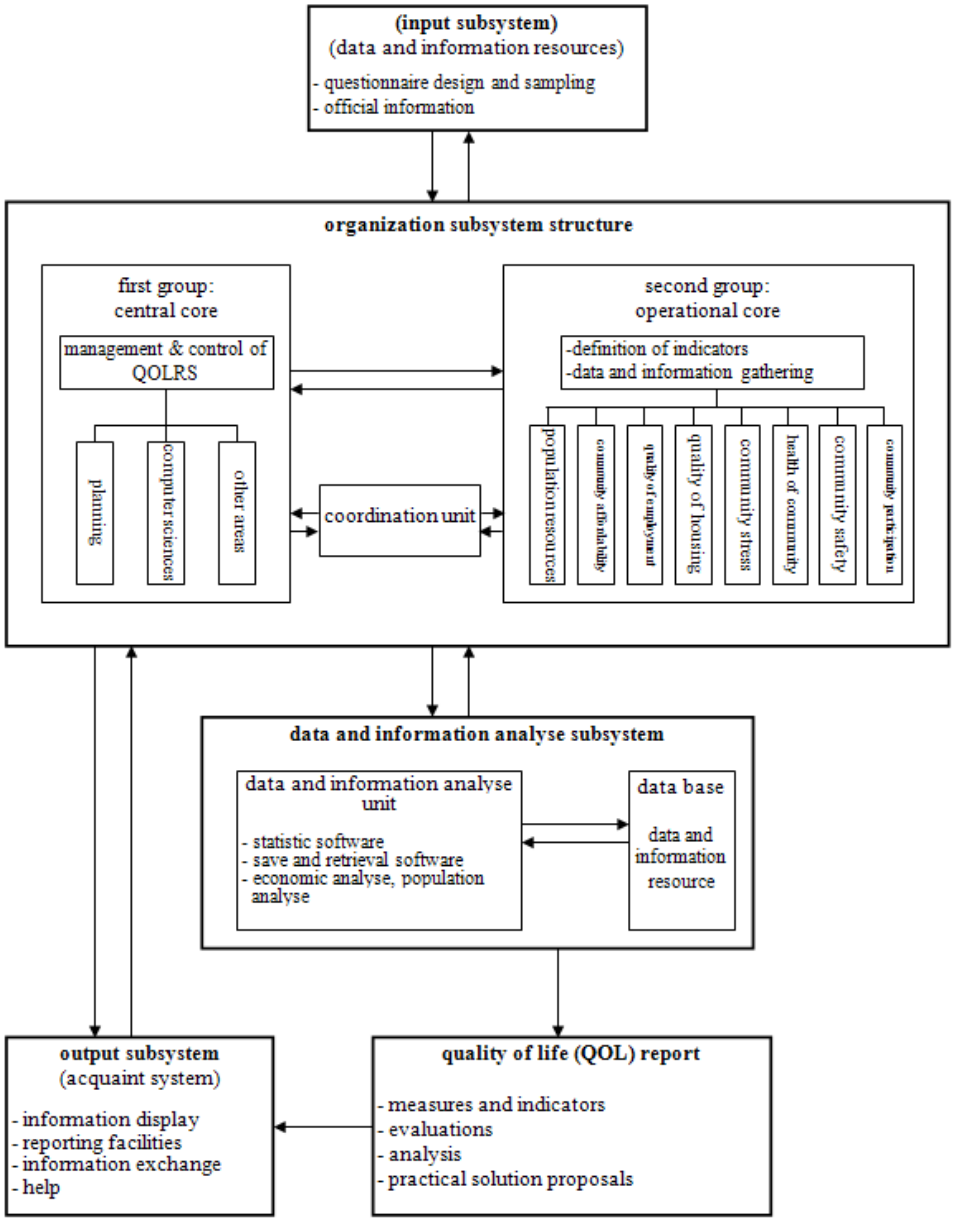

Fig. 2: QOLRS subsystems and their interaction relations as proposed for Esfahan, source: author, 2010, for this paper

7 ASSESSING THE QOL AND ITS SIGNIFICANCE FOR URBAN PLANNING IN ESFAHAN

In order to apply the QOLRS in assessing the QOL in Esfahan and reporting it, a six step process of analysing the QOL was designed, as follows:

- Introducing the measures and indicators of QOL used in the QOLRS
- Selection of the appropriate measures and indicators of QOL
- Gathering data on the indicators of QOL in three ways, namely, first by reference to the available official information of different public organizations, second through inquiry from the relevant expert officials and authorities, and third by conducting questionnaire surveys of people's opinions about their QOL
- Managing data on the indicators of QOL used in QOLRS by constructing different tables
- Comparing and interpreting the indicators of QOL in Esfahan and the indicators used in QOLRS in the Canadian cities, and comparing the findings with people's opinions
- Analysing for reaching the results about the findings of this search

Upon the implementation of the project, Esfahan was divided into 10 districts. To find about the citizens' opinions, the uniform random sampling method was used, and in total 50 surveys were conducted equally for each district. The surveys were completed by the citizens, experts, authorities, and the conductor. The questions were asked based on the measures and indicators of the QOL's information needs and those of the sampling population's characteristics. The information regarding the measures and indicators of the QOL was common among the citizens, experts and the authorities' opinions, and those of the official organs. This enabled us to use the data simultaneously and in combination in the QOLRS, and analyse the QOL accordingly.

The most important findings of the analysis of the QOL in Esfahan are presented below. This is according to the classification of the measures used in the QOLRS designed and proposed for Esfahan in this paper (the quantitative data are not presented here due to their large amount) [1].

7.1 Human Resources Measures (HRM): Information attributes

- The high proportion of the young population of Esfahan (%52.7 of total population)
- The very high population growth rate (%3.9 growth rate for 2 years)
- The very high labour force replacement ratio (2.5 new entrant people versus each leaver)
- A good quality general education while a very poor technical education (%13 versus %1.4)
- A very low labour efficiency and productivity rate (%34.9 of total labour force have no general and technical education)

7.2 Community Affordability Measures (CAM)

- low household incomes ($4273 per 1 year) and low cost of living ($4919 per 1 year)
- The lack of any financial savings due to the high costs of living as compared to the incomes, plus the ever-more financial vulnerability of households to financial crisis
- The increased imbalance of costs and incomes of the society's urban middle classes
- The high percentage of the urban middle classes (%77.9) and the less class differences in Esfahan in comparison to the whole country

7.3 Quality of Employment Measures (QEM)

- The high unemployment rate (%3.5) – especially the high long-term unemployment rate (%65.5 of total unemployment) – in Esfahan and the low employment rate of people within the age group who

[1] The quantitative data on the indators of the QOL were presented in the author's M.A thesis (Sh. Beheshti University, 2006) under the title of "Application of the Quality of Life Reporting System in Urban Planning (The case of Esfahan)"

are employed especially among the 15 – 34 age groups (%18.8) and the labour force aged 40 and above (%14.8)

- The high proportion of temporary employment rate compared to the permanent one (%61.4 versus %37.2)
- The low social support (%9.1) and employment insurance (%1.46) for the households as a result of the decreased job security and incomes
- The low average wage rates ($0.98 hourly)

7.4 Quality of Housing Measures (QOHM)

- The high housing rentals and purchase prices in Esfahan and the difficulty in purchasing or renting affordable accommodations of the lower income households (rent as a percentage of median family income is %41 and average price for a 2 bedroom apartment is $31555)
- The lack of welfare and safety standards in more than 70 percent of houses in the city
- Allocation of almost 41 percent of the income of households to housing

7.5 Community Stress Measures (CSM)

- low number of the lone-parent families (%13.3) and the low bankruptcy rates of the consumers and economical enterprises (9.8 per 1000 establishments)
- The high fertility per 1000 women aged 15-19 (92.8 per 1000)
- The very low suicide rate (near 0.0)

7.6 Health of Community Measures (HOCM)

- The high infant mortality rates (208 infant mortality per 1000 live births) and low birth weights babies (%3.6 of single births less than 2500gr)
- The low premature mortality rate (184 per 100000 population)
- The high hospital discharges rate (20057 per 100000 population) that decreased labour productivity rate

7.7 Community Safety Measures (CSFM)

- The increased number of crimes committed by the youth due to the higher proportion of Esfahan's young population
- The growing unsafety trend
- The lower rate of moral crimes (467 per 100000 population) in comparison to the financial ones (3695 per 100000 population) and the heavy injuries rates resulting from the committed moral and financial crimes

7.8 Community Participation Measures (CPM)

- The low community participation rate (%46.83) and the high fluctuating voting rates (from %29.5 to %63.7)
- The people's low level of awareness of their collective destiny and their little attention to the sustainability issues and the needs of future generations

8 THE ROLE AND SIGNIFICANCE OF THE QOLRS IN URBAN PLANNING IN ESFAHAN

Esfahan is the second industrial city of Iran which has historical and heritage importance too. Its historical importance goes back to many centuries back. This city - in its different historical periods - has sometimes reached its peak of fame and sometimes was led to its demise. The city of Esfahan prospered greatly during the 12th and 13th centuries and has many of its invaluable heritages from that period. Esfahan was selected as the capital city of Iran during the 16th and 17th centuries and it achieved greater growth and fame and was expanded. By the turn of the twentieth century, Esfahan, like the other Iranian cities, underwent dramatic

changes on the domestic and international scenes; and there was an increase in its urban growth rate, especially after the advent of the modernization movement in Iran in 1930's. At that time, Esfahan's spatial structure underwent a great deal of incompatible changes, e.g. new streets were designed, textile factories were established, and official buildings were constructed, and the city's infrastructure was renewed to include fire stations, and water and electricity networks, most of which were done without any well-prepared plan.

The first well-prepared urban development plan for Esfahan was produced in 1957 as part of the country's second national seven-year development program (1963-1956). From that time onward, seven plans has been made, including a comprehensive regional plan, three comprehensive urban development plans, and three detailed plans. Such plans aimed at controlling the landuse and urban growth rather than paying attention to the people's QOL. In this study, an attempt has been made to investigate the substantive issues and the implementation of urban planning in Esfahan, and to pursue the ways in which it was affected by the notion of QOL and to assess the degree of attention paid to the QOL in Esfahan and its urban planning. The QOLRS played a significant role in designing the organizational and control framework, and helped to devise the broad planning goals, to evaluate decision-making processes and its relation to the other urban planning aspects. This is illustrated in Figure 3, which shows the extent by which different Esfahan urban planning processes were affected by the discussed notion of QOL. No urban plan in Esfahan so far has intended to pay direct attention and to enhance the QOL as a definite and broad goal. This is while there are more points of similarity between the urban plans in Esfahan and the notion of the QOL in respect to gathering data, and less in respect to evaluating the planning goals (Fig. 4).

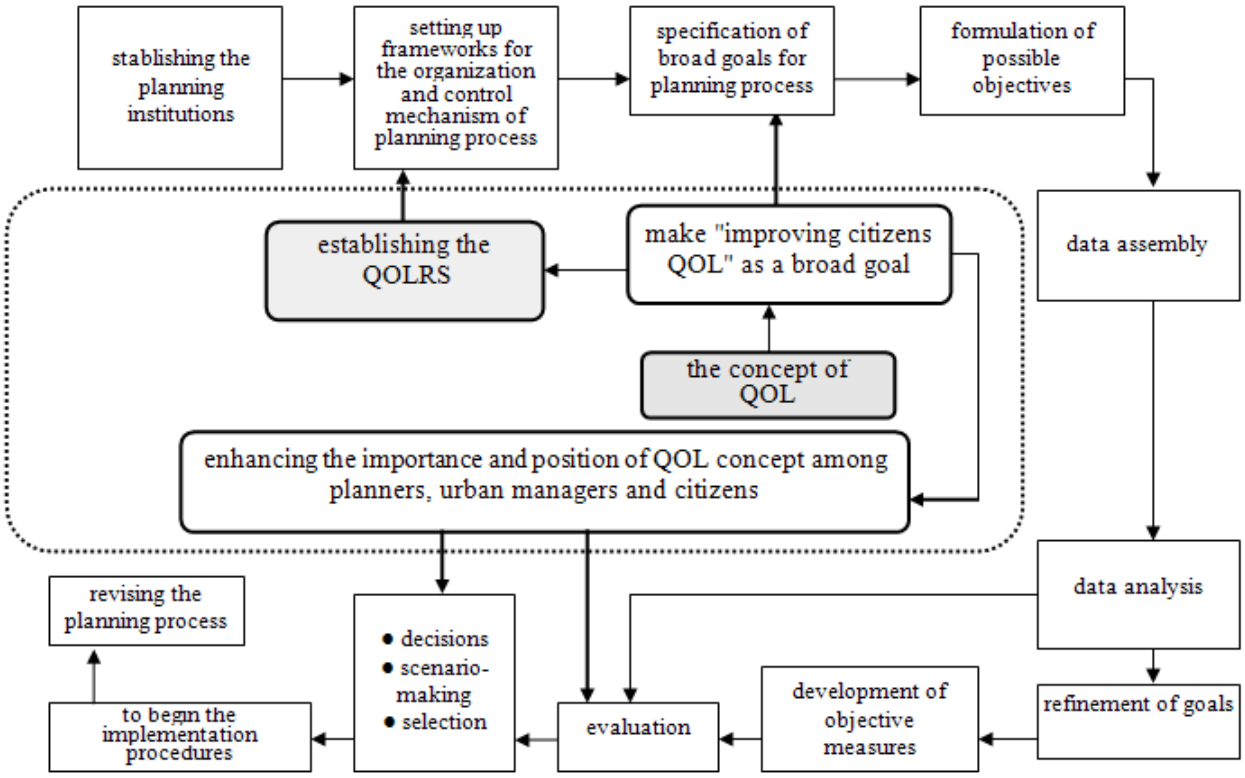

Fig. 3: The effects of the QOL concept in plan-making process in Esfahan, source: author, 2010, for this paper

plans	plan maker	year	the amount of QOL concept effects on the most important stages in plan-making process				
			setting up frameworks for organization and controlling planning process	specification of broad goals for planning process	data assembly	evaluation	decisions scenario-making and selection
master plan	F.H.Cocks consultans Co.	1958	L	L	L	N	L
master plan	Organic consultants Co.	1971	N	L	L	N	N
detailed plan	Organic consultants Co.	1975	N	N	N	N	N
comprehensive regional plan	ministry of housing and urban development, local office in Esfahan	1986	N	L	L	N	N
master plan	ministry of housing and urban development, local office in Esfahan	1988	N	N	L	N	N
detailed plan	ministry of housing and urban development, local office in Esfahan	1997	N	N	N	N	N
review of the detailed plan	collaboration between seven consultancy companies	1997	L	L	L	N	L

table content key: H: direct and high effect (more than %70) **L:** low effect (from %30 to %70) **N:** with no effect (less than %30)

Fig. 4: The amount of QOL concept application in the most important stages of Esfahan plans plan-making process, source: author, 2010, for this paper

The QOLRS has attempted to enhance the quality of people's lives as the main goal of the urban plans; and therefore, it has expanded the horizons of the social, economical, structural and environmental issues. Thus, it takes into account all the public organizations and their behavioural structures and establishes relations between the citizens, the municipality and the other official bodies. The annual QOL report publications show the results of all the administrative bodies, organization performance, their strength and weaknesses, and their general development trends. It is possible to use all of the potentials and strengths of the officials and also the public opinions for the production and implementation of the urban plans in Esfahan. Hence, the QOL concept and QOLRS - as an applicable tool for urban planning - can provide a common language for the consensus of the urban policy making in a sectoral and centralized urban planning system, and to use it as a tool for a coordinated and an integrated urban planning and management (Fig. 5).

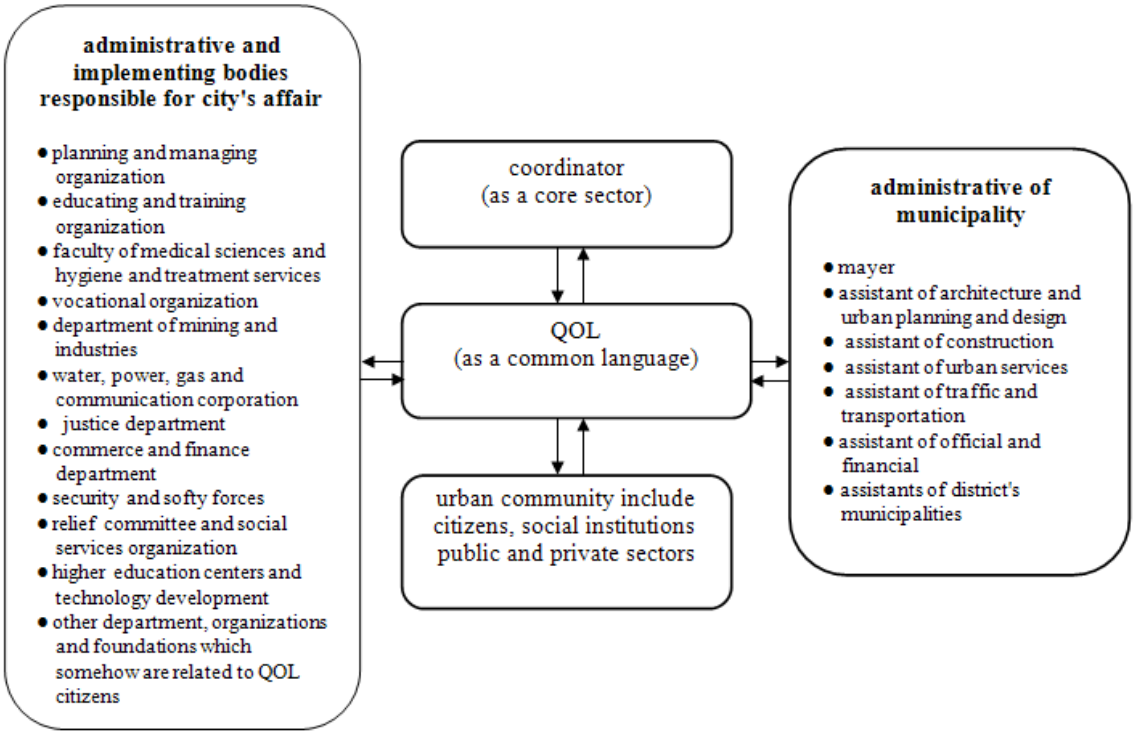

Fig. 5: The QOLRS as a common language to reach consensus in a cenralized and sectoral urban planning system, source: author, 2010, for this paper

9 CONCLUSION

The cocept of QOL can improve the urban planning to achieve community's goals and also create mutual relations between the planning policies and planning organisations within an urban plan-making process. The QOLRS may enable the application of the cocept of the QOL. Also undoubtedly it can achieve the urban planning goals and objectives without the need to perform a comprehensive analysis or have a repetitive work. The measures and indicators used in the QOLRS illustrate that in some aspects and in regards to the measures and indicators adopted, the QOL in Esfahan is not satisfactory and there is an urgent need to have more attention being paid to the QOL measures, quality of employment, human resources and community affordability measures and include all these in an appropriate and well-thought urban planning and management system. The problem is caused by failure - on the part of authorities - to notice and make due attention to the different aspects of the QOL in Esfahan and include it in an urban planning and management activity. This, in turn, results from the centralized and sectoral nature of the urban management in this city - and throughout the country - and the lack of local collaboration between the official bodies and all other stakeholders within the urban planning and management domain. One important and initial step to solve this problem is to promote the necessary collaboration between all the stakeholders – including local authorities - and to move towards achieving consistency of measures and coordinated actions. The QOL concept and the established QOLRS can very well work and be used as an efficient tool for efficiency of collaboration and mutual inter-organisational relations to make an integrated urban management.

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Baukultur Rheinland-Pfalz im Kontext von Geoweb und Web2.0 mit MACE

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1 ABSTRACT

Architektur hängt eng mit dem Begriff der Baukultur zusammen und den Vorgängen, wie der Mensch die natürliche und/oder bebaute Umwelt verändert. Im Gegensatz zum Begriff der Baukunst beinhaltet Baukultur alle gebauten Elemente. Beispielhaft sind hier Ingenieurbauten wie Infrastruktur- oder auch Funktionsbauten zu nennen. Baukultur beschreibt damit Geschichte, Tradition und Identität eines Landes oder einer Region. Im deutschsprachigen Raum sind einige Publikationen zu diesem Begriff erschienen [vgl. hierzu zum Beispiel Weeber et al 2005, Hutton 2005, Mittler 2005]. Dabei ist es jedoch sehr problematisch, dass der Begriff „Baukultur“ in seiner ganzen Bedeutung nur in einem kleinen Spezialistenkreis klar definiert ist, und die breite Bevölkerung, die bewusst und vielmehr auch unbewusst die Baukultur prägt, nicht versteht, dass sie ein Teil der Identität schaffenden Tätigkeiten ist. Bei Beobachtungen neu entstehender Gebäude oder Siedlungen wird dieser Trend vielfach deutlich: Häuser von Fertighausherstellern mit ortsfremden Materialien überwiegen in der Bauweise im Gegensatz zu einer zeitgenössischen aber dennoch regionalen Architektur. Eine Ursache hierfür ist, dass es kaum eine Publikation oder eine Möglichkeit gibt, sich schnell, regional und vor allem umfassend über qualitätsvoll Gebautes zu informieren. Vor allem das Fernsehen hat mit diversen Einrichtungsshows einen gefährlichen Trend zu dieser Beliebigkeit gesetzt. Eine Lösung dieses Informationsdefizits könnten Communities zu diesem Thema im Internet sein. Einen vielversprechenden Ansatz liefert das von der EU im Rahmen des eContentplus-Programms geförderte Projekt. MACE (Metadata for Architectural Contents in Europe). MACE verknüpft über ganz Europa und weltweit verteilte Architektur-Archive mit Datenbeständen über bereits realisierte und in Planung befindliche Bauprojekte miteinander und öffnet sie für Interessierte. Neben der Unterstützung zum Finden, Beschaffen und Nutzen einschlägiger Inhalte will MACE die Inspiration von Architekten fördern und insbesondere deren Aus- und Weiterbildung verbessern. Dazu verknüpft das MACE-System die aus verschiedenen Archiven stammenden Informationen anhand zahlreicher Metadaten. Dies geschieht teilweise automatisch, teilweise manuell unter Einbeziehung einschlägiger Communities mittels Web 2.0 orientierter Ansätze.

Mit Hilfe der MACE-Datenbank wird in diesem Projekt versucht, das Thema Baukultur im Land Rheinland-Pfalz zu forcieren und es für Studenten, Architekten, Entscheidungsträger, aber auch für die interessierte Öffentlichkeit zu kommunizieren.

2 EINLEITUNG

Der Begriff der Baukultur ist nicht abschließend gefasst. Die Architektin Louisa Hutton beschreibt Baukultur als „übergreifenden Dialog mit Wirtschaft, Ökologie, Soziologie, Politik und Kunst“ [Hutton 2008:8]. So ist Baukultur als querschnittsorientiertes Sujet zu sehen, das neben Architekten und Planern viele andere Akteure zwingend miteinbeziehen soll und muss. „Baukultur entsteht, wenn Bauaufgaben umfassend gelöst werden: Wenn außer den gestalterischen auch städtebauliche, funktionale, technische, wirtschaftliche, ökologische und soziale Kriterien das Planen und Bauen bestimmen.“ Weiterhin ist in den Leitlinien des Deutschen Städte- und Gemeindebundes verankert: „Baukultur kann nicht von oben verordnet werden. Sie muss als konstruktiver und kreativer Dialogprozess in den Städten und Gemeinden unter Einbeziehung aller Verantwortlichen entwickelt werden“. Weiterhin wird in den Richtlinien konstatiert, dass qualitätsvolle Gestaltung nur dann erreicht werden kann, sofern eine erforderliche Sensibilität für gestalterische Werte bei allen vorhanden ist [Dialog Baukultur RLP 2002]. Baukultur besteht demnach aus folgenden Bestandteilen, die einem ständigen Wechselspiel unterworfen sind: Fest verankert ist die physisch erfassbare Dimension der bebauten Umwelt, die kulturelle Identität einer Gesellschaft und die politische Realität. Alle Faktoren sind zudem vor dem jeweiligen historischen Kontext zu sehen [Baukulturmonitoring 2010].

Die gesellschaftliche und nachhaltige Auseinandersetzung mit dem Thema Baukultur ist allerdings nur dann zu erreichen, wenn das Bewusstsein in der kompletten Gesellschaft verankert ist. Und eben dies ist das Problem: Baukultur wird meist nur vereinzelt von bestimmten interessierten Gruppen wahrgenommen, ein

richtiges Bewusstsein ist im Gegensatz zu anderen europäischen Ländern wie Italien oder Frankreich nicht vorhanden. Die Frage ist: Ist Baukultur messbar nach den Qualitätsmerkmalen wie Gebrauch der Gebäude, ihrer Nachhaltigkeit im sozialen, ökologischen und ökonomischen Sinne, durch die eigentliche Herstellung oder auch nach der Gestalt der Bauten und gebauter Umwelt und deren Integration in den Raum [Streich 2005:341]? Wie können neue Wege gefunden werden, damit gute Architektur und dementsprechend auch eine Auseinandersetzung mit dem Thema Baukultur in der Bevölkerung besser in der Gesellschaft wahrgenommen werden?

3 DAS MACE-PROJEKT

MACE verknüpft Architektur-Repositories mit großen Datenbeständen, um primär für Ausbildungszwecke einen einheitlichen Zugriff auf diese verteilten und heterogenen Datenquellen zu ermöglichen. Inhalte, die vorher nur informierten Benutzergruppen zugänglich waren, können einfacher gefunden werden. Zudem wird der Austausch und die Diskussion durch das Bereitstellen der Informationen untereinander gefördert. Da die zukünftigen Nutzer über ganz Europa verteilt leben und arbeiten, wurden im Projekt auch multikulturelle und multilinguale Aspekte berücksichtigt. MACE wurde von der Europäischen Union im Rahmen des europäischen eContentplus-Programms bis Ende 2009 gefördert und bietet aktuell Zugriff auf über 170.000 Ressourcen aus mehr als 16 verschiedenen Repositories wie zum Beispiel die „UNESCO World Heritage List of Sites“ oder das Architekturportal „Archiplanet“. Für einen detaillierten Überblick über MACE und die technische Realisierung der MACE-Funktionalitäten möchten wir auf [Wolpers et al 2010] verweisen.

Im Gegensatz zu anderen Bestrebungen wie der INSPIRE-Richtlinie, bei der öffentliche Geodaten europaweit für Behörden der besseren Zugänglichkeit wegen normiert werden, will die MACE-Plattform „nur“ einer interessierten Zielgruppe punkthafte, objektbezogene Informationen (den Points of Interests POI) zugänglich machen. Flächenhafte Informationen würden hierbei eher verwirrend und nicht zielgerichtet auf die Endbenutzer wirken. Unabhängig davon ist ein „Geobezug“ über die KML/Google Maps Oberfläche in das Portal integriert, über die Objekte gesucht und auch georeferenziert werden können (vgl. Abschnitt „Map Search“).

3.1 Das MACE-Portal

Das MACE-Portal (http://www.mace-project.eu) bietet eine Vielzahl an Zugangsmöglichkeiten zu den integrierten Inhalten an, die bereits auf der Einstiegsseite (s. Abb. 1) angeboten werden.

Zunächst ist hier die sogenannte Filtered Search zu nennen (s. Abb. 2): Sie erlaubt zum einen eine gängige Stichwortsuche, zum anderen das Filtern nach verschiedenen Dimensionen wie etwa Repository, Sprache oder Klassifikation (beispielsweise die Zuordnung zu einer bestimmten Gebäudetypologie). Entsprechend der erfolgten Auswahl werden nicht nur unmittelbar passende Ergebnisse angezeigt, es erfolgt auch eine automatische Anpassung der Filter, um so die Charakteristika der ausgewählten Menge von Inhalten zu zeigen.

In der angezeigten Ergebnismenge kann der Benutzer entweder unmittelbar zu einem gefundenen Inhalt navigieren, oder zuvor zur entsprechenden MACE-Detailansichtsseite mit weiteren Informationen über die Ressource springen. Ein Beispiel für eine solche Seite ist in Abb. 3 dargestellt. Neben Informationen wie dem Titel und der Beschreibung der Ressource werden auch die formale Klassifikation, assoziierte Kompetenzen, Schlagwörter, Bewertungen und Kommentare sowie die Verortung auf einer Karte angezeigt. Angemeldete Benutzer haben die Möglichkeit, diese Daten selbst zu ergänzen bzw. zu modifizieren.

Eine weitere Zugangsmöglichkeit bietet die Map Search, mit Hilfe derer Benutzer interaktiv einen Kartenausschnitt auswählen können. MACE-Inhalte, die im entsprechenden Ausschnitt verortet wurden, werden sowohl auf der Karte als auch unterhalb (analog zur Filtered Search) angezeigt.

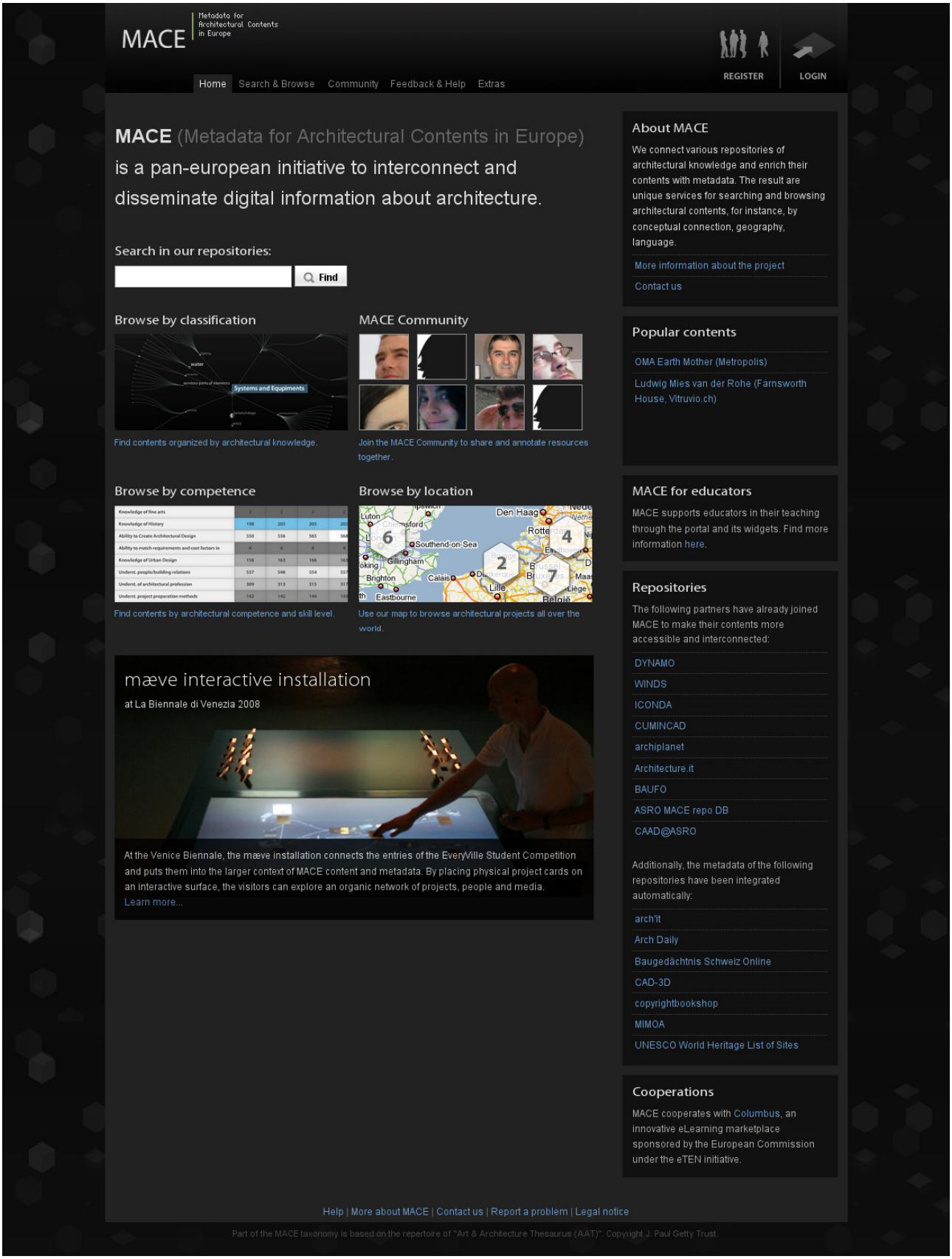

Abb. 1: Einstiegsseite der MACE-Plattform

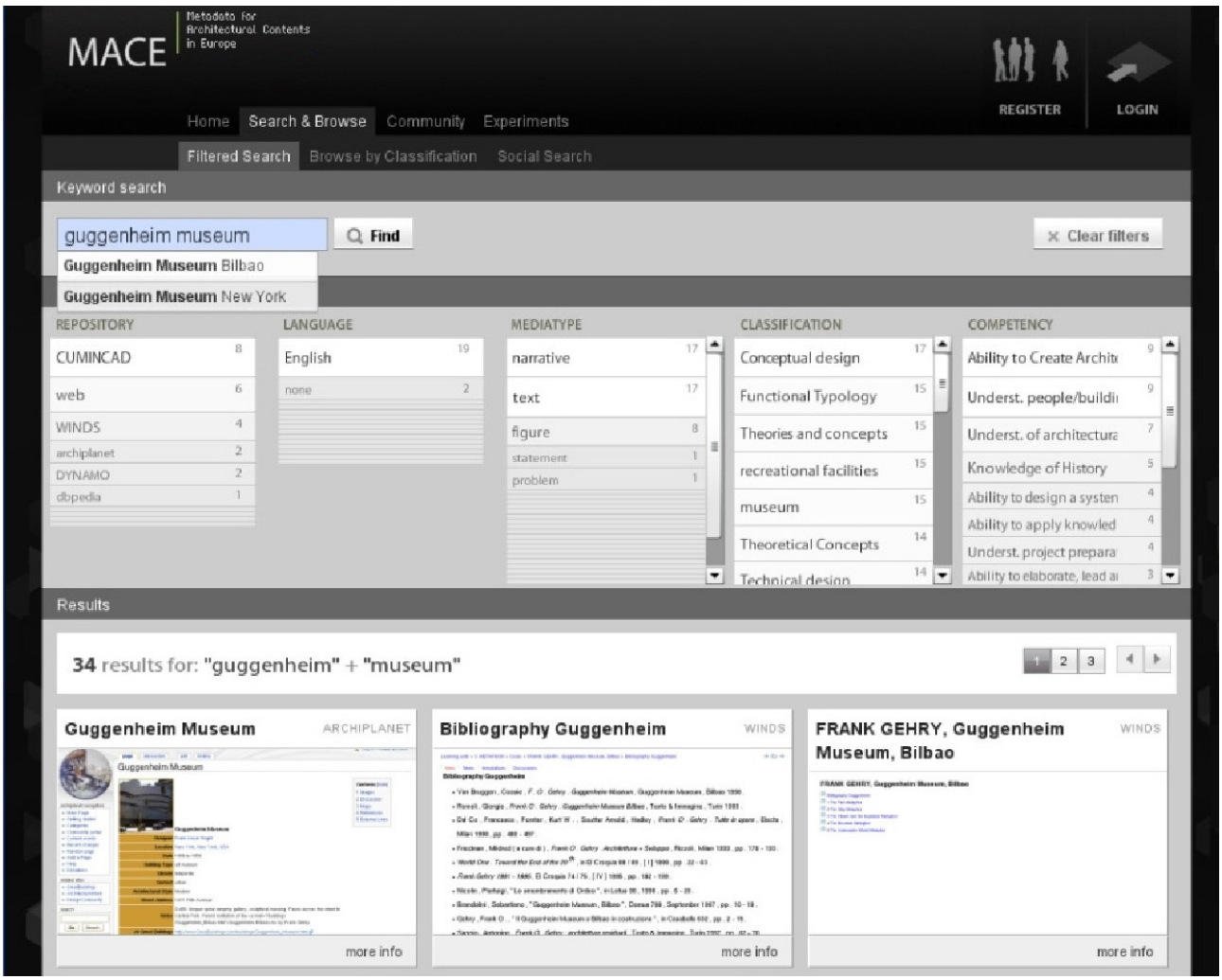

Abb. 2: Filtered Search Ergebnisse zum Thema „Guggenheim Museum“

Auch die in MACE genutzte Architekturtaxonomie mit mehr als 3000 Einträgen kann zum Auffinden von Inhalten genutzt werden. Mit Hilfe des Klassifikationsbrowser (s. Abb. 4) können die Benutzer durch die Taxonomie browsen und sich entsprechende Resultate anzeigen lassen.

3.2 Integration von Inhalten in MACE

MACE integriert eine Vielzahl von Inhalten aus zahlreichen Repositories, ohne diese jedoch aus den betreffenden Systemen zu kopieren. Ein solches Vorgehen würde nicht nur eine nicht unbedeutende Menge an Systemressourcen (z. B: Speicherplatz) verbrauchen, sondern auch komplexe rechtliche Fragen aufwerfen. Stattdessen werden lediglich die Metadaten über die Inhalte integriert. Dies wird realisiert mit Hilfe des OAI-PMH Frameworks [siehe Van de Sompel et al 2004]. Bei dem in MACE benutzten Metadatenformat handelt es sich um eine entsprechend der Spezifika der Architekturdomäne adaptiertes application profile, welches auf dem IEEE LTSC Learning Object Metadata (LOM) Standard basiert [IEEE 2002].

Neben der Integration kompletter Repositories erlaubt MACE zudem das Beitragen von Inhalten seitens normaler Endbenutzer mit Hilfe eines Bookmarklets.[1] Es erlaubt, auf einfache Weise neue Webseiten zu MACE hinzuzufügen und mit entsprechenden Metadaten zu annotieren.

3.3 Systemarchitektur

Das MACE-System ist als eine verteilte, serviceorientierte Architektur (SOA) mit drei Schichten realisiert: Das Frontend mit graphischer Benutzeroberfläche als Client, ein Applikationsserver mit der für die angebotenen Funktionalitäten zuständigen Geschäftslogik sowie der Metadaten-Store als Backend bzw.

[1]Das Bookmarklet kann auf http://portal.mace-project.eu/extras geladen werden

Datenserver. Darüber hinaus sind in MACE sowohl die Systeme ARIADNE[2] als auch ALOE[3] integriert. Während ARIADNE für das Speichern der Metadaten sowie grundsätzliche Geschäftslogik verantwortlich ist, erlaubt ALOE als „Social Backbone“ Beiträge von Endbenutzern und ist für die partizipativen Aspekte und Communityfunktionalitäten zuständig. Für eine genauere Beschreibung der MACE-Architektur und verwendeten Metadaten verweisen wir auf [Wolpers et al 2009].

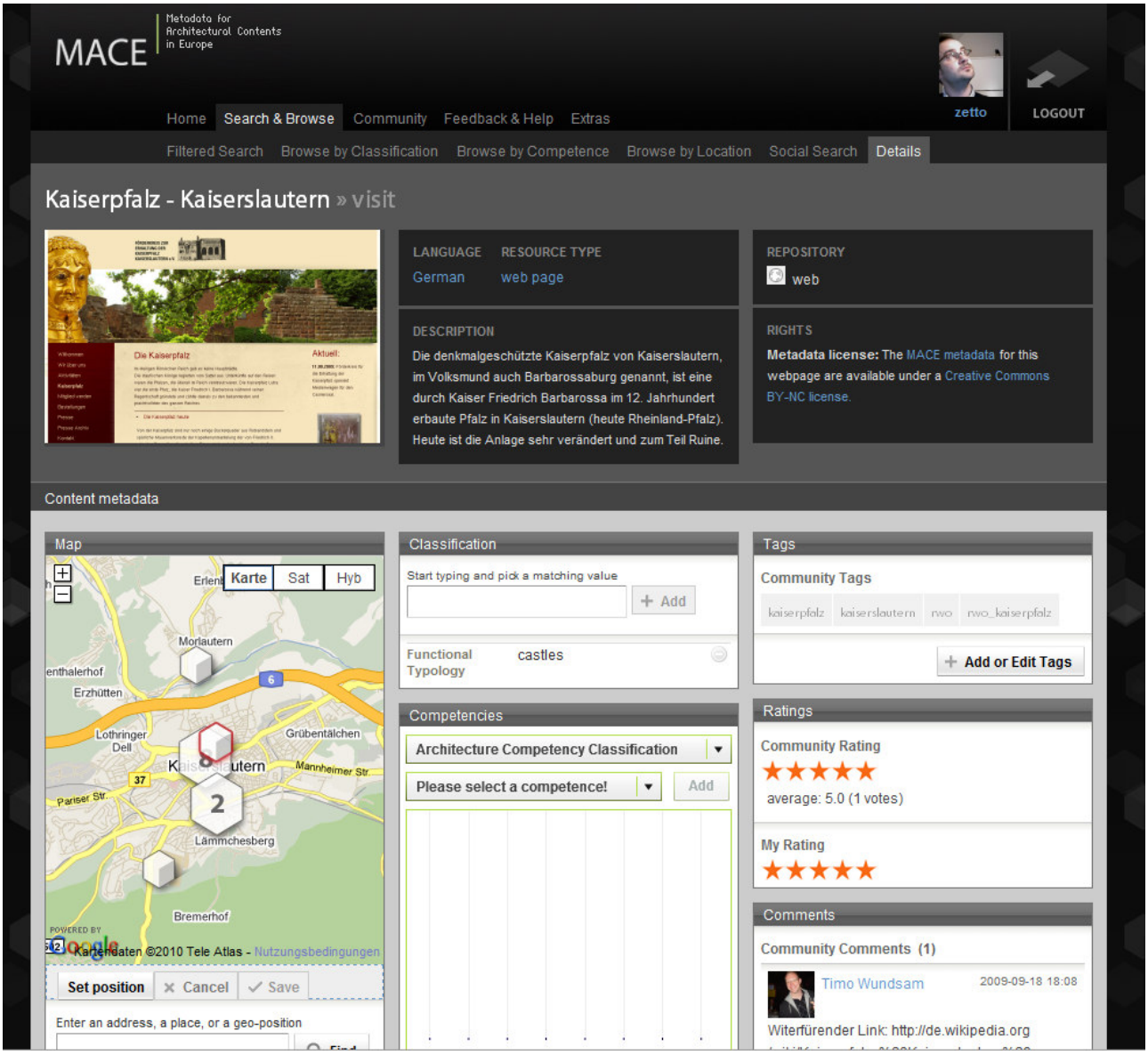

Abb. 3: Detailseite zum Eintrag der historischen Kaiserpfalz in Kaiserslautern, verortet über die Google Maps Oberfläche

4 BAUKULTUR MEETS MACE

Informationen im Internet sind nicht nur durch die Entwicklung mobiler Endgeräte und der entsprechenden Infrastruktur zur Datenübertragung fast jederzeit und überall verfügbar. Schwierig ist aber, den für die eigene Suche richtigen „Filter“ einzusetzen, der bei der immer größer werdenden Informationsflut die qualitativ hochwertigen und vor allem auch relevanten Inhalte findet. Portale können hier eine Lösung sein, jedoch kann das Auffinden der in dem Portal angebotenen Information durch das Phänomen des sogenannten „Deep Webs“ erschwert werden, da die meisten Suchmaschinen diese Inhalte nicht anbieten. Deep Web wird der Teil des Internets bezeichnet, der bei einer Recherche über normale Suchmaschinen nicht auffindbar ist.

Das MACE–Projekt versucht, im „Internet-Dschungel“ eine Hilfestellung zu schaffen, um gezielt und einfach Information über Architektur und damit auch für Baukultur zu erlangen. Hierfür wurden Metadaten aus einer Vielzahl wichtiger Repositories zum Thema Architektur in einer Datenbank zusammengeführt und

[2] http://www.ariadne-eu.org
[3] http://aloe-project.de

über ein Internetportal zentral verfügbar gemacht. Damit wird das Suchen, Finden und Nutzen von gehaltvollen architektonischen Inhalten erleichtert. Zudem versteht sich die MACE-Plattform als innovatives „E-Learning Tools“, das die Bildung bzw. die Weiterbildung architekturinteressierter Nutzer fördern kann. Neben dem Aufbauen eines persönlichen Portfolios ist es jedem Nutzer zudem möglich, sich wie in gängigen Social Communities mit anderen Benutzern zu vernetzen und eigene Inhalte zum Thema Architektur einzuspielen. Des weiteren haben Benutzer die Möglichkeit, Inhalte über eine auf Google Maps basierenden Oberfläche auf einer Karte zu verorten, sie formal zu klassifizieren, und zudem auch zu taggen, zu kommentieren und zu bewerten.

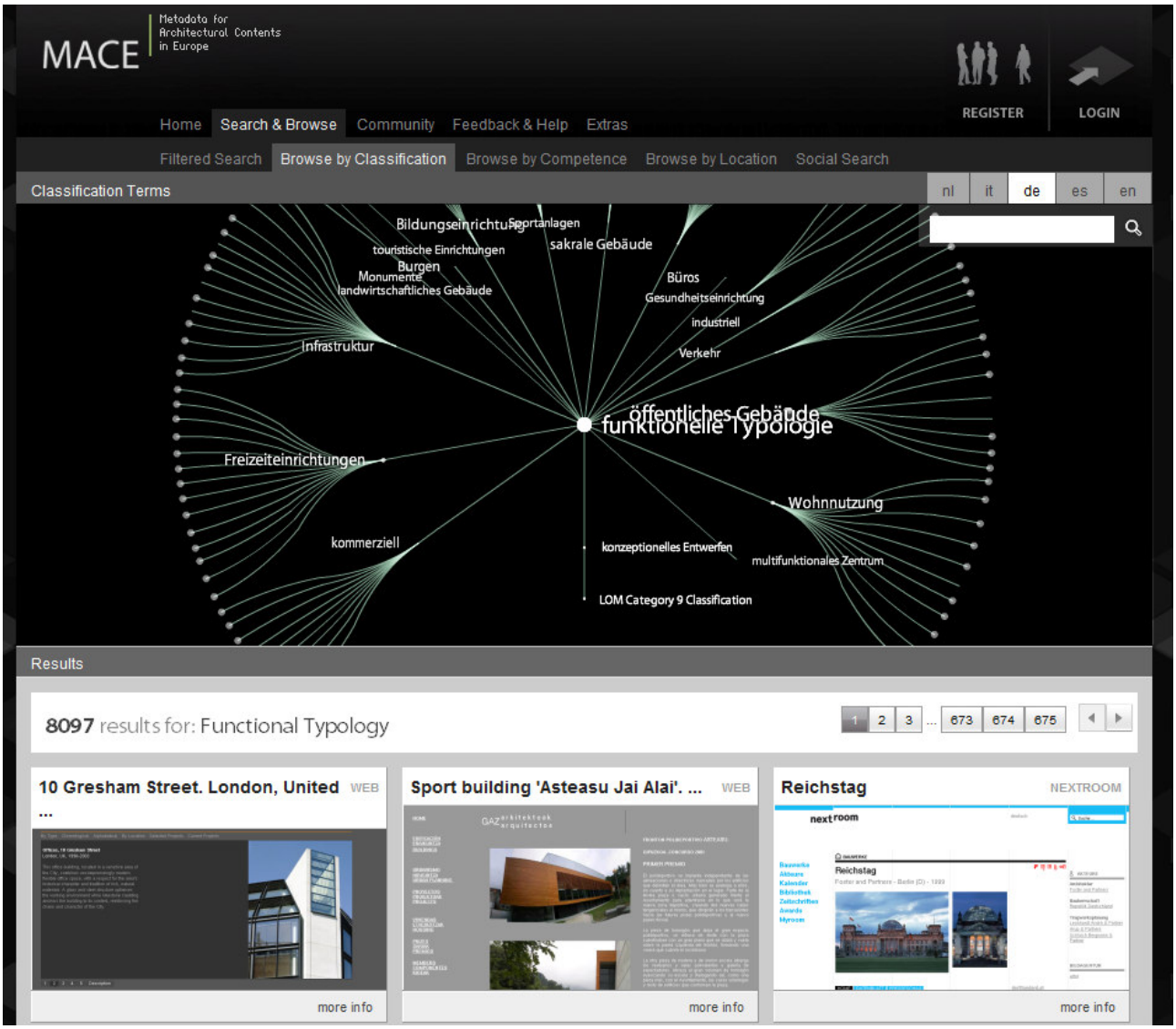

Abb. 4: Die „Browse by Classification“ Suche, in der mit Hilfe einer hyperbolic tree Ansicht MACE-Inhalte basierend auf der MACE-Taxonomie gesucht werden können, hier zum Thema “Öffentliche Gebäude“

Obwohl MACE grundsätzlich auch sogenannte „Real-World-Objects“ (das heißt Informationen und Links zu realen Entitäten wie existierenden bzw. ehemals existierenden Gebäuden oder lebenden bzw. bereits gestorbenen Architekten) unterstützt, mit denen andere Ressourcen dann verknüpft werden können. Momentan ist es für Endbenutzer noch nicht möglich, solche Objekte selbst einzuspielen. Der Fokus in der Datenbank liegt (noch) auf Dokumenten zum Thema Bauen. Auffällig bei der Betrachtung der von Benutzern eingespielten Inhalte ist zudem, dass die Region Rheinland-Pfalz und den dem angrenzenden SAAR-LOR-LUX Bereich eher als „terra incognita“ auf der Google Maps Oberfläche geführt wird.

Die Idee ist nun, Daten aus Rheinland-Pfalz und der SAAR-LOR-LUX Region zu sammeln, in MACE einzuspielen und so einen Beitrag zum Thema Baukultur zu liefern. Dabei soll auf bestehende Informationen wie zum Beispiel die Homepage der AchitekTouren, UNESCO-World Heritage, Zeitschriften, Foto-Communities etc. zurückgegriffen werden. Wichtig sind hierbei sowohl die Klassifizierung als auch die

Georeferenzierung der Objekte über die Google Maps Oberfläche. Neben der Einspeisung der Daten ist die kritische Auseinandersetzung mit dem MACE-Portal ein zentraler Punkt des Projektes, d.h. es sollen Ideen und Vorschläge entwickelt werden, wie das Thema in Hinblick auf Baukultur, Tourismus, Routing, Webdienste noch besser vermittelbar wäre und über welche Anreize es gelingen kann, Benutzerpartizipation zu fördern.

Vor diesem Hintergrund steht das hier vorgestellte Projekt, in dem eine Nutzergruppe aus Kaiserslautern baukulturell interessante Objekte in der Region verortet, klassifiziert und somit einen wertvollen Beitrag Verbesserung der Wahrnehmung von Baukultur im Land einrichten kann. Zudem wirft die Arbeit und das zur Verfügung stellen von Inhalten die Frage auf, ob damit es zu einem (besseren) Diskurs über das Thema Baukultur kommen kann.

5 METHODE

Da das Bearbeiten der Fragestellung „Baukultur“ mit der MACE-Plattform zu einem sehr späten Zeitpunkt der Entwicklung des Portals erfolgte, lag neben der eigentlichen Bearbeitung des Themas auch eine kritische Reflexion der sogenannten Usability . Das Hauptziel war, dass baukulturell interessante Inhalte in die MACE-Datenbank unter Zuhilfenahme von Web Ressourcen und des eigens entwickelten MACE-Bookmarklets eingepflegt werden. Die Inhalte sollten anhand von selbst gewählten Auswahlkriterien wie zum Beispiel Einfamilienhausarchitektur, „Green Building“ oder kulturelles Erbe in der MACE-Datenbank formal kategorisiert und georeferenziert werden. Um trotz der Beschränkungen seitens MACE Real-World-Objects einspielen zu können und zugehörige Informationen zu verlinken, wurden ersatzweise Wikipedia-Seiten herangezogen und Tagging-Konventionen genutzt, um die zugehörigen Objekte zusammenzufassen.. Der Vorteil liegt darin, dass jeder „Tag“ ein Attribut für weitere Portalfunktionen oder GIS-Anwendungen sein kann.

Neben der inhaltlichen Auseinandersetzung lag die kritische Reflexion zur Benutzerfreundlichkeit des MACE-Portals allgemein im Zentrum der Betrachtung. Zusätzlich sollten Überlegungen getätigt werden, inwieweit das Portal eventuell noch modifiziert werden müsste, um das Thema Baukultur noch besser, transparenter und schneller den Benutzergruppen näher zu bringen.

6 ERGEBNISSE

Insgesamt wurden in der Testphase 578 Einträge zum Thema Baukultur in Rheinland-Pfalz getätigt, zudem wurden die Objekte alle georeferenziert und mit 3543 Tags versehen. Hauptthemen bei der Bearbeitung waren Burgen-Schlösser-Altertümer, Wein(Kultur), Kirchen, Green Buildings, Stadien und der Umgang mit Zeugnissen der Industriekultur im Saarland.

7 FAZIT

Das MACE-Portal bietet bereits umfangreiche Möglichkeiten, um als Datenbank für Baukultur im regionalen Einzugsgebiet zu fungieren. Mit den vorhandenen Funktionalitäten ist ein großes Potenzial vorhanden, das weiter ausgebaut und ausgeschöpft werden sollte.

Eine denkbare Möglichkeit, dieses Potenzial weiter zu entwickeln, ist die mobile Umsetzung des Portals, so dass es möglich ist, auch unterwegs bereits in der Datenbank befindliche Informationen abzurufen oder sogar Informationen zu Gebäuden bzw. Bauten neu aufzunehmen und zu verlinken. Dabei müsste die Neuaufnahme in weiten Teilen automatisiert werden, denkbar ist hierbei, den technischen Stand der Smartphones sinnvoll zu nutzen, indem das GPS-Modul automatisiert die Position ermittelt und in die Datenbank einträgt. Exemplarisch wurden die MACE-Inhalte seitens der Open Universiteit Nederland von Dr. Stefaan Ternier bereits in die Augmented Reality Applikationen ALOQA[4] und LAYAR[5] integriert. MACE-Inhalte können somit abhängig vom aktuellen Standort und der Blickrichtung des Benutzers angezeigt werden.

Doch nicht nur der technisch-mediale Weg kann zur Öffentlichkeitsarbeit genutzt werden. Es sollten auch Fachzeitschriften mit Werbung versehen, Publikationen über die Nutzung des Portals veröffentlicht und Aushänge an Universitäten und Fachhochschulen gemacht werden, die auf die Existenz eines solchen Portals

[4] http://www.aloqa.com/
[5] http://layar.com/

hinweisen. Dies kann weiteres Interesse für das Projekt wecken und auf diesem Wege eine höhere Teilnahmequote fördern.

Abb. 5: TagCloud der eingespielten Inhalte zum Thema Baukultur in RLP, visualisiert mit http://wordle.net

Eine weitere Nutzung des Portals ist dahin gehend denkbar, dass Städte dieses zur Öffentlichkeitsarbeit nutzen, indem sie interessante Bauwerke darauf vorstellen und sich dadurch repräsentieren, wie es beispielsweise schon in der Stadt Osnabrück geschehen ist: Es wurden historische Gebäude, der Kultur- und Landschaftspark, alle Kirchen sowie die vor Ort ansässigen Museen mit einbezogen, die dem Nutzer einen Einblick in den historischen Stadtkern geben sollen und die Stadt als touristisches Reiseziel interessant machen. Hier ist ein Ballungsraum von historischen Gebäuden in der Kernstadt vorzufinden.

Durch Anhängen von KML - Dateien an die einzelnen Objekte wäre durchaus ein Routing denkbar, das Touristen durch die Stadt entlang der einzelnen Sehenswürdigkeiten führt. Des Weiteren wäre für geschichtsinteressierte Touristen denkbar, die Google Earth Darstellung mit historischen Karten zu hinterlegen. So wäre z.B. bei Interessenten, die ein Mobiltelefon mit GPS – Empfänger nutzen die Möglichkeit gegeben, herauszufinden, was sich in früheren Zeiten an den entsprechenden Orten und Plätzen, auf denen er sich bewegt, befand. Hierdurch wäre auch eine weiterführende Verknüpfung der einzelnen Objekte untereinander in der Datenbank von MACE denkbar.

Die Community steht für jeden Architekturinteressierten offen: Probieren Sie es aus! http://portal.mace-project.eu

8 DANKSAGUNG

An dieser Stelle möchten wir uns bei den Probanden, die an diesem Projekt teilgenommen haben bedanken. Trotz einiger technischer Schwierigkeiten sind hervorragende Ergebnisse heraus gekommen. Im einzelnen sind dies: Benjamin Allbach, Nadja Bautz, Ricardo Sousa Carvalho, Susanne Franz, Alexander Jung, Alexander Masser, Jasmin Ohnesorg, Stephanie Petry, Andrea Picht, Marcus Reeg, Rebecca Trautmann, Willi Wendt, Timo Wundsam und Eike Zender. Vielen Dank für Euer Engagement!

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🏆 *reviewed paper*

Bikabilty In Metropolitan Lagos: A Conceptualization of Eco Friendly Transportation Alternative

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1 ABSTRACT

Mobility induced city air pollution is evident in the metropolis where governments annual budgets emphasized road transportation and car ownership at the detriment of ferry, rapid and light rail transit systems. Alternative mobility frame work advocates for circulatory facilities including sidewalks, walkways, paths and bike lanes. These facilities minimally impact cityscape, rely on renewable energy, use less urban space, reduce traffic congestion, improve physical fitness and are cheaper. This paper explores conceptual framework for bicycle as an eco friendly transportation system in Lagos.

The study identified the fear of accident and the absence of 'changing rooms' in most public destinations as major constrains to the acceptance of bicycle as transportation mode. The later reason is due to the fact that Lagos is a hot and humid tropical city. Leisure cycling was however accepted as a recreational undertaking. An off road bicycle route system was conceptualized using satellite imagery, geographic information system and AutoCAD as design tools and Lagos State physical planning development control standards. 52 kilometers 'off road' bicycle route case study between Ikeja as point of departure and Bariga/Yaba as destination was undertaken. The route falls within setback of Ogbe and Iyaalaro rivers flood plain refered to as tertiary sytem 1 and 2 and railway setback. It is apparent that acceptability of bicycle as effective transportation mode in the city will be triggered by sustained interest in leisure cycling. The Paper recommends that LAMATA (Lagos Metropolitan Area Transport Authority) should embark on categorization of bicycle policies as general policies, facility policies and issue-based policies that will provide a practical guide to sustainable non-motorized transportation mode.

2 INTRODUCTION

The realization that scientific urbanism is unable to manage the waste products of the technology that define it continue to attract discussions on the health of the city. The philosophy of architectural modernism treats cities as architectural objects on regional landscapes crisscrossed by highly geometric streets that sustain automobile mode of transportation. The shortcomings of this technologically inspired urban concept is the inability to manage the wastes from supporting resources especially emission of hazardous gases from thousands of automobiles that daily load the streets. The destructive impact of gaseous emissions from fossil fuel driven engines especially nitrogen dioxide, voltaic organic compounds and carbon dioxide is worrisome. Nicholls (2004) referred to this destructive effect as degradation of life support system since they play major role in the depletion of ozone layer. The much celebrated modernism school of urban design collapsed under the weight of the very transportation technology that set it up. The desire to solve transportation induced urban pollution pushed mobility in urban centers to sustainable paradigm.

Mobility induced city air pollution is evident in metropolitan Lagos where governments annual budgets emphasized road transportation and car ownership at the detriment of ferry, rapid and light rail transit systems. About 40% of all new vehicle registration in Nigeria are in Lagos and accounts for 40% of the total national premium motor spirit consumption (Olowoporoku, 2007). Over 27,500 automobiles excluding commercial motor cycles load the streets on daily basis (Loricamp, 2007). 95% of these vehicles were manufactured over ten years ago without catalytical converters to minimize noxious effluents. Vehicular density is estimated at 220 vehicles per kilometer compare to national average of 1.1 vehicles per kilometer (LSG, 2006). About 20 years ago commercial motorcycle emerged to complete auto based transportation mode. Arbirage (1997) analysis of the city traffic showed an earlier domination by bus, 53%; private cars, 23.5%; taxi 18,5%; and commercial motorcycle 5% bringing to reality the continuous reliance on automobile transportation mode. Recent studies revealed that the metropolis has daily passenger trips record of about 6 million people (LSG,2006). 75 % of these trips are by bus based public transportation system; 24% cars and a negligible 1% rail and ferry service. None of these studies highlighted modal split in the metropolis. The problem of land transportation is not restricted to congestion but also deteriorating infrastructures, high consumption of non renewable hydrocarbon energy and polluted air space.

Air quality of the metropolis is a reflection of long hours of traffic congestion (Loricamp, 2007). There is no systematic measurement of the air quality in Lagos; however a few studies have reported measurements of green house gases especially carbon monoxide and volatile organic compounds. Arbritage (1997) attributed 11.37 tons of volatile organic compounds per year; 175.4 tons of carbon monoxide per year; 297 tons of nitrous oxide per year,; and 32 tons of sulphur dioxide per year to motorized road transportation mode. These gaseous effluents did not include emissions from generators as alternative energy source at both residential and industrial estates. According to LASEPA (2001) carbon monoxide measurement at Oba Akinjobi Way, Arch Bishop Vinning Memorial Church, Immigration Junction and Lagos Country Club/ Joel Ogunnaike Street at Ikeja was 63ppm, 27ppm, 67ppm and 72ppm respectively.

Mitigating measures for climate change, demand reduction of carbon dioxide and other green house gases emissions by 60-80% (WWF 2008),. This calls for the development of new energy saving transportation strategies. Sustainable transportation planning as a remediation tool for local air quality problems respect renewable energy sources. Within the context of sustainable urban design, non motorized transportation facilities give priority to walkways, sidewalks, public paths, trails, bike lanes and generous arterial road shoulders. These facilities accommodate a diverse range of users including people standing, sitting, children playing games, vendors, walkers and physically challenged individuals. Transportation modes supported by these facilities include wheel chairs, joggers, skating boards and bicycles. Bicycling minimally impact cityscape, rely on renewable energy, use less urban space, reduces traffic congestion, and improves physical fitness. This paper explores conceptual framework for bicycle as an eco friendly transportation system in Lagos metropolis.

Metropolitan Lagos developed on low lying sand barrier-lagoon coastal geomorphology at an average elevation of 3 meters above sea level. It is characterized by loose sedimentary sandy soil formation that supports fragmented fragile riparian landscape delineated by wetlands. The metropolis is framed by longitudes 2 0 42/ E and 30 22/ E of the Greenwich Meridian and latitudes 60 22/ N and 60 42/ N of the equator. Littoral climatic variables prevail throughout the year. Ikeja and Shomolu local government areas of northern metropolitan area are chosen for the case study. The study area is an agglomeration of 15 communities with a total population of about 955,000 (nine hundred and fifty five thousand) people.

3 SUSTAINABLE TRANSPORTATION PRINCIPLES

Sustainable transportation play dominant role in the transformation of existing urban centers into healthy ecological cities. Such mobility framework does not endanger public health but accommodate transportation modes that depend renewable energy resources. Sustainable city transportation network is an urban design concept that emphasis the importance of reducing the number of pollution generating fossil fuel driven automobiles. This study is underpinned by ecological design concept and Community Cycling Accessibility Initiative (CCAI) philosophy. Ecological urban design concept is the incorporation of the knowledge of how nature operates into city process. When human settlements take advantage of natural processes that makes the ecosystem functional then a healthy urban ecosystem is borne. This is what Register (1992) referred to as ‘eco city’. It is a city conceptualized on minimal developmental impact; inhabited by people committed to efficient energy, water and food consumption; and pay much attention to generated wastes especially gaseous, heat and liquid emissions. Ecologically designed human settlement takes advantage of available energy sources and demands that open spaces, streets and transportation medium meet high energy efficiency standards (Downton, 2003).

Ecocity strives for minimum use of automobiles as transportation mode. It promotes low energy consumption automobiles, zero-emission vehicles including electric vehicle and integrated public mass transportation strategy that are technology driven. Ecocity transportation measure at this level may not be feasible as a result of shortage of man power and high technological cost. Shifting the attention from automobile transportation must evolve a policy underpinned by the philosophy of ‘city for public mass transit system, pedestrians, and cyclist. Streets of such cities must then be conceived to be pedestrian friendly. Community Cycling Accessibility Initiative (Vanek and Spindler, 1999). is one of the several conceptual frameworks for non motorized transportation mode.

The core mission of Community Cycling Accessibility Initiative (CCAI) is to encourage cycling especially transport oriented cycling that reduces car trips through improvement of existing cycling infrastructure and construction of new ones. CCAI allows for combining ‘both leisure and non leisure cycling into a single

campaign to provide safe cycling routes where people can travel to and from amenities they need' (Vanek and Spindler, 1999). Amenities refer to active nodal spaces including bus terminals, schools shopping complex, offices and commercial establishments. The argument in favour of CCAI is that government should invest in cycling infrastructure just as road network is currently funded. CCAI advocated four criteria to be used in identifying most suitable locations for bicycle infrastructure including sufficient population density, predominant use of automobiles in the current situation, sufficient space for adding new infrastructure with community interest in mind and high rate of bicycle ownership.

While metropolitan Lagos satisfies the first three factors, ownership of bicycle is very low. So insignificant is the place of cycling as transportation mode in the city that recent transportation studies including Arbirage (1997), LSG (2006), Loricamp (2007), Olowoporoku (2007) and Rom and Phoenix (2007) did not consider it in their report. Rather emphasis was on fresh public mass transit policies. The solution to automobile based traffic congestion in cities demands a deliberate change in transportation policies that will reduce automobile traffic. Such policies must respect the role of non motorized and car free planning. Non motorized facilities include walkways, sidewalks, crosswalks, paths, pedestrianized streets, pedestrian plazas, bike lanes and highway shoulders. The starting point is to identify the current modal split of Lagos commuting population. Modal split refers to the form of transportation a person chooses, including walking, bicycling, public transit, and driving cars. The aim of this study is to increase the percentage of people who will choose to bicycle rather than travel by automobile in the metropolis. This is because every motor vehicle trip traveled that is eliminated represents a quantifiable reduction in air pollution and traffic.

3.1 METHODOLOGY

The first phase of this study recognizes participatory research as a viable physical planning tool for people oriented transportation program. Relevant primary data was obtained through a combination of three descriptive survey instruments including questionnaire, semi structured interviews and personal observation. Administered questionnaires took into consideration age group and focused on the choice of transportation options and acceptability of bicycle as a recreation and transportation mode. The structured open-ended interview was drawn to collect information from the public about their views on the current transportation mode and expectations on cycling in the city. The primary data were analyzed to understand feasible options that will accommodate new bicycle infrastructure within the metropolitan setting. The later recognizes previous research works and planning reports as authentic secondary source of information. Desk top studies took into consideration Lagos State Metropolitan Plan (LSD 1985); Lagos State Review Regional Master Plan (Ashinyanbi 2005); Ikeja Model City Plan (IMCP 2008). Desk top studies focused on the compliance of the study area to positive bicycle facilities physical planning criteria meant to enhance livability in the metropolis. This constitutes the second phase of the study. Satellite imagery and digitized plans were analyzed to authenticate and update the physical state of the study area through direct observation. Updated base map was subjected to ecological city planning principles to proactively assess the readiness of the study area to accommodate eco friendly bicycle infrastructure.

4 PUBLIC PARTICIPATION IN CYCLING INFRASTRUCTURE

Engaging the public in the planning process is critical to the success of any transportation mode. The study revealed that 55% Lagos commuting population show preference for public mass transit followed by privately owned cars (35%). Figure 1 Shows that 8% will trek while the remaining 2% opt for cycling. Public mass transit refers to mini shuttle bus and the recently introduced Bus Rapid Transit (BRT) system with exclusive road lanes earmarked along major high ways in the metropolis. This has brought some level of relief to few commuters who hitherto rely on private cars. Figure 2 probes the present low interest level of bicycling in a metropolis that once relied heavily on cycling as transportation mode by the middle of last century. The fear of accident on the congested streetscape (57%); lack of public changing facilities at various destinations (20%); increasing crime rate and poor security (16%); and the stigma of attaching poverty to bicycling lower economic class at rural Lagos (7%) were reseasons given for low interest in cycling. The latter is the legacy of crude oil economic illusion left behind by long years of military ruler ship and the flamboyant life style of extremely corrupt political elites. 71% of the respondents agreed that if the fear of accident on the busy roads and security of the cyclists are guaranteed then leisure cycling will be considered while the remaining 29% hinged their participation in non leisure cycling on availability of changing facilities at schools and government office complexes. The interest in leisure cycling is connected with the

dearth of public spaces in the city. Ashinyanbi (2005) noted that the ratio of planned hectare of open space per population in metropolitan Lagos dropped to an all time low figures of 90,000 people per hectare which was far from international standard of 300 per planned hectare. Any recreational infrastructure in the metropolis will boost the much needed leisure facilities. Leisure cycling is compatible with non motorized and car free planning philosophy. Nonmotorized modes are either developed along roadways or off road trails along urban natural corridors including parks and urban wilds.

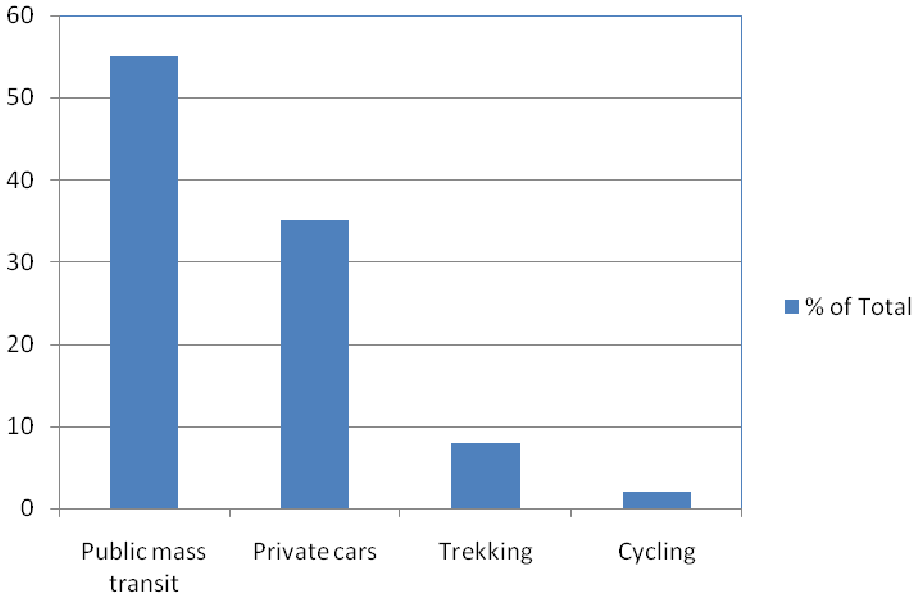

Figure 1. Lagos Commuters Transportation Prefernce

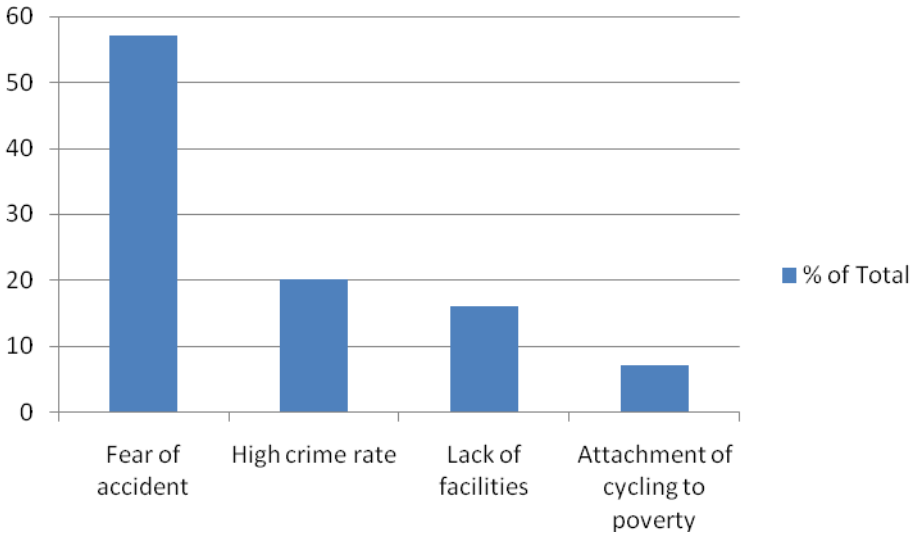

Figure 2 Present Low Interest In Cycling

5 LOCAL BICYCLE FRIENDLY AGENDA

Healing the urban landscape must take a holistic look at ecocity principles that can be accommodated within the present sociopolitical, economic, technological and human resources capability of the state government. Local sustainable transportation infrastructure planning model that can mitigate climate change impacts will be situated within Kenworthy (2006) conceptual model to enhance the compliance of existing cities to eco city principles. Kenworthy (2006) 'sustainable urban form and transport factors' reiterates the importance of compact, mixed-use urban form that uses land efficiently and protects the natural environment, biodiversity and food-producing areas. It is a high density development city concept that does not accommodate sprawling but have ample land area devoted to green infrastructure. This measure is easily and economically

achievable in new towns, new housing complexes and industrial estates. Currently Lagos streetscape is not planned to support non motorized transportation mode especially on-road bicycle route system. The existing streets are conceptualized as thoroughfares framed by silted open storm drainage channels with irregular concrete fence background along the beacon line. Introduction of energy saving transportation mode in already built up and highly populated metropolis demands high financial capital driven urban revitalization projects which the current economy may not support.

5.1 OFF ROAD NON MOTORIZED MODE - SUITABLE ROUTE

Yamakawa (1999) identified four categories of bicycle roads namely separate bicycle alone route, bicycle and pedestrian routes running side by side, on road bicycle track and on road bicycle and pedestrian track separated from vehicular lane. While the first two are ideal for off road route system the last two are part of existing streets and road right of way. Rehabilitating existing Lagos road to accommodate either of on road bicycle route system will be financially involving. Besides, the interest of the people at this point in time, is not on bicycle as a transportation mode but leisure cycling. As a starting point introducing off road non-motorized route system made up of walkway and bicycle on leisure platform may trigger the interest of the people in the nearest future. Possibility of safe off road bicycle route system is demonstrated for Ikeja and Shomolu local government areas in northern metropolitan area of Lagos (Figure 3). As noted by Ashinyanbi (2005), there is no planned metropolitan public park system. More compatible green land uses are the numerous wet lands that define the various communities and unplanned waterfront area. Drainage basins and flood plains separate the various townships and cities that make up the metropolis. There are six major natural drainage basins, at a total length of 112.22 kilometers (Table 3). These drainage basins are the city's tertiary drainage systems and are designated system 1 to 6. The northern metropolis is drained by systems 1 and 2. The most prominent is "system one" also known as 'Iyalaro' River that drains lower Ogba, Ikeja, Opebi, Ojota, Anthony and Ifako- Bariga townships into Lagos lagoon. System 2 drains Akoka, Bariga, Gbagada townships. These drainage system and other water bodies are secured by developmental control legal setbacks including 150 meters from the ocean, 75 meters from lagoon shoreline, 60 meters from rivers and 15 meters from canals (LSG1986)

SYSTEM	LENGTH
System 1	18.93km
System 2	7.0km
System 3	4.7km
System 4	7.09km
System 5	21.0km
System 6	53.5km

Fig. 3: Major Drainage Channels in Lagos Metropolis Length and Area (Source: World Bank Assisted Lagos Drainage and Sanitation Project 1998)

Subjecting the identified natural drainages and railway right of way to modified CCAI principle provides the opportunity for safe off road non motorized transportation mode made up of bicycle route system and walkways. CCAI allows for combining both leisure and non leisure cycling as unit to provide safe cycling routes where people can travel to and from important nodal spaces (Vanek and Spindler 1999). The first phase of CCAI principle is aligning safe cycle route through identified corridor with minimal obstructions at busy roads and other thoroughfares in the city. Bicycle route alignment along the natural basins took into consideration the upper terrace of the flood plain free from the peak annual flow of the rivers. This case study allows for 18 kilometers off road bicycle route along the flood plain upper terrace of 'System One' from Adeniyi Jones Ikeja township to Oworonsoki without crossing the highways. The alignment is conceptualized to run parallel to Iyaalaro River and using the existing under bridge pedestrian set back to escape crossing the two highways. A tributary of Iyaalaro River drains Pedro Township and constitutes system 1A and covers 4 kilometers. The cycle route alignment follows the 15 meters canal setback to connect System 2A. While system one has an average width of 100 meters, system two has been narrowed by developmental activities and now functions as manmade canal. The average width on each side of the canal is 15 meters being the setback prescribed for development control. The proposed off road bicycle route is set within the 15 meters set back. It emanates from University of Lagos and aligned along Ogbe River

canal (System 2A) which drains Shomolu and Gbagada townships. Linking System 1A and system 2A involves crossing 10 residential streets. These intersections must be addressed through traffic management mechanism.

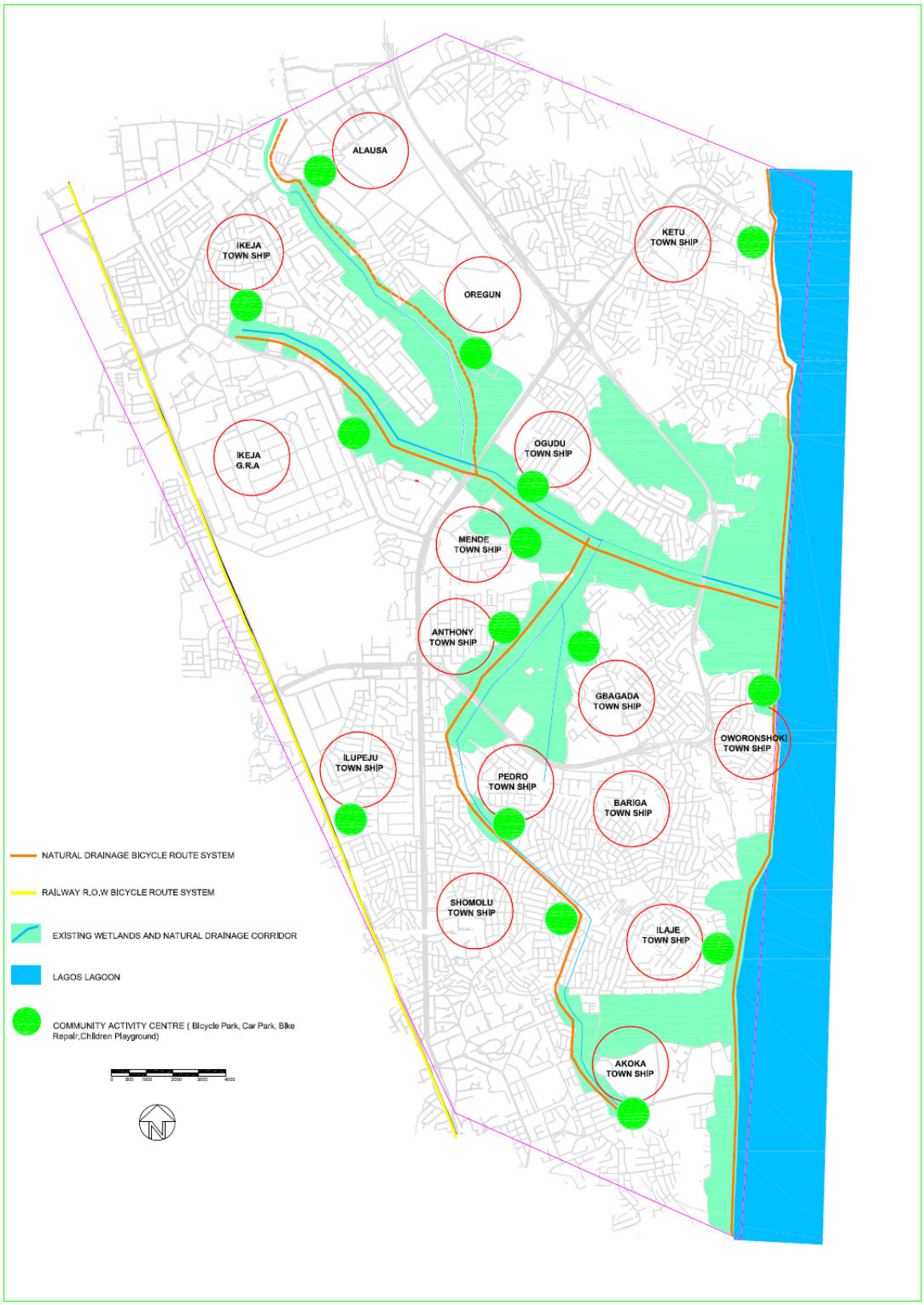

Figure 3 Possible Off Road Bicycle Route System

The 30 kilometers Nigeria Railway Corporation dual carriage rail line stretches from Iddo terminus in the south to Agege in the north. The minimum set back allowed between a building and railway line is 21 meters (LSG 1986). Aligning a three meter bicycle/ pedestrian route within the setback provide a vehicle free lane

for cyclists. This off road concept along the natural drainage and railway set back recognize other important elements including bicycle parks at adjacent communities; car parks; bicycle repair points and practicing tracks. In the absence of metropolitan park system, introduction of minor adventurous play ground might become the nucleus for adjoining communities to have a park. This leisure cycling concept. becomes a trigger for livable outdoor environment in hot and humid tropical city in dire need recreation centers

6 CONCLUSION AND RECOMENDATIONS

Bicycling was an important transportation mode in Lagos State until the advent of crude oil economy in 1970s. Unfortunately the rate at which people are biking to work decreased drastically in many urban communities within the metropolis. During this same period, life expectancy dropped while obesity increased, contributing to health problems in the city. These two trends are related, and demand the creation of livable built environment that accommodates bicycling as a key element to rectify the critical issues. This is a major challenge in the face of high costs of health care delivery, energy crises and reliance on vehicular transportation mode. The way forward for bicycle as a transportation mode and leisure facility resides in its immediate recognition. The recognition must commence from the introduction of non-motorized transport mode policy. Such policy should benefit from internationally acclaimed and tested 4Es bicycle planning philosophy namely engineering, education, enforcement and encouragement. Since successful bicycling programs involve education, engineering and enforcement efforts, diverse cross section of government ministries, agencies and parastatals must contribute to required policies. Prominent ministries include physical planning, environment, education, health and transport. While ministry of transport is expected to drive bicycle policy as an energy saving and eco friendly transportation mode, ministries of sport and health will jointly evolve bicycle related sports and recreation policies.

The stated hindrances to non leisure biking by residents including fear of accidents, insecurity and lack of changing facilities in destinations is not restricted to Nigeria. Such problems have been experienced in other cities and appropriate tested solutions that may be useful in Lagos devised. What is really needed at this point in time is a political will to accept non-motorized transport mode as an effective eco friendly alternative to mitigate negative impacts of hydrocarbon driven automobile mode. As noted by Yamakawa (1999) bicycle should be seen as a transport mode ideal for short distances to identified destinations within the city. Specific areas of focus to enhance the goal of an eco friendly bicycle as transportation mode in Lagos are as follows:

- Secure the various drainage basins and canals through strict application of development control instrument. This will checkmate encroachment by land speculator.
- Relate properly with railway and other Federal Government agencies that hold the potential right of ways in trust for the people.
- Consider the the incorporation of Lagos Traffic Operatives along the routes. The officers must be made to relate to security agents to allay the fears banditry along the lanes.
- Government transportation agency especially LAMATA (Lagos Metropolitan Area Transport Authority) should embark on categorization of bicycle policies as general policies, facility policies and issue-based policies that will provide a practical guide.

The later, issue based policies, are the most important at this point in time. Included are policies on sidewalks, crossings, trails in green areas, bicycle parking and changing facilitities at civic buildings and public nodal spaces . Health and fitness, energy conservation, air quality, and safety must be given adequate priority to secure the confidence of the people bicycle riding.

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Chongqing at Crossroads: How Urban Planning and Infrastructure can Support Sustainable Industries.

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1 ABSTRACT

Chongqing, the "Furnace of China" makes a potent case against the consequences of the traditional model of industrial growth left unchecked. Environmental degradation and pollution threaten not only its residents' quality of life, but also its future as an economically competitive municipality. Chongqing still possesses abundant resources and low-cost labour, however. But to continue to remain viable, Chongqing needs to apply a sustainable, integrated development model that addresses local context in urban planning, infrastructure resource efficiency, and especially industrial symbiosis. The municipality's economic vitality demands greater industry collaboration and leadership. Chongqing is at a crossroads. This study underscores the need for action and provides forward-thinking recommendations that will ensure Chongqing continues to thrive and set the model in western China as a centre for sustainable industries.

2 CHONGQING AT CROSSROADS

Chongqing is currently the only major municipality in western China and is a leading center of foreign investment and manufacturing. It has benefited from government policies, such as the Grand Western Development strategy and various Five Year Plans, building a large industrial and agricultural base centered on domestic consumption.

However, Chongqing still lags behind Beijing and coastal cities such as Shanghai and Guangzhou. It also faces increasing competition from its western counterparts, Chengdu and Xi'an. Its rating in the United Nations Human Development Index – a cumulative average of per capita gross domestic product, life expectancy and educational attainment levels – is moderate at 0.756. This places Chongqing slightly below the national average of 0.78, but far behind its coastal counterparts who are around 0.9, and even regions in central China that are around 0.8.

Additionally, it is facing a more affluent and demanding population, greater resource and infrastructure constraints and severe environmental pollution. The city is infamously known as the "furnace of China." Indeed, Chongqing's environmental degradation has reached a point where it now jeopardizes the city's long-term economic competitiveness.

For Chongqing to continue to be economically competitive, support its existing and emerging industries and attract and retain critical human capital, it needs to develop sustainable urban planning and infrastructure. While Chongqing has made notable efforts in this area, especially in its master plan, much more can be done in a more coordinated fashion.

3 SUSTAINABLE URBAN PLANNING AND INFRASTRUCTURE

From this point of view, urban planning involves high density, multifunctional, mixed-use living, with extensive greenery and biodiversity that responds to microclimatic conditions and reduces climate change effects. Industrial considerations include location, orientation and and use.

Resource efficiency is important for energy, water, waste, transport and agriculture. This first involves optimizing demand – decreasing the need for energy, water, and travel, and limiting the waste produced. Once all reasonable efforts to reduce demand have been implemented, the next focus should be on making the quality and supply of resources as efficient as possible. Resource-intensive industries should be discouraged, and instead the focus should be on the following:

- Energy: Stronger building codes, audits and rating systems. Developing more expensive renewable energy should be the last option, though Chongqing's agricultural base provides good biofuel potential. Industry should consider energy efficiency agreements, manufacturing, processing and clean technology opportunities.

- Water: Better watershed management, pollution prevention, water quality, sustainable agriculture and technologies to provide quality and reliable water supplies, such as rainwater harvesting, water capture and recycled water management. Industrial considerations include quality and quantity of storm water runoff, wastewater treatment and monitoring discharge.
- Waste: A resource waste management strategy follows reduction, reuse, and recycling principles in construction and post-construction phases, promotes circular economy strategies and applies energy recovery technologies. Industrial considerations include waste streams, co-location and the promotion of industrial symbiosis.
- Transport: When travel is needed, it should be undertaken by walking, biking or public transport, including bus rapid transit. Cars should be the last option, and inhabitants should be encouraged to use car clubs or electric/hybrid vehicles. A Low Emission Strategy provides a package of measures to help mitigate the transport impacts of a development, and provide further access and ease of travel for industries and people, connecting external and internal transport systems. Industrial considerations include travel mode and frequency by industry and household for both leisure and work.
- Agriculture: Having a healthy, stable, affordable, and local food supply has always been the backbone of China's self-sufficiency food mandate. Traditional industrial farming practices should change to a sustainable food production model by adopting small scale farming enterprises, which promote more labor intensive modes of production, technological pluralism, greater adaption to local resources for higher agricultural productivity and improved resource efficiency. Industrial considerations include resource input and output factors for enhanced production and better production methods.

4 SUSTAINABLE INDUSTRIES

Resource prices should be competitive, determined in terms of implications for society. Consumption should be metered for informed tracking, with policies to encourage better choices and discourage negative practices. The most effective way for Chongqing to move towards a sustainable model of economic development is to take a holistic, integrated approach to identifying solutions, one that is grounded in an understanding of the social and economic cost of inaction. Breaking the vicious cycle of unsustainable development requires an understanding of how these issues are inter-related, controlled and influenced not only through technological means, but also through policies, planning and education.

Chongqing has identified eight pillar industries that it wants to develop, expand and promote: Automobiles and motorcycles; equipment manufacturing; electronic information; biopharmaceuticals; logistics; business and trade; service outsourcing and finance. In light of the sustainable infrastructure and planning opportunities highlighted, and considering the integrated systems approach, there are many opportunities for these industries to develop in a more environmentally-friendly and sustainable manner.

They include reducing the resource intensity attributed to manufacturing and distribution, minimizing the hazardous waste produced, applying industrial symbiosis to co-locate and share resources; establishing environmental and health quality-control management systems and creating an attractive and distinctive urban space.

Urban competitiveness is defined as "a city's ability of creating more wealth in a faster and better manner than other cities in the world." [1] Traditionally, the three key components considered vital to economic competitiveness have been[2]:

- (1) Providing adequate infrastructure (transportation, telecommunications, water & sanitation, etc.).
- (2) Improving public services (education, health, public security, housing, etc.).
- (3) Reducing the cost of doing business (e.g., fast processing of new business licenses, tax incentives, labor laws, economic zones with special privileges, etc.).

[1] Global Urban Competitive Project. http://www.gucp.org/en/
[2] Ming, Zhanga. "What Can Cities Do to Enhance Competitiveness? Local Policies and Actions for Innovation," *En Breve*, The World Bank. 2008.

Chongqing has made great strides in creating an attractive environment that is conducive to business. It has low costs for labor and resources, and is improving its transport and infrastructure. However, its poor environmental health and quality of life have deterred industries and people, especially highly-skilled workers and tourists, from coming to the city. It has not invested enough in innovation and human capital. Research and development need to be applicable to industry. Education should be translated to the needs of the market at all levels and job types.

5 STAKEHOLDER COLLABORATION

Collaboration between stakeholders is essential to transforming Chongqing into an economically competitive, sustainable municipality. Stakeholders include the local government, the public and industry. Each has a role to play in developing, promoting and participating in initiatives that support sustainable economic development and share a sense of urgency to drive decisive action.

- Government: The government sets the vision, with a long term strategic development plan and qualitative and quantitative targets. It should present bold and innovative actions, but also communicate and coordinate with other stakeholders to reduce risks of uncertainty. Heavy investment in sustainable infrastructure, education and evaluation should be made. Government should demonstrate by example and be sensitive to the needs of its constituents, especially the less fortunate in society.
- Public: Their mobility allows them to obtain the best skills, practices and knowledge; and to promote Chongqing nationally and internationally. Increased affluence, technology and education puts the population in a better place to demand greener products and processes from industry.
- Industry: Industry's role can be divided into three areas to take advantage of various sustainable opportunities: core business (the products and services a company makes and how they are designed), sustainable operating practices (the systems, practices and processes used by companies to manufacture and assemble their products and operate their facilities) and external relations (the leadership role that companies can play within their industry, supply chain and communities).

6 CONCLUSION

Chongqing is at a crossroads. Continued economic growth using the traditional industrial model will accelerate environmental damage, deplete natural resources, jeopardize public health and deteriorate the quality of life, which eventually could drive people and investment away as well as offset the economic gains achieved through growth. For Chongqing to fulfill its dual goals of retaining economic competitiveness and setting the model for development in the west, it needs to apply a sustainable, integrated development model. Such a model would assess the local context in urban planning and infrastructure; and promote resource efficiency, industrial symbiosis, and greater collaboration and leadership for industry.

Chongqing can fulfill its vision as a center for sustainable industries, and set the path for sustainable development and economic competitiveness if it acts creatively in a coordinated manner.

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City environment: Regional development dimension. Baltic case

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1 ABSTRACT

Economic processes underway in the country directly and indirectly affect the welfare of the people and the social environment, starting with job security and having a direct impact on the qualitative and safe living environment.

Population differences of wealth are defined by uneven distribution of resources and economic activities within the countries, which affects also population welfare level in rural areas. There is a higher level of welfare of the people observed near cities in Baltic States. The relatively small distances to the city restrict labour everyday mobility. Settlement structure in the Baltic States since 1920 have greatly changed, which clearly outlines the population preferred the social environment.

The article describes existing situation and gives analysis of the regional development policy determination and implementation in the all three Baltic States. According statistical indicators there are differences between implementation of the regional development activities between all Baltic States and in regions of inside each country.

The author is analysed more detail differences between regions in Latvia, Lithuania and Estonia according possibility to evaluate success of development processes in regions of the Baltic States. The descriptive analyse of documents, statistical indicators at national level and regional level were used in the research.

2 SOCIAL ECONOMIC ENVIRONMANT OF THE BALTIC STATES

Baltic region consists of three small countries: Estonia, Latvia and Lithuania, and it look like a miniature model of the European nations. In large geographical scale it is advisable to include these countries into one group - the Baltic States.

As long as there are differences, there is regional identity in the Baltics. Close trade ties among the Baltic cities within Hansa, the union of city-states, is often mentioned. It brought prosperity to the entire region in the Late Middle Ages and left traces still visible in the capitals of the Baltic States. In the 20th century during the short period of independence between 1918 and 1940 political initiatives for the purpose of the development of regional identity, including formation of the Baltic Union (with Finland and Poland) and a plan to establish customs union between Estonia and Latvia, emerged in all three countries. During the Soviet regime similarity of the Baltic States was taken into account when planning economy.

Despite the geographical proximity of the three countries, it is hard to miss the essential historical, ethnic, cultural and social differences in the region. Traditionally they were formed from smaller settlements that historically grew to a large trade centres. State territorial and administrative borders remained unchanged, according to the current government and its military achievements and needs. There were similar trends observed in Baltic economies. However, countries today are at different growth level of development, which clearly confirmed by macroeconomic indicators.

On the one hand the Baltic States have always served as a bridge between the East and the West where their development was facilitated by the great potential for growth due to the respective trade and business ties.

States on the shores of the Baltic Sea can use many economic cooperation possibilities. In this aspect geographical position of the Baltic cities is advantageous, and they have received significant foreign investment with a substantial contribution from neighboring Nordic countries. These factors stimulate specialization of the production network and vertical specialization that may serve as an important source of static and dynamic efficiency.

After the restoration of independence all three Baltic States adopted similar price liberalization policy trends. They chose about the same development scenarios and methods as transition states in the Central Europe with greater progress levels.

Although according to international experts quality of the business environment in Latvia is comparatively only slightly behind that of the neighbor countries Estonia and Lithuania, it is essential to at least maintain

this level under the current conditions of the global economic crisis. Environment favorable to economic activity is the key aspect facilitating investment flow to the country, creation of new jobs, and gross domestic product (GDP) growth. All of these factors are critical for Latvia to get out of the present economic hole.

State can improve its general business environment by investing in infrastructure, education, and other resources available to all companies based on equal competition thus decreasing their operating costs and increasing efficiency of labor.

Despite aspirations for economic integration, economic likeness, and perception of national interests, cooperation of the Baltic States has also caused contrary effects. Since on a large scale capital and labor capacities are very similar, they manufacture almost the same types of products and compete for the same exterior markets; gains from the interior interstate market in the Baltic States are not great.

Starting with the Treaty of European Union, the conception about cohesion was further defined and was understood the decrease of developmental levels between the different regions, not the general division between the regions.

In general Estonia, Latvia, and Lithuania as member states of the EU gain considerable benefits and advantages thanks to the greater influence of EU common foreign trade policy on international level as well as due to increased availability to third country markets provided by EU free trade treaties. As a result of EU expansion the largest common market with more than 450 million consumers has been created. Thus Estonian, Latvian, and Lithuanian businessmen may sell their products in other EU member states and member states of the European Free Trade Association (Norway, Switzerland, Lichtenstein, and Iceland) making use of the advantages of the free movement of goods, services, labor, and capital. While for the Baltic States as EU member states foreign trade means trade with third countries where the major foreign trade partners include Russia, USA, Belarus, and the Ukraine etc.

It is equally important for the EU member states to maintain the social welfare, to provide conservation actions, health security, and educational system, decrease the crime rate, increase the quality of services and provide growth and development for scientific work and development in general.

Although the average level of consumer prices in the Baltic States is roughly the same, the way it has been achieved differs across countries - high and low inflation periods are not equally pronounced and causes of inflation differ.

Based on the institutional analyses on the European Union action principle and formation of the regional policy, the author understands that terms for long lasting economical growth are development, competition and employment.

In the last decades not only the country, using the central governing institutions and local authorities, is active in the implementation of the regional policy, but also the European Commission and other international organisations (Vaidere, 2006).

There can be observed quintessential social economical differences between the regions in the EU. The big social economical differences slow down the EU in general, as a whole, and each region of each state, even the wealthiest slow down in growth. Therefore one of the EU priorities by realizing the solidarity principle (European Commission, 2009) is the economical and social reconciliation (cohesion).

The main investment areas in Baltic States are financial intermediation and real estate and renting. In the newest Eastern Europe Outlook (2009), considering the economic situation of the Baltic States, specialists of SEB Bank point out that the recession of the global economy is over, but the recovery is equivocal and there are still many risks. The recovery of economics, especially in Latvia and Lithuania, depends on the stabilization of state finances. Swift changes have reduced unbalances in economies. Low purchasing capacity and increasing unemployment will continue to force drop in prices.

Governments will be forced to keep implementing sharp and unpopular cost optimization measures. Significant prerequisites for the recovery of the region will be the financial stability of those countries and the recovery rate of external markets.

Economic processes in the country have direct and indirect impact on the welfare of population and the social environment, starting from job security, and have direct influence on qualitative and safe living environment.

Several important priorities are established for the development of the social field in some policies of European Union – to create conditions for sustained growth and employment, where a potential obtained from one market could be fully used, to develop "know-how" policies stimulating scientific activities and technical development in the EU countries, increasing educational level and developing educational programs; to streamline employment systems; to increase the quality of life by guaranteeing economical development in an integrated society by improving public health condition, environmental protection and implementing policies for the establishment of freedom, safety and justice regions.

Currently the initiatives to be implemented in the field of employment, social and health areas are additions to the revised strategy of Lisbon (Treaty of Lisbon, 2007) oriented to economic, social and environmental regeneration. The strategy of Lisbon envisages "making the EU the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment".

Participants of the economy need time to change their consumption habits. Since mid-2003 the rise of inflation has been stimulated by external and internal processes – the global rise of oil prices took up, fundamental tax law changes took place in the Baltic States due to the joining the EU, import prices increased because of the EUR value increase, the pressure of the supplying party on the inflation hardened. In its turn, wider availability of credit opportunities, income sent home by persons working abroad as well as EU funding increased the domestic demand simultaneously having strong impact on the interaction of supply and demand factors.

The population has been ageing, i.e. the share of elderly people compared to the total population increased. In Latvia there are 467 thousands retirement pension receivers per approximately 1.15 millions of employed population, which means that approximately 2.5 employed persons have to support one retired person. In Lithuania 1.5 millions employed persons have to support 596 thousands retirement pension receivers, which means, that like in Latvia one retired person is supported by 2.5 employed persons there. Only in Estonia one retired person is supported by 3.6 employed persons. Also social insurance payment volumes are similar in all three countries, respectively, in Latvia 33.09% are paid in total, from which 20% are payments into the pension capital, in Estonia the social tax is also 33%, from which 13% are allocated to medical insurance and 20% – for provision of pensions, and in Lithuania the tax is 30.7%, from which 23.85% are allocated to the social insurance of pensions that is for some percent points more.

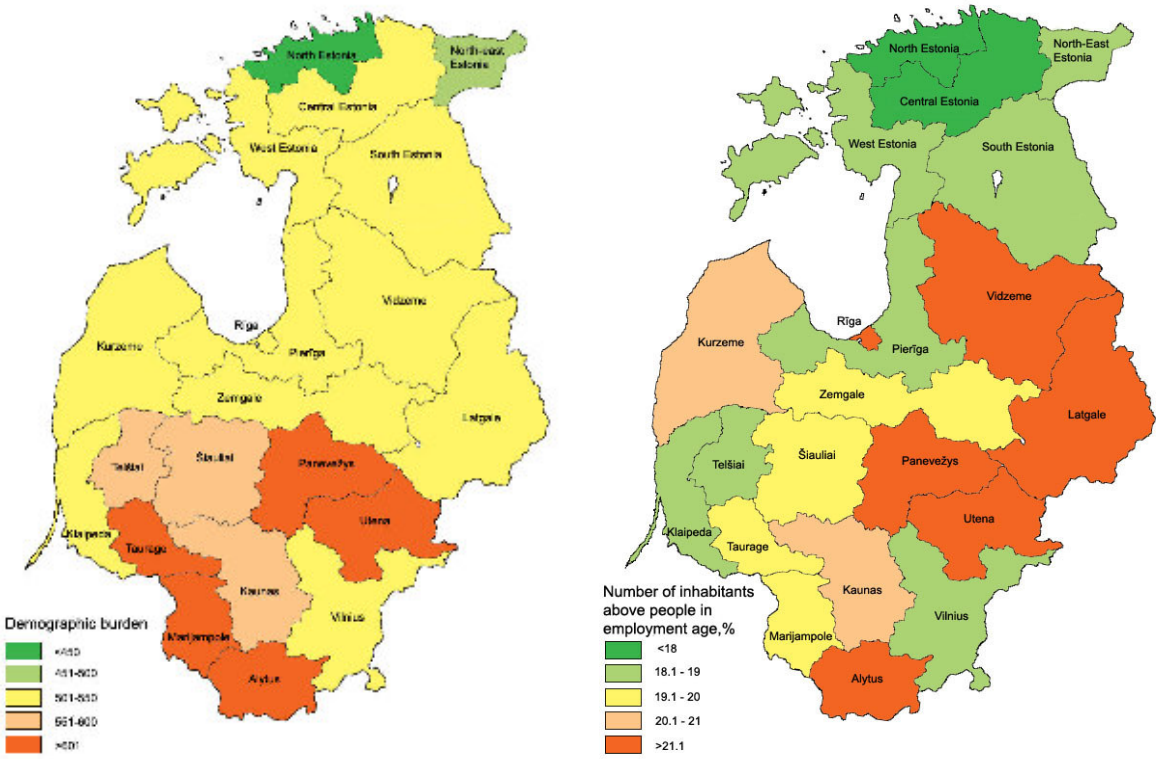

Fig. 1: Demographic burden and number of inhabitants above employment age in Baltic States, % of total population, 2008

The allocation of labour forces is strongly subordinated to the economic activities, respectively – allocation of employment possibilities, consequently the demographic burden varies in different territories. In the territories with more jobs and higher remuneration possibilities, especially in cities and their surroundings, there is a higher concentration of able-bodied population, whereas economically not so active rural regions are mostly populated by retired persons, not looking for employment possibilities any more.

Differences in welfare levels of the population are determined by uneven allocation of resources and economic activities in the countries causing highly different welfare levels of the population in different rural areas. Higher welfare levels of the population are near the towns, where relatively small distance to the town does not limit everyday mobility of labour forces.

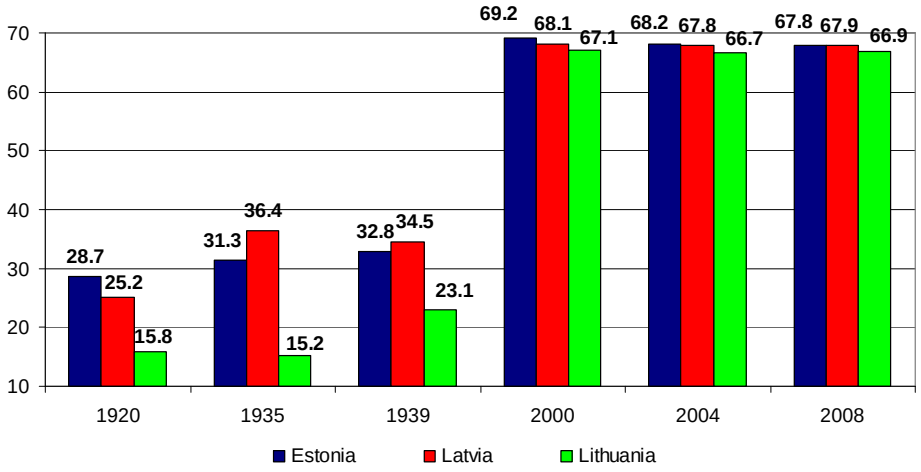

Fig. 2: Urban population, % from total population in country

The structure of the population in the Baltic States has strongly changed since 1920, which clearly defines the preferable social environment of the population. During the first independency more than one third of the population lived in towns, in year 2000 almost two thirds of the population of the Baltic States has chosen the city environment as their place of residence (Fig. 2).

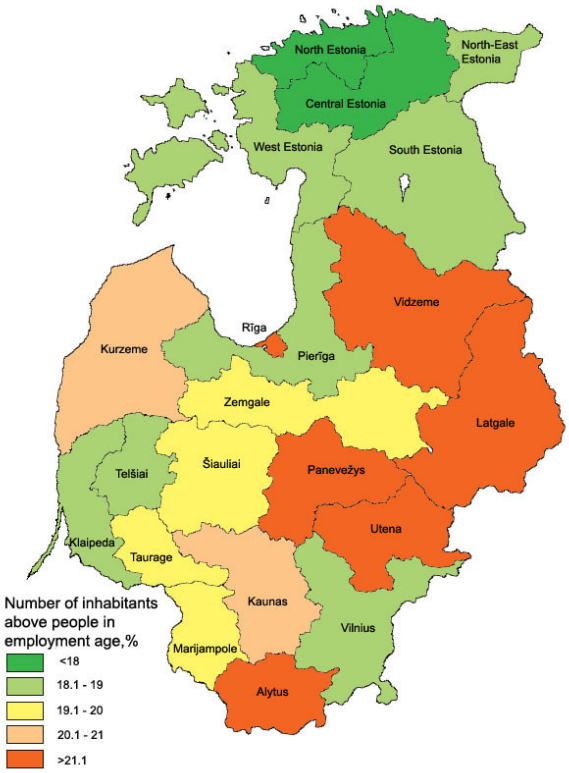

Fig. 3: Urban population in the regions pf the Baltic States, 2008

Among the population of Lithuanian regions there is a tendency (more than in other Baltic States) to choose towns as their permanent place of residence (Fig. 3). At the beginning of 2009, 66.9 per cent of Lithuania's population lived in towns on the major part of its territory. Over 2000–2008, the share of the urban and rural population remained almost unchanged (Statistical Yearbook of Lithuania, 2009).

In Estonia and Latvia the ratio of the urban population (more than 50% of the population living in towns) makes little bit less than a half of the total territory. In the region of Central Estonia the ratio of urban population makes just 21.4% of the total population of the region, but in region of the Baltic States (including capitals) the ratio of urban population is between 78 to 83% of the total population in the respective region.

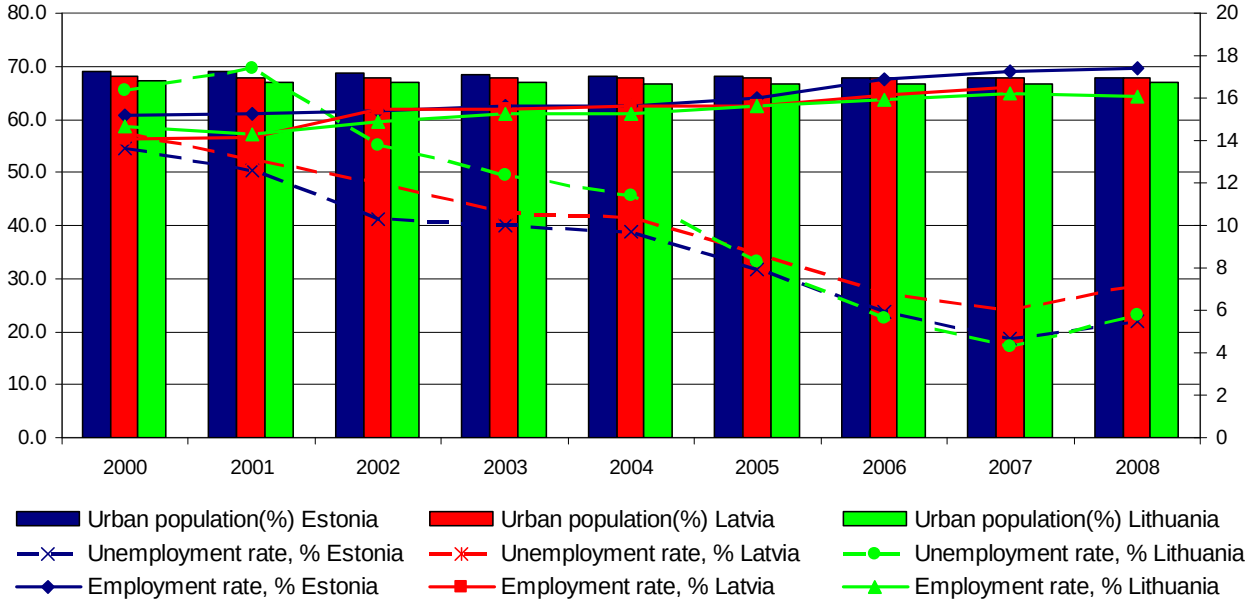

Fig. 4: Urban population and employment indicators in Baltic States during 2000 – 2008

Also the number of the unemployed has been annually decreasing. The employment level in the Baltic States has increased in the last eight years (Fig. 4). The highest number of the unemployed had been recorded in 2001, while in 2007 – 4 times less than in 2000. From 2001 to 2007 the unemployment rate in all three Baltic States was decreasing, but from 2008 it has began to increase and, according to the EUROSTAT data, a big leap is prognosticated in 2009 – in Latvia up to 19%.

Due to decreasing employment possibilities the unemployment increased in 2008 among persons with low educational level as well as among persons with high educational level. Persons who have only general education had remarkably more problems with finding a job (Statistical Yearbook of Estonia, 2009).

Changes and influences on the labour market reach other fields but at different time, this also applies to other fields which are influencing the labour market. In case of mutual relation it is unclear what field has stronger influence but in most cases it is easily discovered, which field is stronger (Statistical Yearbook of Estonia, 2009).

Comparing the volume of natural growth in the 20s and 30s of the 20th century with today's tendencies we can see sharp differences – in the beginning of the 20th century the natural growth was positive in all the Baltic States (Fig. 5), but at the beginning of the 21st century, comparing indicators of the demographic situation, we can trace negative tendencies in the changes of population numbers.

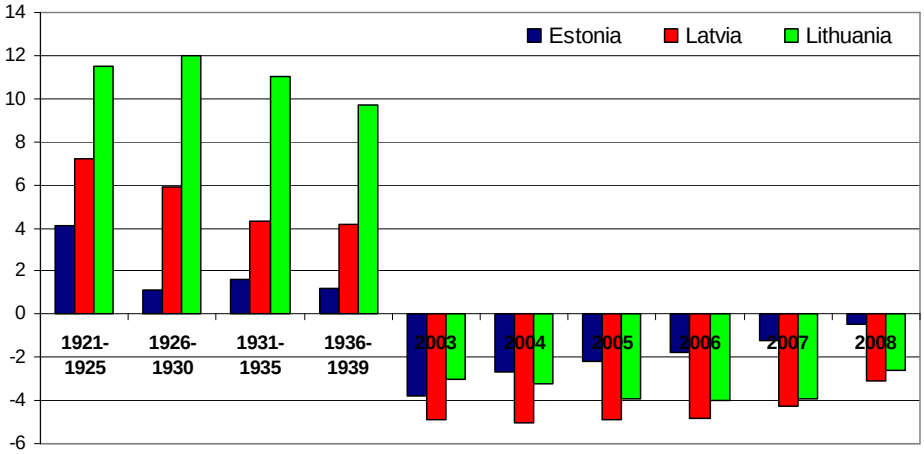

Fig. 5: Natural growth in Baltci countries

During the last three years a negative growth tendency can be observed mostly in regions of Latgale and Utena where the natural growth indicators were -9.1 and -7.2 per 1000 inhabitants respectively. The main reason of the decrease in population is not only the natural decrease, but also international migration that can be observed on all the territory of the Baltic States. As from 2006 the situation in all the Baltic States has been improving and we can see the increase in birth rates.

There is a tendency characteristic of the capitals of the Baltic States to oppress economic potential of other areas of the respective state, thus total growth is generally accounted for by the state's capital. Author reminds that the key prerequisite for common development of the cities is their willingness to become part of the collective network and cooperation among the most important participants in the field of politics, economics, and administration.

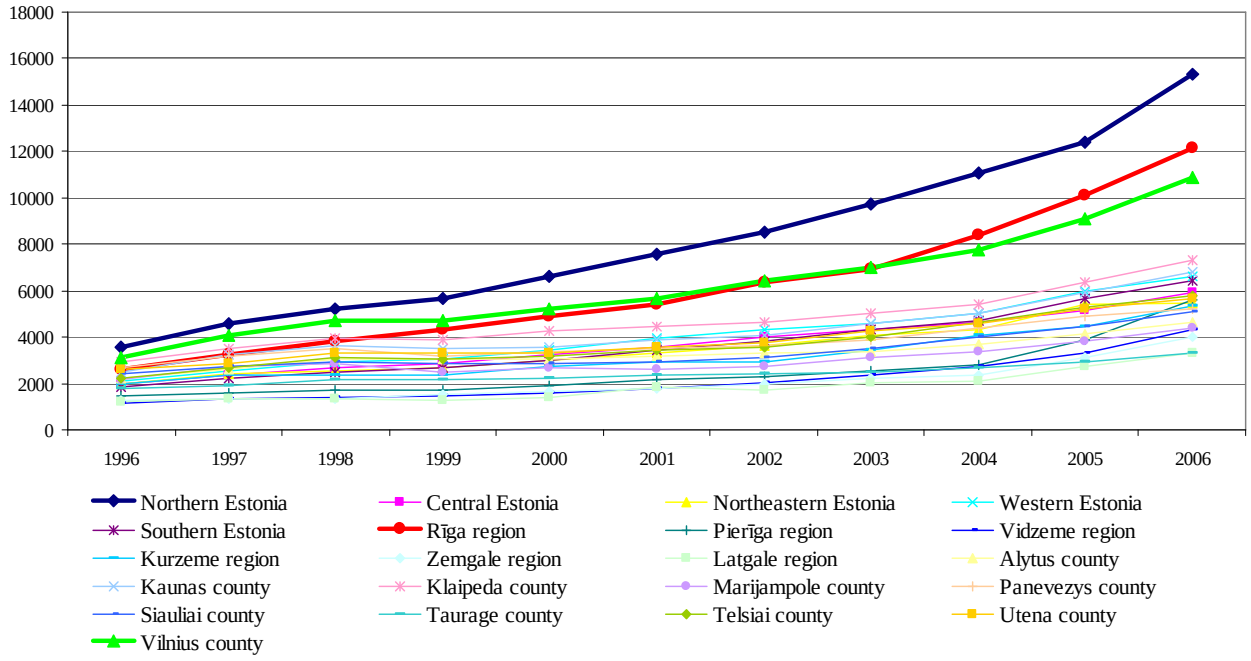

Fig. 7: Regional GDP per capita n Baltic States

Region of Riga accounts for a substantial share of the state economy of Latvia – in 1996 it was 46.5%, in 2006 – 57.3% of Latvia's GDP, the remaining share is accounted for by the rest of the regions (Fig. 7). Whereas Northern Estonia accounted for 53% of the state economy in 1996 and 61.1% - in 2006, and region of Vilnius accounted for 28.6% of the GDP in 1996 and 36.9% - in 2006.

In 2006 GDP per head in Vidzeme was as many as 9 times smaller than in the region of Riga, other regions showed only slightly higher rates – in Zemgale it was 8 times smaller, in Latgale - 7.5 smaller, in the outskirts of Riga and in Kurzeme - 5 times lower than in the capital.

In Estonia the situation is similar – in Northern Estonia, where the capital Tallinn is located, the rate was even 9.5 times higher than that of Central Estonia. Northeastern Estonia showed GDP per head 8 times smaller than Northern Estonia, in Western Estonia it was 7 times lower, and in Southern Estonia - 3.5 times smaller than in Northern Estonia where the capital Tallinn is located.

In Lithuania the difference in respect of GDP per head among regions is even sharper – region of Taurage showed even 20 times lower share of Lithuanian economy than region of Vilnius, Marijampole and Alytus counties were also behind by more than 10 times, Utena and Telsiai counties showed a value 8 times smaller, the rate was 5 times lower in Panevezys County, 4.8 times - in Siauliai County, 3 times - in Klaipeda County, and GDP value was almost 2 times lower in Kaunas County.

Sharp differences in respect of GDP rates across the Baltic regions may most clearly be observed in diagram (Fig. 8) where data of the capital regions differs considerably.

During the period (1996 - 2006) discussed in the study basic growth rate of GDP per head in Riga Region (taking 1996 as the base year) was 363%, average growth rate was 17%. Whereas other regions of Latvia did not show such a rapid economic growth, and the average growth rate in regions across Latvia ranged from 11 to 15%, 11% in Kurzeme and Latgale, 13% in Zemgale, 14% in Vidzeme, and 15% on the outskirts of Riga.

In Estonia basic growth rate of the Northern Estonia was 335%, while the average growth rate was 16%. In other regions it showed the same tendency as in Latvia ranging from 11 to 13% - 11% in Northeastern Estonia, 12% in Central and Western Estonia, and 13% in Southern Estonia.

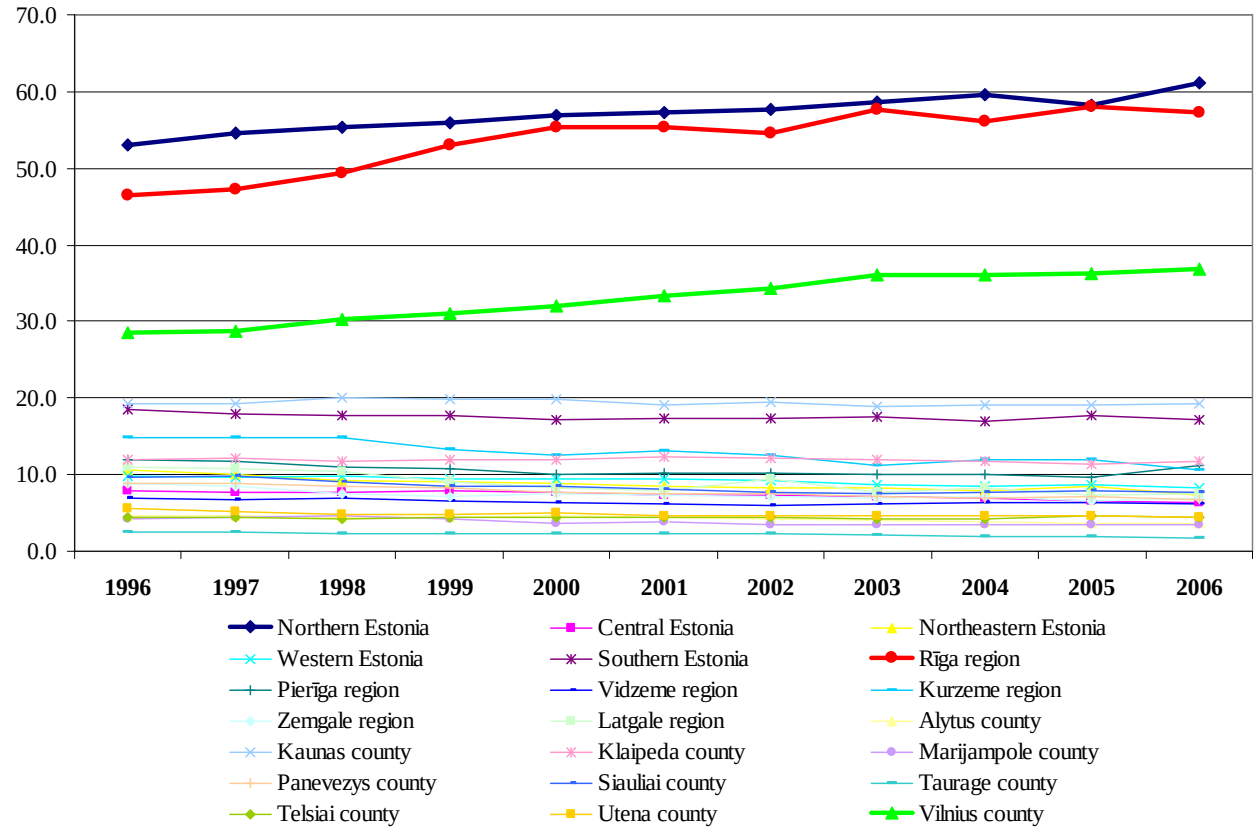

Fig. 8: Annual regional GDP in Baltic States during 1996 – 2006, % of GDP within each country

In Lithuanian the average growth rate was slightly slower - 14% in Vilnius Region, 6% in Taurage County, 7% in Panevezys County, 8% in Alytus, Marijampole, Siauliai, and Utena counties, 10% in Klaipeda un Telsiai counties, and 11% in Kaunas County.

The life rhythm in modern day Europe is fast. To solve problems that affect us not only in Europe, but also outside it, the legislation needs to adjust to the fast growing technological development and need to further

innovations that could protect the wellbeing and security of the inhabitants of Europe. The public offices and authorities need to be effective, flexible and determined. These are the standards that the European Commission (2009) has set for themselves.

The public authorities adopt legislations for the society to reach numerous goals - to provide fair trade and competition, provide health security and security, further innovations and protection the environment. When developing the policies and legislations the government tries to obtain betterments – make sure that the right instruments are used for the corresponding task, the gains are maximized and the negative influence is minimized, and they make sure to listen to those who are directly influenced by these actions. Therefore the author is convinced that the legislation is a tool that makes policies become reality and realizes the needs of citizens.

The international dialog and collaboration is extremely important not just because of security of high consumer rates and social and environmental protection, but also from the perspective of business development. Just like the creation of a single market in the Europe was set by the company needs to get rid of the unreasonable differences in norms between the member states, the international collaboration motivation is to scale down or liquidate excessive formalities between the business partners.

3 COMPARISON OF THE REGIONS OF BALTIC STATES USING FACTOR AND CLUSTER ANALYSIS

As in the past, even today we can talk about each country individually as well as of single region. Further analysis of the regions of the Baltic States is done at NUTS III level according to Eurostat's defined statistical regions of Europe.

Each administrative territorial units (parishes, towns, districts, counties) and regions can be described using many different parameters, and each of them can form different spatial clusters. Particular importance of these characteristics is among those that may serve as indicators, both describing the situation as a whole and find a causal relationship, as well as emphasizing the ongoing processes.

Based on the assumptions that there are complex interactions and relations of dependency between variables and parameters and thereby the possibilities of reduction the information, it is necessary to apply the method of gathering information, which remove the relevant information from non-significant one and indicates interrelationships.

Based on a set of indicators that characterize the Baltic country's socio-economic development using factor analysis it is useful to form a small number of complex factors that can not be observed directly and which are not correlative to each other and describes the overall structure in the initial factor system.

Factor analysis method allows dealing with some approximation of a very substantial research task - based on the wide array of information processing, to develop the classification scheme with an explanatory description.

Studying the characteristics of a system with factor analysis it is possible to reveal the logical structure of complex phenomena, to distinguish between independent and substitutable indicators, relevant from the irrelevant, and to justify the choice of indicators system and assess its information load, as well as to test hypotheses on system regularities of the indicators (Field, 2000; StatSoft, 2003; Patria, 2007).

The choice for usage of factor analysis in work was the essence of the method - identifying the links between the initial indicators and get a smaller number of factors, which characterizing the socio-economic development of the Baltic regions, and describing their competitiveness.

Initial indicators corresponding characteristics of territory and living environment has formed 3 complex factors using factor analysis which generally explains 69.8% of information. The first factor explains 32.2%, the second - 24.5% and a third - 13.1% of information.

Factor	*Initial Eigenvalues*		*Indicators*	*Component*
	Total	*% of Variance*		
Quality of living environment	4.186	32.2	Level of demographic burden (2008)	-0.840041
			Number of dwellings per 1000 inhabitants (at the end of 2007)	0.830591
			Housing stock average per inhabitant, m^2 (2008)	0.732723
			Number of beds in hotels and other accommodation establishments per 1000 inhabitants (at the end of 2007)	0.719869
			Number of visitors in hotels and other accommodation establishments per 1000 inhabitants (at the end of 2007)	0.829385
			Recorded criminal offences per 10000 inhabitants (at the end of 2007)	0.762847
			Sown area, thsd ha (at the end of 2007)	-0.541485
Attractiveness of living environment	3.179	24.5	Population density, population per 1 km^2 (2008)	-0.653436
			Immigration per 1000 inhabitants (at the end of 2007)	0.653294
			Emigration per 1000 inhabitants (at the end of 2007)	0.837291
			Urban population ratio, % of total population in region (2008)	-0.860151
			Forest cover, % of total area (at the end of 2007)	0.639959
Accessibility of territory	1.709	13.1	Road traffic accidents per 1000 inhabitants (at the end of 2007)	0.91566

The result of factor analysis describe the quality of living environment – the higher value of the first factor belongs to regions with bigger amount of housing stock and number of dwellings calculated per 1000 inhabitants what is characteristic for urban area. Those regions have also more visitors stayed in hotels and other accommodation establishments and number of beds in those establishments calculated per 1000 inhabitants. As negative feature characterizing the same regions should be mentioned higher level of recorded criminal offences per 10000 inhabitants.

By contrast the characteristics of the demographic burden and the sown area of agricultural land is part of the package that form factor with a negative component, which means that the region has low dependency ratio and low agricultural crops.

The higher value of the second factor describing attractiveness of living environment within the region the bigger migration flows of population and more forest cover in territory. At the same time there is lower population density and wherewith lower urban population ratio characteristic for those regions.

The third factor describes accessibility of territory and the higher values of this factor characterise regions with more road traffic accidents calculated per 1000 inhabitants.

These complex factors clearly show interaction of urban and rural areas and characteristic marks typical for urban and rural environment.

Further study was done using cluster analysis, which is a statistical analysis method, and can be used to set up essential groups of similar objects. The main purpose and challenge of this method is to form groups of investigated objects into clusters, based on certain representative comparison of parameters. However, different groups of elements should be divergent. The cluster analysis was done by SPSS program.

The author chose the optimal regional allocation of 6 groups, which further described in the work.

Factor / Cluster	1	2	3	4	5	6
Quality of living environment	1.48389	1.34060	0.58582	0.59162	-1.03904	-0.54831
Attractiveness of living environment	-1.19455	0.90629	1.61198	-2.72410	-.38052	0.08945
Accessibility of territory	-1.12623	-0.16568	1.72472	2.25487	-2.21580	0.07582

This table shows the values for the final cluster centres. The values in the table are the means for each variable within each final cluster. The final clusters centres reflect the attributes of the prototypical case for each cluster.

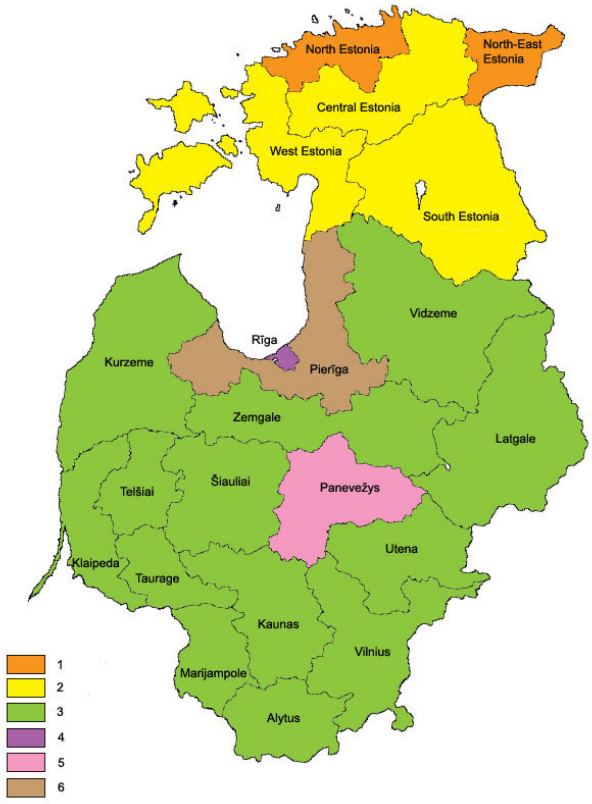

Fig. 9: Clusters of territory and living environment factors

The author, along the traditional statistical analysis, analysed clusters using cartographic method, which gives an overview of the diversity of circumstances in the Baltic region. During cluster analysis for selected complex factors it was made 6 groups obtained following distribution of Baltic regions (Fig. 9).

4 CONCLUSION

The regional policy often is called the structural policy because in the result of implementing the regional policy the regional and state economical and social structures change.

For the regional development and promotion of competitive capacity in the Baltic States in 2007-2013 large means of structural funds for different programmes of business activity and research development therefore promoting the state and individual region competitiveness from the European Union are available.

More similarities in management of social and economic processes have Latvia and Lithuania. Promoting cross border cooperation between regional and local municipalities in Latvia and Lithuania it is possible to foster economic growth jointly addressing the cultural, industrial and social problems.

Rational use of available resources in regions is an investment in future development, promoting better interaction between regional bodies and thus improving the living conditions and future economic development.

Regional disparities and increasing gap between regions within the Baltic States and the Baltic States themselves justifies the need for implementation of long-term development policy and spatially differentiated approach to regional support to provide solutions to specific problems in the region mostly using the existing resources and potential.

The author suggests using different instruments for support of regional development at state level and local (municipality) level to foster the effect of support actions:

State level: Subsidies, loans, donations; Investments; Differentiated support for problematic regions; Rationing of resources consumption.

Municipality level: Finance, credits, warranties; Consultancy, employment training; Licensing, certification, privatization; Development of organizational structures.

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🏆 *reviewed paper*

Confronting the Lagos Informal Land Use: Issues and Challenges

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1 ABSTRACT

Lagos represents one of the cities with the fastest growing urban agglomerations in the world. Rapid urbanisation coupled with inadequate public resource has given rise to peculiar land development system that is, informal land use. It has been observed that formal land management system has continuously failed in providing land for housing and other uses, registering titles and land transfers, regulating access to and use of land as well as providing basic infrastructure services. The shortage of the formal system has, however, been largely compensated by the increasing importance of an informal system in land development. This paper addresses the main issues and challenges of informal land use in Lagos State and how it can be integrated into urban development so as to achieve a sustainable, healthy and livable urban settlement. Major issues and challenges confronting informal land use as identified by the paper include uncontrolled and conflicting land use, Unplanned growth, illegal squatting, overcrowding, inadequate or lack of basic services and infrastructure, continuous rise in incidence of informal land use, insecurity of tenure, poverty and worsening environmental conditions, marginality, exclusion and vulnerability among others. Therefore, it is imperative to confront the incidence of informal land use through the use of adequate and sustainable means of land use management system, informal land regularization that guarantees security of tenure, urban growth and housing strategy to address shortage of affordable and adequate serviced housing, massive provision of basic services and infrastructure and improved urban land administration.

2 INTRODUCTION

In sub-Saharan Africa, land defines the social, economic and political relations in the society. Especially in the urban areas, it provides the basis upon which planners predicate their strategies of development (Wanjala, 2002). However, It has been observed that in many third world cities, urban land can either be obtained formally or informally, and that the informal sector provides much more land to land seekers (including the majority of the poor) than the formal sector. Nevertheless, the mechanisms of the informal land sector are usually ignored and are hardly understood and documented. (Mabogunje, 1990).

The informal sector encompasses a wide range of areas of informality — environmental, spatial, economic, and social, covering business activities, employment, markets, settlements, and neighborhoods. Most urban households in the developing world live in informal settlements due to their often exclusion from formal systems of land management. Up to 85 percent of new housing is produced informally, a trend that is especially pronounced in sub-Saharan Africa and particularly in Nigeria (Nkurunziza, 2007).

Land policy is an important tool in spatial planning and planning administration. The structure and pattern of any settlement is a reflection of laws that regulate land administration. The past and existing patterns of development within Nigeria settlements are a function of land laws and administration (Oyesiku 1998). Prior to 1978, land administration in Nigeria had been predominantly guided by customary laws. This system recognized the interest of individuals, families and communities on land. Therefore, all the people have equal right of access to land, while the chief or head of the family is the trustee who holds the land for the use of the people. Acquisition of land for use under the customary law is normally through a grant by the chief of the community or head of the family. Alienation or transfer or terms of grant are restricted to strangers (Yakubu, 1985). Today, land tenure in Nigeria is governed by the Land Use Act of 1978 under which all land in all the states of federation is vested in the Governor. Access to land is by way of a 'right of occupancy' granted by the government. This development had led to a lot of controversies in the acquisition, disposal, use and administration of land especially in the urban areas due to increase in the demand for use of land which is brought about as a result of high rate of urbanization.

With the present trend of rural urban migration in Nigeria as epitomised by the situation in Lagos being the commercial and industrial hub of the country – with a land area of about 3,345 square kilometers, which is just about 0.4% of the total land area of country. It is physically the smallest but the most populated and urbanized state in the country with population of over 10 million inhabitants which is about 10 percent of the entire population of the country. Therefore, it is not unexpected to observe unusual pressure, leading to

unprecedented demand for land. Through the pressure being mounted by the demand for land, it is a common phenomenon to see most undeveloped land being taken over informally by the rural immigrants

who are mostly poor in order to satisfy their urban land needs. Consequently, such invasion or informal development usually leads to uncontrolled and unorganized developments, while such neighborhoods/communities lack basic infrastructural facilities which are needed for healthy living. The rapid rate of development, equally results to overall plannessless of these areas. It is against this background that the paper seeks to addresses the main issues and challenges of informal land use in Lagos and how to prevent informal urban development in order to achieve a sustainable human settlement worthy of living, working and recreating.

3 LITERATURE REVIEW AND CONCEPTUAL ISSUES

3.1 Informal Land use: definition and characteristics

There has been a considerable growth in the amount of literature on informal land use. Also, the research on the economic, social, and political forces that generate and sustain the incidence of informal development is abundant. This includes work by Payne (1989), Satterthwaite et al (1989), Arche (1992), Rakodi et al (1993), Kombe (1995), Durand– Lasserve (1996), Habitat (1996), and Kombe and Kreibich (2000). Many synonyms have been used in literature to refer to informal land use. These include spontaneous, irregular, unplanned, marginal, squatter and informal settlements (UNHSP, 2003c). Therefore, throughout this paper, informal land use is equated to informal development, informal settlement or squatter settlement.

The phrase informal settlements has been accepted as well as refuted by scholars in numerous disciplines. According to Leeds and Leeds (1978), the occupation of land that does not belong to the person settling on it is what distinguishes informal settlements from other settlements. The inappropriate invasion of land characterizes these settlements as an illegal form of land use because occupation is neither based on the legal ownership of such land, nor in payment of rent to its legal owners. In a study identifying the significant variables that determine the character of squatter settlements, Leeds argues that the only uniform identifying characteristics are their illegal and unordered origins or organized invasion and, because of their origin, their continued juridically ambiguous status as settlements (Leeds, 1969). Sietchiping (2000) refers to informal land use as any human establishment, human settlement or land use in the urban area which is not suitable and/or in opposition to the expected standard and regulations. Informal land use includes the poor and precarious housing within the city or in the city fringes or other areas where land are vacant, accessible and affordable.

According to Srinivas (2003) informal land use is characterized by unauthorized use of vacant public or private land, illegal subdivision and/or rental of land, unauthorized construction of structures and buildings, reliance on low cost and locally available scrap construction materials, absence of restrictive standards and regulations, reliance on family labour and artisanal techniques for construction, non-availability of mortgage or any other subsidized finance. Study by Sietchiping in 2000 revealed that informal land use is characterised by overcrowding, deterioration, insecurity, absence or insufficient basic facilities. These conditions endanger the health, safety or moral of the inhabitants and the livability of the community at large.

The development of informal land use - the evolution of what are now described as informal settlements- was blamed in the seventies on the tendency of the private land market to marginalize the poor (Gilbert and Ward, 1985; Turner, 1980). Informal land use according to World Bank (1999) constitutes an expression of poor urbanization and poverty of city dwellers as well as failed policies, bad governance, corruption, inappropriate regulations, dysfunctional land markets. Furthermore, according to Yapi-Diahou (1994) informal (settlement) land use originated from difficult problems of housing, immigration rate, politics, physical planning, landlessness, land tenure system and employment especially in the urban areas. In particular, they originate from the existing gap between the number formal/regular land supply and the need.

Land in the formal market remains too expensive for urban poor. Government allocations are slow and bureaucratic, and the land allocated for shelter considered insufficient. Recent empirical observations in nine African countries according to Mattingly and Durand-Lasserve (2004) provide evidence that Informal land systems are effective enough in terms of the quantity delivered to be an alternative to formal urban land delivery systems. They are less bureaucratic and more flexible than formal systems. They are more effective in reaching poor people. However, their viability, livability and sustainability raise a series of questions as

the system produces poorly planned areas with insufficient basic services as been experienced in Nigeria cities today.

Nigeria is one of the most rapidly urbanizing countries in Africa and the challenges that come with this especially in the supply of adequate land for basic services, housing and other uses are major challenges that government faces (FMH&UD, 2003). This had long been recognised by government therefore; attempt to meet these challenges led to promulgation of land use act of 1978 which seeks to nationalize the land tenure system in the country and entrusts the administration in the hand of the government. Nevertheless, in Nigeria today as epitomised by the situation in Lagos the informal sector is the dominant provider of urban land and housing, as only about 20% to 40% of the physical development in Nigeria cities is carried out with formal government approval. The weaknesses of government planning controls, and the haphazard developments associated with the informal sector have created disorderly and unhealthy urban environments (Nwaka, 2005). Generally, dwellings in informal settlements are built by the spontaneous, undirected and untrained efforts of the squatters who cannot afford to secure legal or formal land or a safe site on which a house can be built. Usually informal developments are located on vulnerable and areas such as deep or dangerous slopes. They are known as catastrophe prone areas Sietchiping (2000).

Informal land developments provide shelter for over 85% of the population of urban dwellers in most developing countries (UNCHS, 1996 and 2000; Durand-Lasserve, 1997). Yet, they either do not appear at all in government records or are regarded with so much negativism as to warrant constant harassment or exclusion from provision of necessary infrastructure and amenities (Durand-Lasserve and Tribillon, 2001; Agbola, 2005). As a result, actors involved in the informal and illegal land markets are denied access to formal opportunities for optimization of capital formation and accumulation.

Today, according to World Bank (2006) over two-thirds of the population of Lagos lives in the informal settlements or slums that are scattered around the city. The Lagos Master Plan 1980–2000 identified and classified 42 slums or informal settlements in the city. There are now over one hundred of such communities in Lagos. Many poor and low income families excluded from access to land and housing in the formal sector find refuge in the informal settlements where land and housing can be purchased and built according to means and capacity. Although, they generally lack security of tenure by virtue of not having the certificate of occupancy however, many informal settlement residents hold bona fide legal rights and interests in the land on which they live, having validly acquired land from legitimate land holding families or communities.

Driven by the quest to eliminate or drastically curb the incidence of informal settlements, the government has used forced eviction as a preferred tool of urban engineering with counter-productive outcomes. Generally, these evictions are planned and carried out without regard for the due process of law. In addition to the broad range of social, economic, psychological, cultural and physical havoc inflicted on the victims, forced eviction has helped to fuel the growth of new informal settlements or the expansion of existing ones with more complex dimensions. These communities are routinely denied funds needed for the provision or maintenance of basic facilities such as community health centres and portable water among others which are needed for a healthy living (Morka 2007).

It has been observed that there is lack of consensus regarding the status of informal settlements, especially the nature of their legality or illegality. The often cloudy statutory nature of the settlements is further complicated by a muddled policy environment and a often lukewarm stance by most Third World governments (Kombe 1995).The fact that the majority of settlers in informal settlements belong to the economically and socially marginalized groups seems to have worsened the reputation and increased the alienation of the informal land development by the policy makers. Government responses to informal land development in most developing countries have ranged from passing tough, stringent regulations to excluding them from infrastructure extension plans to barring their integration into urban or municipal services to outright demolition (Zaghalonl 1994). These are common phenomena in Lagos urban informal settlements.

Qualifying definitions, characteristics, quality and examples of informal settlements vary widely, with the inherent danger of generalization, but an attempt has been made to identify key features which are common to such areas and distinguish them. Generally, according to Kombe and Kreibich (2001) informal settlements portray some similar characteristics irrespective of their status or where they exist the following are their common characteristics:

- They are built by the inhabitants themselves and their proportion continues in spite of frequent eviction threats from public authorities. The houses are built with the intent of owner-occupation, renting or both.
- They are built, for the larger part, by low-income urban dwellers that the existing formal housing systems or markets are hardly realistic options.
- The houses are built primarily with informal financing methods, i.e. family savings, capital from inheritance, sales of inherited land or savings from informal credit associations.
- The builders employ local building materials, skills, designs and indigenous technology.
- Often builders do not adhere to formal/legal building codes and planning standards.
- The informally built houses exhibit high variations in types and quality of construction, ranging from traditional construction materials (e.g. mud and pole or thatch) to modern quality components (concrete blocks, corrugated iron, aluminum, zinc, or tin roofs).
- They are built and serviced incrementally, ensuring flexibility on the part of builders and owners.
- They can exhibit unique urban designs with significant variations in lay-outs and spatial arrangements.
- Their densities are normally increasing rapidly up to saturation or over densification stage.
- The land use patterns are highly mixed, including small industries and urban agriculture.
- Especially in the initial stage of growth social cohesion is strong

3.2 Evolution and Causes of informal Land use

The relationship among people, land, and shelter is complex and differs between nations depending on their history, culture and legal system (Eliade, 1957; Doebele, 1983; Rykwert, 1988; Payne, 1997). Even though some societies still operate under customary tenure systems, while most have regulated the ways in which land may be held as a result of both social and economic reasons (Payne, 1997). These systems, however, have led people who cannot conform to them to create extra-legal systems, thus abandoning the formal approaches to settlements (UNCHS/Habitat, 1982; De Soto, 1989). Informality of land use according to Macedo (2000) is not only as a result of massive rural-to-urban migration or the perception that urban areas offer a better quality of life, let alone the pull of the bright lights of the city. Informal land use is also a product of national and regional inequalities due to the changing economic nature of nations and the lack of appropriate policies to mitigate the effects of change.

The economic push and pull associated with these processes is related to employment and is affected by geographic, infrastructure and service factors. Significant economic push from rural areas can be attributed to the exclusion of small farmers from the agricultural economy by large landholders. With massive numbers of displaced small farmers relocating to urban core areas for access to wage employment, uncontrolled and unplanned urbanization was inevitable. The housing supply in urbanized areas was inadequate, and with the low wages these workers were earning, formal housing was not affordable; their only option was informal arrangement (Macedo, 2000).

The incidence of informal land use has also been credited to the inability of governments to provide affordable housing to low-income families, particularly in the largest urban centers of developing countries (Abrams, 1964; Turner, 1977). Therefore, a large proportion of urban people are forced to live in sub-standard, unhealthy conditions. Uncertain land tenure contributes to the insecurity and other difficulties of squatters. This situation as noted by Chung and Hill (2002) persist due to the failure of the urban housing and land markets, in particular: the high cost of housing construction; the high cost of formal land transaction; the lack of affordable credit to low and middle income families; the small amount of land available for urban housing, in part because of the slow pace of regularizing tenure; insufficient government, and other, funds to implement services; other restrictions on service provision; lack of alternative urban housing that is affordable for low-income households; and poor co-ordination of urban infrastructure planning issues within Government. Payne (1997) argues that what seems to be an inability of governments to control or regulate land through direct action may be a reflection of the strong demand for land as much as a lack of government commitment or capacity to act. For instance, Lagos state government having realized that the informal sector

accounts for between 75% to 80% of urban employment and plays important role in income generation, as contained in the Upgrading Policy Note of the Lagos Urban Renewal Authority, the State relaxed rigid regulatory rules, which lead to further intensification of informal land use. Rising costs and delays in executing formal land transactions have also been blamed for the proliferation of informal settlements in various cities including Lagos. Under some formal systems, the cost of transferring the rights of land exceeds the market value of the land itself (Dale, 1997). For lack of a better option, these settlers, often migrants in search of employment and better living conditions, occupy vacant land, public or private, and build shelter for themselves. The study conducted by Agbola and Agunbiade, 2006 in some selected informal settlement in Lagos metropolis revealed that the process of obtaining legal title is expensive and laborious which is actually out of the reach of poor majority. Therefore, they prefer to approach the informal sector in order to meet their land and housing needs.

Urbanization coupled with rigid and inadequate land administration and planning policies to meet ever increasing demands for housing by the poor majority has also been associated with the growing of the informal land use (Ali and Sulaiman, 2006). Lagos, like many developing cities has been experiencing the demographic phenomenon of urbanization which is one of the driving forces for the incidence of informal land use on the fringe of urban centres. Recent studies and surveys show that about 70 per cent of the urban population in Lagos lives in informal settlements.

3.3 Urban Land management

Land management is a broad term that refers to a set of processes that deal with the: acquisition of land, continued rights to the land, regulation of the use and development of land, and trading of land. Land is managed either formally or informally. According to Planact (2007) the formal systems are characterized by: legal, regulated channels managed by governmental authorities; a great deal of bureaucracy, delays, often high costs, and problems in dealing with issues that fall outside existing policies and regulations; system biased towards owners of land and property, but use of land and property can be regulated by government On the other hand, informal systems are characterized by: extra-legal channels that are mainly used by people with an immediate need for land, and who do not have the financial capacity to buy or rent through formal channels; a more flexible and responsive way to address people's needs, informal networks are often utilized for access to land and to address governance within communities; instability and lack of regulation, rights are less secure or not acknowledged at all by the formal system. In Lagos, both formal systems and informal systems happen simultaneously and within the same areas.

Generally land in and around urban areas are either owned by the government or by the private sector or owned communally by tribes or clans. Often large land owners, be they governmental, communal or private, have a vested interest in maintaining the position. These vested interests gain more by keeping the land management fragmented, without proper controls and by keeping the dealings in the land market non-transparent. While they profit from the position the prime losers are the urban residents, particularly urban poor who are mostly accommodated in the informal settlements. Problems in urban management have arisen mainly because of the inability of government to cope with the intensity and range of urban problems arising from rapid growth of population due as much to natural growth as to migration (Dattatri, 1994). Government has been quiet observer to the deteriorating infrastructure and resulting poor environmental conditions within their area but also chaotic and environmentally unsound land development in the periphery.

In the recent past there has been a clear recognition of the importance of urban land management in helping to alleviate urban poverty and urban livability in the developing countries. It is argued that, managing the economic aspects of urban poverty has to aim at reforming regulations and policies that limit the access of the poor to urban land (Olima 1997). Despite the fact that land has been recognised as the main link between development programmes and projects and people little importance is shown for sound urban land management. The result of this according to Dattatri, (1994) is seen in a continuous increase of land prices leading to land speculation, scarcity of developed urban land particularly for housing, and proliferation of slums and informal settlements with little or no infrastructure services. For urban land to meet the needs of a growing population it has resulted in conversion of marginal or environmentally hazardous lands such as beside railway tracks, along rivers and canals, swamps to accommodation by this ever increasing population.

3.4 Extent of informal settlements in Lagos

In Lagos, the rapid growth of informal settlements was part of unprecedented urbanization process fueled majorly by rural-urban migration. The growth in city population occasioned increase in the demand for urban land for different purposes. The increase in demand was accompanied by increases in land prices, rental prices, inadequate formal land supply and poverty. The influx of population from outside the city coupled with reduction in the affordable housing provision especially from formal sector created an acute housing shortage and price increased beyond the reach of the poor majority. With this, the poor are left with no option than to occupy any available land especially outside the formal system which are mostly located in vulnerable areas of the city. Vacant uncommitted and committed government lands were also victims of this process. In a way informal land occupation is a spatial manifestation of poverty. Currently, Lagos urban agglomeration is characterized by a very significant presence of the urban poor who are mostly accommodated in informal settlements, with a growing poverty profile.

Informal settlements have multiplied over the years and the living condition of the poor is getting worse. Environmental decline, inadequate basic services and infrastructure in informal settlements across the state hit the poor hardest. Informal settlements which range in size from clusters of shacks to entire districts are scattered across the state in different local government. The number of informal settlements and the population in Lagos Metropolis are increasing at a faster pace on daily basis. As far back as 1984, 42 settlements had been identified as blighted (UNCHS/Lagos State Government). The number has risen to about 100 as at 2004 (UN-Habitat/Lagos State Government). The study carried out by Nubi and Omirin in 2006 revealed that over 70% of the built up area of the Lagos metropolis is blighted. Although, presently there is no accurate data on the exact number of such settlements and their population but there are indications that there are over 200 of such settlement in the state.

It has been observed that informal settlements in Lagos are located on both private and government lands without access to basic services. The poor in the city of Lagos are spread in squatters and informal settlements located in vulnerable areas such as swamp, canal setback, rail line setback, marginal land among others, deprived of basic infrastructural services. These make them more vulnerable to environmental degradation, threats of eviction, ejection and demolition.

4 CHALLENGES OF INFORMAL LAND USE AND ATTAINMENT OF HEALTHY CITY IN LAGOS

Informal land use system have evolved in response to a need for alternative means of access to land and shelter for the urban poor. Such systems provide alternative land delivery and tenure through simplified procedures that are accessible, user friendly and affordable. Up to 80% of all urban land delivery in developing countries is through informal means (UN/FIG, 1996b). However, the growth of this land use is associated with various socio-economic, land and environmental related problems. These consequences according to Ali and Sulaiman (2006) include pollution, deforestation, flooding, and waste of agricultural lands among others.

Informal land development presents a number of challenges to urban land management process as well as urban dwellers. Where the informal land tenure systems are not recognised by the authorities, they do not provide sufficient tenure security to residents of informal settlements (UNHSP, 2003a; UNHSP, 2004a; UNHSP, 2004b). Since they are not part of the official urban management system, little or no land information is collected in the settlements and they are left out of the urban development planning process (Sliuzas, 2004; UNHSP, 2002). Yet these settlements are home to increasingly large proportions of urban populations in developing countries.

The informal occupation of land by poor migrants and otherwise displaced families creates one of the biggest challenges to urbanization. Even when the land becomes subject to regularization, it is almost impossible to make the area comply with established land use and zoning standards, especially when the settlements are already consolidated. Informal developments are the alternative for those too poor to participate in the formal market of planned and serviced housing. The manner in which these settlements materialize is similar across the majority of cities in developing countries with no exemption of Lagos.

Furthermore, lack of access is also a common problems associated with informal land use. Because there is neither a layout plans nor the regulatory machinery, residents tend to build to almost 100 per cent of their

plot size. It has become impossible to provide access roads to these areas as there is no space to accommodate such. Likewise, no area is left open for social services like schools, hospitals, children's play grounds, etc. Consequently, people and services movement in these areas are very restricted and residents have to walk long distance to obtain services like health, education, transport and the like (Ali and Muhammad, 2006). The rapid growth of informal land use in the urban areas of Lagos poses significant challenges to both dwellers and government. Challenges of informal land development in Lagos is multi dimensional ranging from social, economic, cultural, environmental and physical dimensions.

Informal land use is a widespread phenomenon in Lagos with the dwellers occupying land outside the legal land tenure system whether through the occupation of land in the periphery as illegal subdivisions by private agents, the direct invasion of public lands by settlers, or the invasion of infill vacant public lands in central areas with limited or no access to public utilities. Lagos urban informal settlements are characterized by a very significant presence of the urban poor, with a growing poverty profile. Informal settlements have multiplied over the years and the living conditions of the poor are getting worse. Environmental decline, inadequate basic services and infrastructures in these settlements across the state hit the poor hardest. Informal development which range in size from clusters of shacks to entire districts are scattered across Lagos state in different local government. The number of informal settlements and informal settlement population in Lagos Metropolis are increasing at a faster pace on daily basis. From 42 slum settlements in 1984 (UNCHS/Lagos State Government), the number has risen to about 100 (UN-Habitat/Lagos State Government, 2004). The continuous expansion of these settlements without adequate caution poses health, environmental, planning and development control problems to policy makers and the inhabitants.

The urban challenges of developing countries as identified by Population Reference Bureau in 2004 include environmental hazards, natural disasters, public and reproductive health, and poverty. These are all evident in the various pockets of informal settlements located across the state.

The environment components such as land, water and air which provide support system for healthy living, prosperous city and liveable city are been polluted daily in Lagos as a result of pressure on them due to human developmental activities and desire to meet daily livelihood especially by the poor. According to Gandy (2006) the city's sewerage network is virtually non-existent and at least two-thirds of childhood disease is attributable to inadequate access to safe drinking water. In heavy rains, over half of the city's dwellings suffer from routine flooding and a third of households must contend with knee-deep water within their homes. With this situation, the poor are mostly affected because they often live in marginal or environmentally hazardous and ecologically vulnerable areas of the city.

The influx of population coupled with infiltration of informal land use and unplanned growth has serious implication for flooding wish has been identified as a serious problem in Lagos metropolis. The poor drainage systems, the relatively high water table and the flat topography of Lagos had hindered the flow of surface water run-off and prevent rapid discharge into the sea. Flooding of Lagos metropolis is usually caused by a combination of human and natural factors. The human factors are as a result of poor wastewater disposal and other sanitation practices (e.g. blocked drains by refuse, silt, sludge, etc) which are common practices in informal settlements. The natural factors include rainfall, flat topography and poor infiltration. Informal settlements often occupy marginal land, including river banks, swamp and flood-plains. Some are regularly flooded even in moderately heavy rain. This has caused a lot of damages which have led to lost of lives, properties, and destruction of infrastructural facilities.
Furthermore, informal development suffers from uncontrolled land use, squatters, overcrowding, poor drainage, unplanned access, and lack of adequate sanitation facilities and water supply. In adequate or conspicuous absent of these basic facilities make daily life uncomfortable to the inhabitants of these settlements. Lagos, the commercial nerve center of the Nigeria, also faces the difficult problem of informal land development within its cities. The continuous rise in incidence of informal land use, reduction in infrastructural provision, insecurity of tenure, poverty and continuously worsening environmental conditions in these areas make it very difficult for the dwellers to improve their homes and immediate environments on their own.

The informal occupation of land generates problems of marginality, exclusion and vulnerability for the settlers. Although the inhabitants especially those located in the central areas benefit from living in a central area accessible to employment, infrastructure, and urban services (especially health and education) however,

living conditions are extremely poor (Magalhaes and Eduardo 2008). Low quality houses and the dire environmental conditions of the land they occupy expose these settlers to higher than average health risks. These areas are devoid of open spaces and recreation, as well as inadequate circulation and access to the residential units, making services such as emergency provisions and garbage collection extremely difficult. These situations are evident in most informal settlements in Lagos metropolis notable among these are – Ajegunle, Makoko, Ilaje, Iwaya, Ijora among others. Livability, safety, sustainability and health of these settlements and their dwellers become a mirage if nothing concrete is done to address the current situation.

According to Hancock and Duhl (1988) a healthy city is one which is continually creating and improving those physical and social environments and expanding those community recourses which enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential. Therefore, healthy is defined by a process and not by outcome. A healthy city is not one that has achieved a particular healthy status. Rather, it is one that is conscious of health and striving to improve it (Tsouros 1990).

However, for a city to be healthy according to Tsouros (1990) it must possess the following qualities:

- A clean, safe physical environment of high quality which include housing quality
- An eco system that is stable now and sustained in the long term
- A strong, mutually supportive and non-exploitative community
- A high degree of participation and control by the public over the decisions affecting their lives, health and well-being
- The meeting of basic needs (food, water, income, work, safety) for all the city dwellers
- Access to wide variety of experiences, resources, contacts, interaction and communication
- A diverse, vital and innovative city economy
- The encouragement of connectedness with the past, with the cultural and biological heritage of city dwellers and with other groups and individuals
- An optimum level of appropriate public health and sick care services accessible to all
- High health status and low levels of diseases

An appraisal of the above qualities suggests that it is an ambitious goal to achieve especially in informal settlements which are characterised by low quality housing, inequalities, vulnerability, lack of access to public infrastructural facilities, exclusion, and inability to meet basic needs of life among others. However, in the other hand, it is an achievable goal bearing in mind that healthy city is a learning, evolving and continuous process which no one city could lay claim to have totally achieved. This means that there must be continuous efforts to see that the inherent characteristics of the informal settlements are turned around.

Unhealthy living, urban and environmental problems of cities in developing countries have been attributed to uncontrolled and excessive population growth, lack of land available for urban development especially by the low-income group as well as inadequate infrastructural facilities which are caused by lack of resources, corruption, poor maintenance culture or deliberate neglect by the government (Giroult,).

5 CONFRONTING THE CHALLENGES OF INFORMAL LAND USE AND ACHIEVING HEALTHY CITY IN LAGOS

There is a need for city wide informal settlements regularization in Lagos. The pocket of informal settlement scatter across the state should be considered for regularization. Many approaches for regularization have been tried in different parts of the worlds with high degree of success. Such approaches include titling, legalization and/or formalization of tenure and physical upgrading of informal settlements. These approaches usually aim to forge links between the formal and informal land management systems. However, regularization processes often require legal, administrative and/or technical adjustments to the formal land administration system. It is important to note that globally, national land policy approaches to informal settlements are generally shifting from policies that threaten tenure security (e.g. eviction, neglect, involuntary resettlement) to positive policies that support regularization of these settlements.

It is suggested that policy framework and strategy for an improved urban land administration be instituted. There is urgent need to formulate and implement both an appropriate and efficient land administration system as well as modernization of land information system. Formulating or implementing an urban land tenure policy should not be isolated from other related policies of urban land management and city development. Tenure should be seen as part of a package of policy measures intended to improve the efficient and equitable use of urban lands and, at the same time, improve the living conditions of the urban poor. The tenure options should naturally encourage the people to invest their own labor and savings in the improvement of their environmental conditions. Furthermore, it is also important to offer a range of tenure options, including ownership and rental options, so as to meet the diverse and changing needs of communities and households on a long term basis.

It has been established from literature that shortage of affordable housing and inadequate land supply through formal system especially for the urban poor is a major cause of continous incidence of informal land use which has become almost intractable in Lagos. Therefore, government needs to develop a comprehensive Urban Growth and Housing Strategy with timeframe and specific measurable targets to addressing the shortage of affordable and adequately serviced housing.

Lack of adequate or at times completely absence of basic infrastructural facilities is a major feature of informal settlements and constitutes a serious health challenge for the dwellers. This shortage could be as a result of deliberate attempt by government not to recognize these categories of settlements since they are outside the legal provision. Also, limited resources at the disposal of government and concentration of these limited resources on the recognised settlements at the expense of the so called illegal settlements could be another reason for such neglect. Thus, consideration needs to be given to alternative ways to provide basic services to poor households in the informal settlements, particularly ways that encourage environmentally sustainable and self-sufficiency. Private sector (NGO, corporate bodies) option can be explored to provide assistance to the settlements in order to bridge the gap between what the government can provide and what the residents need for decent and healthy living. However, it is important to say that the private bodies should be encouraged through duty and VAT exemptions or rebate for providing such services.

6 CONCLUSION

Land defines the social, economic and political relations in the society. While access to land use in most developing countries could either be through formal or informal system but the informal system has been seen as the major provider of land especially for the majority of urban poor. The paper has discussed extensively the issues and challenges of incidence of informal land development and how it can be confronted in Lagos. The paper revealed that the incidence of informal land use is rooted in uncontrolled and unplanned urbanization, inability of government or the formal sector to provide affordable housing to the low-income group, inappropriate land administration and planning policies to meet housing and land demand of the poor majority and poverty among others. The findings revealed further that Challenges confronting informal land development in Lagos is multi dimensional ranging from social, economic, cultural, environmental and physical dimensions. Therefore, the paper suggests the need to confront this situation through adequate and sustainable urban land use management system. Finally, the prevention of new informal settlement is critical to the sustainability of the solutions proffered. This requires an adequate institutional and legal framework for land development regulation that facilitates the production of affordable housing and land for all uses, thus reducing the informal occupation of land and adding an important institutional development dimension to sustainable and healthy urban development.

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🏆 *reviewed paper*

Contemporary tools of urban development - orientated on equity?

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1 ABSTRACT

Equity planners are convinced, "that equity in the social, economic, and political relationships among people is a requisite condition for a just and lasting society" (Krumholz/Forester 1990:51) and that politics do not only serve authority interests, but also potentially compensatory equity (Bauhardt 2003:41). In this paper we explore if there are criteria to indentify equity planning in planning processes. We try to find a role model for equity planning by analysing three actual planning processes for urban renewal, with different legal status and different planning instruments, all concentrated on complex social and spatial situations.

In each of our case-studies, a specific planning entity with a set of rules was created. In order to understand if these could be a role model for similar urban locations, we compare the local conditions as well as the planning processes. To investigate if the local inhabitants have benefitted from the development in similar and more or less fair ways we apply criteria developed in gender mainstreaming for spatial planning.

On the one hand we raise the question if we can find elements of equity planning in this processes, and how targeted to the real situation the used tools and institutions have been. On the other hand, we look in how far social objectives have been met. We conclude by signalling the potential for embedding equity planning in urban renewal. We did not, however, find a role-model, as the equity results for local residents have mainly depended on specifically created planning instruments and exceptional social budgets.

2 SEARCHING FOR A ROLE MODEL FOR EQUITY PLANNING

We want to concentrate on equity planning as both a participatory way of searching for social goals, as well as a method to bring it to spatial reality. In contrast to democratic planning, which is mainly orientated on the participatory process, the equity planning focus is on the substance of the program (Fainstein/Fainstein 1996:270). Adjusting power asymmetry between the stakeholders is the objective of equity planning (Bauhardt 2003:40). It stands for "the new movement for urban change that calls for greater representation of disadvantaged groups in the governmental process and for the decentralization of governmental policy making" (Fainstein/Fainstein 1996:271).

This movement has gained relevance for German planning practice with the end of the confrontation of eastern and western blocks at the end of the last millennium, symbolized the fall of the Berliner Mauer. The position of citizens' initiatives and grass root groups in Germany changed: instead of confrontation & opposition-based, the planning culture shifted to a more negotiative model. Herewith a new development in spatial planning was needed (Bauhardt 2004:149) enlarging possibilities to articulate the divergent interests of different target groups. Authoritarian appearance and the technocratic way of planning, which existed mainly in the 1980's, lost importance (ibid.).

Historically the traditional planning proceeding was orientated at middle- and upper-class assumptions of urban organization (Fainstein/Fainstein 1996:267ff). Against this background, concepts of more social-democratic and liberal ideas like democratic-, equity- and incremental planning, are up and coming. These approaches, like any planning approach, are following the changing political thoughts and are to be seen also as political processes (Fainstein/Fainstein 1996:266). In this paper we focuss on three different urban renewal projects, characterized by the contemporary discourse of social justice and resilient city. In this framework the spatial planning is related to a wider programme of finance and social activities:

- Hannover-Vahrenheide: Soziale Stadt
- Rotterdam-Pendrecht: Integrale Stedelijke Vernieuwing
- Hamburg-Wilhelmsberg: International Building Exhibition IBA

We raise the question in how far equity goals are embedded in the basic planning elements applied.

After introducing some facts and figures about the three examples explaining the general spatial and social situation, we want to look for some elements of equity planning in these projects.

3 EXAMPLES OF CONTEMPORARY URBAN DEVELOPMENT PROJECTS

In three case studies we want to identify if there are any elements of equity planning to be found. These projects present current urban development processes. Each of them is using different instruments for promoting similar goals: spatial, social and economic development combined with ideas of sustainability.

The schedule below shows some comparable information about their organisational structure:

	Hannover - Vahrenheide	**Rotterdam - Pendrecht**	**Hamburg - Wilhelmsburg**
Program	Soziale Stadt (Federal program)	ISV - Integrale Stads Vernieuwing (National Law)	IBA - Internationale Bauausstellung (Regional activity)
Process term	1998 - 2010	1995 - 2009	2007 - 2013
Budget	1998-2008 15 Mio € Since 2001 3 Mio € (esp. for education, youth, local economy)	ISV PM Social Ca. 3,5 Mio €	100 Mio €
Investment	52 Mio € (Renovation) · 7,5 Mio € National Renovation Budget · 17 Mio € property sales	PM	120 Mio € (Infrastructure)
Unit of organisation	Stadtteilbüro / district agency	Working group, managed by local authorities, steered by housing corporation (main investor)	International Building Exhibition IBA Hamburg GmbH
Cause for planning	· Bad housing condition · Social problems · negative image of the district	· deteriorating housing conditions · aging population and entrance of immigrants · negative image of the district	· Development pressure · Social problems · negative image of the district
Development objectives	· Improve the situation of poverty and failing housing standards · Stabilizing social structure · Improve economical opportunities for residents	· Reduce the percentage of social housing from 95% to 54% · Make public space more safe, recently expanded to also reduce violence in the home · Improve the image of the neighborhood · Improve level of local services especially for senior citizens	· Housing · Innovative building types · Saving and producing renewable energy · Qualify education · Promote of art and culture, working places, leisure activities · Enhance transport
Principal actor	· GBH housing corporation	OWG housing corporation	IBA team
Partners	Stadtteilforum, local authorities	with local authorities and private investors	· International Garden Show igs 2013
Committees and boards	· Refurbishment committee · Stadtteilforum	· Working group · Indepartmental public servants meeting · Project teams · Dwellers organization BOP	· Supervisory board · Curatorship · Participation council · Institutionalized dialogue with citizens

References: KEI Centrum, Integriertes Handlungskonzept 2008 (www.hannover.de), www.iba-hamburg.de

3.1 Soziale Stadt Vahrenheide-Ost

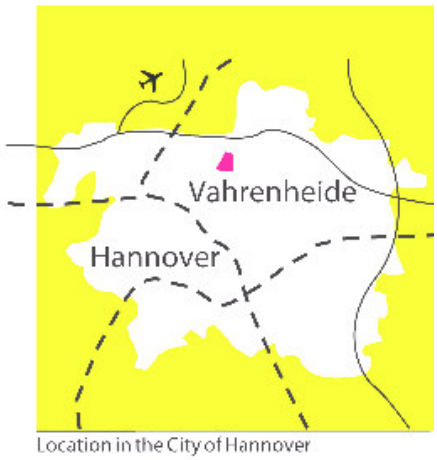
Characteristics		
Total space	73 ha	
Total population (01/2009)	+/-7.000 pers.	(100 %)
with foreign background	3.612 pers.	(51,6 %)
under 18 years	1.505 pers.	(21,5 %)
over 60 years	1.757 pers.	(25,1 %)
unemployment	20,4 % of pot. empl.	
Housing stock	3.400 units	(100 %)
in public authority	ca. 1220 units	(59,4 %)
Public transport	City railway 3	Stops / 1 Line
	Busses several	Lines

Vahrenheide-Ost was build between 1955-1974 as the first major residential area in Niedersachsen. Following the urban design principles of the time, most of the buildings consist of apartment blocks with larger green spaces in-between. It contains a number of schools and Kindergarten, 2 churches, as well as services and 2 small shopping centers.

In the first stage, a highrise block from the 1970s with 560 apartments (of which 50% empty > 1 year) and accumulating huge social problematic was torn down. On the plot so far 30 one-family houses have been build, more are planned but building stagnated in the financial crisis.

Through the Stadtteilforum, local residents participate in the decision-making and articulate their needs and aspirations. It decided on funding local initiatives from a yearly €25.000 Local Development Fund

Building structure



Location in the City of Hannover


Urban scheme


Open space with rainwater retention


Tenant Club Mik Y

3.2 Integrale herstructurering Pendrecht

Characteristics		
Total space	123 ha	
Total population (01/2009)	+/-12.000 pers.	(100 %)
with foreign background	6.600 pers.	(55 %)
under 19 years	3.120 pers.	(26 %)
over 65 years	1.740 pers.	(14,5 %)
unemployment	20,6 % of pot. empl.	
Housing stock	6.400 units	(100 %)
social housing	5.120 units	(80 %)
Public transport	Metro 1 Stop / 1 Line Busses 2 Lines	

Pendrecht was build as exemplary CIAM residential area: apartment blocks and terrace houses around large public green spaces. However, since 1980s the social position of its residents has been declining, and Pendrecht became one of the first areas in the ISV programme. [note: Integrale Stads Vernieuwing was a national programme by which cities could apply for subsidies if they fulfilled requirements such as social investments, citizen participation in design process, integrat ing design of green space, traffic, networks and so on).

Since 1995 a programme of neigbourhood development has be implemented, subsidized mainly by ISV law.

Nevertheless, in 2009 Pendrecht was listed second in the "problem neighbourhood list " of the Dutch Ministry of Hous ing.

Building structure

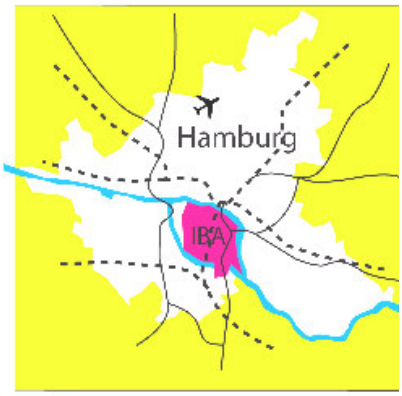
Location in the City of Rotterdam


Urban scheme (dS&V Rotterdam)


Pendrecht "kindlint"

3.3 International Building Exhibition IBA Hamburg

Characteristics		
Total space	26,65 km2	
Total population (01/2009)	55.093 pers.	(100 %)
with foreign nationality	19.496 pers.	(35,4 %)
under 18 years	12.234 pers.	(22,2 %)
over 65 years	7.573 pers.	(13,8 %)
unemployment (06/2009)	12,2 % of pot. empl.	
Housing stock	22.716 units	(100 %)
in public authority	ca. 13.500 units	(59,4 %)
Public transport	S-Bahn 2 Stops / 2 Lines	
	Express/Metrobusses 2 Lines	
	Regional + Citybusses 10 Lines	

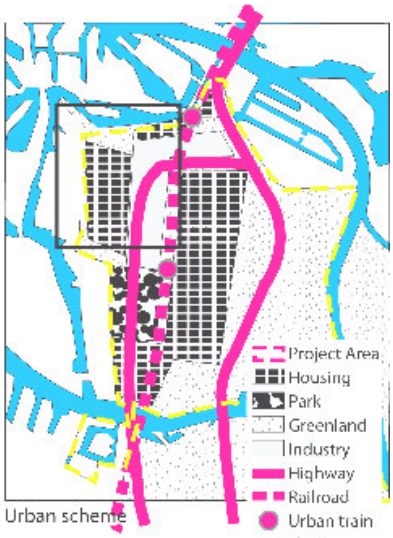


Location in the City of Hamburg

Overleaping the Elbe - Urban development in the south of Hamburg

The landscape of the Elbe Island Wilhelmsburg is affected by a mixture of water and meadows, one family houses and perimeter blocks in wilhelminian style, harbour industry, railroads and highways.

This is the suspenseful background of the International Building Exhibition IBA Hamburg from 2007 until 2013. A team of planners and experts for energetic engeneering, education, art and public relation is hired by the City of Hamburg to proof and develop about 40 projects under the three keythemes Cities and Climate Change, Metrozones (development of the inner peripheries) and Cosmopolis (organising cultural exchange).



Urban scheme

Building structure (examplary spatial situation)


IBA Project Weltquartier

4 COMPARING THE MAIN FEATURES

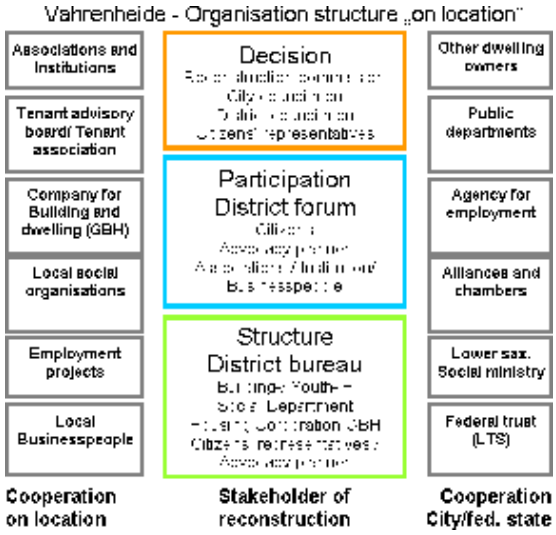
4.1 Organization

Vahrenheide

The central coordination point for the reconstruction is the district bureau. Representatives of public departments, housing corporation, citizens and advocacy planners are meeting and working here together.

Within the scope of the citizens' district forum the goals of the renewal are to be discussed. The result has to be reported to the reconstruction commission which frames a recommendation for political decision-making in the district council.

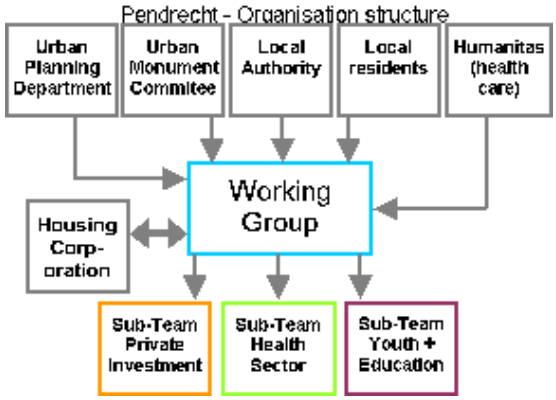
The local public housing corporation participates at local events and meetings and works together with urban and social planners and advocacy planners in the district bureau. (Landeshauptstadt Hannover 2008:13ff)



Pendrecht

The renewal process was an initiative of the housing corporation who owned 85% of the housing stock. They had to work together with the planning department of the municipality who is the owner of the land and controls building permission. Together they developed a new zoning plan, respecting the principles of the original design.

A working group was created, including representatives of local residents and following demands of ISV-law. For partial projects sub-teams were formed with wider collaboration, for example the health sector, youth and education, green structure and open spaces or private investors.



IBA Hamburg

The IBA Hamburg is a full-owned subsidiary of the City of Hamburg in form of a German GmbH (Limited Company). With the International Garden Show igs 2013 it has an associated company which is also located in Wilhelmsburg. As shown in the right illustration the company is under observation of different kind of boards and councils, which are consulted in order to assure a high level of quality up to date.

The company staff consists of urban planners, (landscape-) architects and experts for real estate, for renewable energy, for public relations and for educational development.

Comparing the organization structures

All examples have more or less complex structures, including provisions for the participation of local residents. Through cooperation with experts for spatial, social and economic questions they try to achieve a

high quality standard. In the two german projects the decision making is located on the political level. In the Dutch situation the working group prepares overall decisionmaking such as investment programmes and zoning plans for the local council.

IBA Hamburg organisation structure
(based on IBA 2009:43)

IBA Supervisory Board 6 Representatives from the Senate	IBA Board of trustees 7 Global consultants for professional and scientific questions
IBA Hamburg GmbH (the same management as igs 2013)	igs 2013 GmbH (the same management as IBA Hamburg)
IBA/igs Participation Council (24 citizens and 9 politicians (without vote) who are consulting)	IBA Climate & Energy Council (6 experts from science, policy and praxis consulting)
IBA-Partner & Sponsors (over 80 representatives from the local business world)	

4.2 Instruments

Vahrenheide

As a pilot for the federal program “Soziale Stadt”, the renewal concept for Vahrenheide-Ost identifies enhancement of constructural, economic and social conditions as the main fields of action in the spatial development The planners focused on creating better housing conditions, with additional programmes for social moblization and ecology (introducing renewable energies). The social investments turned their attention especially on the aid for the youth, for families and elderly in disadvantaged living situation as well as on the promotion of the local economy and tried to create integrated solutions. (Landeshauptstadt Hannover 2008:16) Besides the renewal committee, the District Forum (Stadtteilforum) discusses general orientation of the investments and has e yearly budget of €25.000 to spend on local proyects and initiatives.

Pendrecht

ISV law is a national subsidy for urban renewal for which Municipalities can apply every five years. To obtain funding, plans and proposals need to fulfill specific conditions for ‘integrated planning’, such as participative design processes, and concerted planning of the green structure, housing, transport, infrastructure and so on. In other words all technical departments of the municipality were with more or less intensity participating in the working group. The application for ISV funding had to go through several rounds of decision-making, balancing local priorities, the quality of the proposal and the available national funds.

To participate in the planning process, the local residents were facilitated with a meeting place and consultancy budget to create a board which represented the residents in the working group. These support funds have been going down over the years, following a general trend in the Netherlands.

In the first years of development, guiding principles for planning were the rehousing of the aging population and preserving the qualities of the original urban and landscape structure. In a later stage, economic impulses came more to the foreground and new social funds were applied in a social investment programme called Pendrecht Zet Door (pendrecht perseveres). From that moment also ‚soft’ municipal department got involved in the working group, such as Employment (SoZaWe), Education (DSO) and health care (GGD). The working group is chaired by a so-called ‘City-officer’ (stadsmarinier) a highly qualified and mandated public servant. Since 2008, households have to show a secured minimum income to rent a corporation dwelling.

IBA Hamburg

The IBA was installed by the City of Hamburg by a special political senate decision in 2005 and proclaimed by the IBA memorandum which was called: Leap Over the Elbe (cf. Freie und Hansestadt Hamburg 2005).

The IBA Hamburg works as a project developer. The first tasks were verifying different kinds of project ideas and searching for investors and project running organisations. An overall project plan is used to promote the projects, but not as an interrelated master plan. The IBA Hamburg has no planning authority; reconciliation with local authorities is needed.

The IBA Hamburg works against the thematically background of three key themes:

Metrozones – How to develop inner-city border and crossover zones to multifunctional living spaces?

Cosmopolis – How to create the living together and the optimal use of potentials an international multicultural society? As well as **City in Climate Change** – How could metropoles reconcile economic and population growth with environment and climate protection?

Every IBA project has to fit in at least one of these key themes (IBA 2009: 27).

Comparing the instruments

The Pendrecht and Vahrenheide projects run within national programmes. They are focused on basic aims of creating better living conditions for disadvantaged social groups. They need to use integrated approaches to obtain funding from the national programmes, based on the assumption this is a better way to ensure durable success. The IBA Hamburg is more orientated on creating new and innovative 'fysical' results which should be role models for similar spatial situations. With postulating the key themes Metrozones, Cosmopolis and City in Climate Change they create the framework for integrated solutions. The IBA structure is a special approach with a lot more money than the other examples were able to obtain.

Vahrenheide is the only location where residents have direct say over a fund for local initiatives.

4.3 Results

Vahrenheide

New ways of creating property were promoted, for example self owned family houses or rental cooperatives. This was a contribution in the stabilization of the local social structure and in the enhancement of the citizens' relationship to the district (Landeshauptstadt Hannover 2008:15). The rental cooperative project was not successfull so the scheduled accommodations are currently again in rent. 29 family houses have been built. Buildings fields for ca. 40 houses are still offered. The City of Hanover surrendered a part of their occupancy rights for social rentals. Herewith mixture and stabilization of social groups is achieved. (Landeshauptstadt Hannover 2008:19ff) The goals for bettering the local economy were not achieved, because of the oppositional economic framework. The embedding of economy in the housing structure was only sporadically. Old economic buildings could not be reused; they will be replaced by green space. The foundation of the "Interessensgemeinschaft Vahrenheider Gewerbe", an economic association, was the solution for strengthened the existing local economy. (Landeshauptstadt Hannover 2008:23)

Pendrecht

Between 1999 and 2009 interventions in the northern half of the neighbourhood have been almost completed as far as housing is concerned. The program for renovation of schools is lagging behind.

Housing conditions for senior citizens have improved considerably, together with the level of services. There is a wider range of typologies such as private owenership and homes contining workspace. Social programmes such as Pendrecht University have had a positive impact on social cohesion, yet on the other hand the urban problematic of increased immigration, violence & poverty intensified, partly as a result of influx from other renewal areas. For this reason it was decided to take a more radical approach. The operational planning infrastructure has modified under the influence of privatization and merging of the housing corporation, growing further away from its local roots and involvement, as well as restructuring in local government. In 2009 a major demolition was started in the southern half. This means a change of strategy compared to earlier planning principles which where mainly geared toward preservation and renovation. Building works are to start in 2010; however the market for private housing is slowing down some of the projects.

IBA Hamburg

The planned building projects of IBA Hamburg are mainly public buildings (school center, office building for the Federal Planning Authority of Hamburg, S-Bahn-Station, floating office building for the IBA itself) and housing development. The main project is called "Wilhelmsburg Mitte" (Wilhelmsburg centre).[1] To

[1] This project contains four building areas for experimental building with smart materials, on a smart price level, on the water and with a flexible space on offer. It is the so called "Building exhibition in the building exhibition". It will be completed by a local energy combination. Located at the same area is the office building for the federal Urban

guarantee quality IBA used mainly the instrument of urban planning, open space planning and architectural competitions. Both established & famous as well as young architects were invited to participate.

There are also projects for improving the cultural life on the Elbe island Wilhelmsburg. IBA-Laboratories for discussion on current questions of spatial and environmental planning and curated art events (Kultursommer) take place on the more or less intellectual level. Open air concerts like the Dockville festival and events like the "Flusslicht" are popular amongst all citizens of Hamburg and its metropolitan region. The year 2010 will be used for interim presentation (Zwischenpräsentsationsjahr) with a program of visiting construction sites and reflecting theoretically the key themes.In 2013 the work of the IBA Hamburg Company should be finished, meaning all projects, even not completely built, should be on the run. The social networks on the Elbe Island and the connections to Hamburgs community should be strengthened.

Comparing the results

Because of the difficult situation on the housing markets the projects from Hanover and Rotterdam have problems with the marketing of their new dwelling efforts. Also the activities for creating new jobs and infrastructure are hindered, creating small businesses and shops nearby dwellings results difficult.

The housing market in Hamburg is under a higher pressure, but even here it is not easy to find investors. They are also careful with investing in districts with a negative image. The succsess of the IBA projects could not be finally evaluated because the process is running until 2013.

5 LOOKING FOR EQUITY PLANNING

How do we define criteria for equity planning?

Acting on the assumption that feminist thinking is always a try to overcome conservative and paternalistic structures, we apply gendered appraoches to planning. The structures to overcome a traditional and maybe technocratic way of acting are comparable to the intentions of equity planning. For this purpose we rely on gender mainstreaming approaches to identify some major principles for spatial planning as follows (Tummers/Wankievizc 2009):

Key-issues shared everywhere are:

- The lack of user centered planning/ user centered transport systems
- usability as general topic
- the invisibility of daily routines, time-space patterns (life style)
- representation and diversity

For example the invisibility of diverse, eg gender-specific time-space patterns produces planning solutions that make urban resources un-accessible for some groups while causing peaks and overburdening of infrastructure that could be avoided (Tummers 2007). Issues of security & fear facilities accessibility tend to re-shuffle priorities in the planning and design of public space/shared space as well as transport & mobility network.

We apply these insights to our cases as folllows:

5.1 Is the everyday life of the local people relevant for the planning?

Multifunctional districts fulfil the needs of everyday life. Here the ways between home and working place, between educational institutions and daily shopping are short. The requirements of working and family life can be balanced by everyone (Becker 1999:60).

Vahrenheide

We can say that the everyday life of the local people is mentioned in the planning process in Vahrenheide because a neighbourhood help with founding the VIZe (Vahrenheider Initiative Centre for family, leisure, education and profession) and clubs for tenants (Project example: "Mik-Y") were promoted. Also a special social program for people in complex living situation was created. Other projects were educational

Development and Environment Department. This major project is not leaded by the IBA Hamburg, but by the department itself.

programms for parents, for German language learning and for healthy balanced diet. All these projects were help for self-helping and they should better the integration in the local neighbourhood an in the (german) society. Efforts haven been made to keep the local shopping centres alive.

Pendrecht

The Pendrecht project has also paid attention to solutions for the everyday life of the residents. The approaches are orientated on the local target groups. For example there are more services offered for senior citizens (a large share of the population). Houses with workspace are built to attract (after some difficulty) new kind of business and household types. And a new concept of school routing for children is established (Kindlint). However the smaller shopping malls are disappearing and a durable replacement has not been found yet.

IBA Hamburg

With enlarging the dwelling spaces in old standard houses the IBA Hamburg tries to enhance everyday life for immigrant families with many children. In this way the housing situation will be adjusted to the real family sizes (Project example: “Weltquartier”). However, during this enlarging the families who are currently living there have to move to other dwellings (including to other districts). They loose their neighbourhood and their well known environment for at least three years. The planners count with less back coming families because they have planned less dweling units than before.

With creating a better school structure and image the pupils should get better conditions every day and higher chances in the future (Project example: School centre “Tor zur Welt”).

The intentions of safeguarding local supply facilities for the resident population in the Quarter Veddel are not successful because of current economic framework and complex planning laws. The inhabitants will have to accept long distances to fullfill their everyday needs ever more.

Every project has positive examples in their single project portfolio, but there are also tendencies of not fulfilling some needs because of law destrictions or because of unsuccessful economic measures.

5.2 Is there diversity in staff at all levels?

Every planner has a subjective influence on the planning because of his/her undiscussed everyday knowledge and moral attitude (Bauhardt 2004:172, Greed 1994). To avoid involuntary advantage for any specific social group, we have to assure that the staff which designs, disposes and arranges spatial decisions, is diverse. (For more criteria for professional planning cf. Gender Kompass Planung (Zibell et al. n.d.))

Vahrenheide

In the project documentation (cf. Landeshauptstadt Hannover 2008) no special differentiation is made to show how the staff is exactly composed. The authors of the documentation are mainly female so we can conclude that they are generally the professional majority. Their cultural and religious background, their nationality and their age is not mentioned, but all of them wear German-sounding names. One goal explicitly articulated is to use gender mainstreaming concepts in every project (Landeshauptstadt Hannover 2008:17).

Pendrecht

The director of the housing company decided to invite young female architects for the new housing projects in the northern part (phase 1), because he expected a higher quality. This was a successful strategy; some of the projects have won quality prices. If it serves as an example of enriching the diversity in Pendrecht spatial planning is relative: gender mainstreaming is not structurally embedded. Some established (all male) offices were already involved for renovation- and key building projects.

The housing company is more actively trying to represent the diversity of clients in its own staff; on the other hand the municipality of Rotterdam is not pro-actively implementing this policy.

The fenomenon that immigrant dwellers are more seen as problem than as co-makers (with exceptional projects) is another structural problem, which is illustrated in their under representation in planning teams and working groups.

IBA Hamburg

The IBA Hamburgs staff is equal mixed from the gender perspective at the middle hierarchy levels, but the management is not. The supervisory board is led by a female senator. Also the age of the staff group is very mixed in all of the few hierarchy levels. However there are no staff members with a foreign background. There is no person who is specifically responsible for equal opportunities or gender mainstreaming.

Representatives of foreign economist take part in the participation council and meetings of local economists with IBA Hamburg management (AG Wirtschaft) so that they can point out their needs.

On the spatial level with the organizing of architectural competitions there is always the will to give young professionals a chance to participate.

To create a staff with a diverse mixture in perspectives of gender, age or cultural background is not easy even if it is subject to explicit policy (Burgess, 2008). This was not the case in the three main organisations of our examples. Although the Social City defines Gender Mainstreaming a policy aspect this is applied only to external activities. As a consequence, firstly population groups with an immigrant background are missing at all levels, and secondly women are under-represented in key- decisionmaking.

5.3 Does the planning enhance economic perspectives for all cultural backgrounds and age groups?

For independent and self-determined living there need to be possibilities to work and earn one's own income. Not only is this a need and right for every individual disregarding gender, ethnicity or abilities; the labour market increasingly needs everyone in the aging European societies. What has been achieved on this field in our case-areas?

Vahrenheide

In the Vahrenheide project the enhancement of the residents' economic perspective consisted of help for employment applications and local initiatives for further education. Unfortunately bringing jobs was not very successful, because of the general economic framework (s. 4.3).

Since Vahrenheide is a pilot for the federal program „Soziale Stadt" and not an official part of the programme area, there is no continuing special employment sponsoring. The local interest in entrepreneural promotion has not been identified.

Pendrecht

There have been attempts to bring or keep jobs within the planning process in Pendrecht but this was overrun partly by financial crisis and intensification of the problematic of poverty and unemployment in general.

A café run by mentally handicapped young people was started as a pilot project. The Pendrecht University collaborates with the renewal project to increase citizens participation and to help improve chances on the labour market. This is done through organizing mutual support as well as courses for the residents.

Another spatial project was building homes with workspaces/studios to improve diversity of use in the quarter. There are attempts to existing revitalize the original shopping centre with local and cultural entrepreneurs. The central shopping centre was revitalized amongst others by rehousing the supermarket to attract other business and services.

IBA Hamburg

The IBA Hamburg will provide new spaces for arts and crafts studios, with the aim to attract new groups of citizens to settle in the IBA area. At the same time, it should accomodate young people who experience problems on the labour market (Project example: "Kreatives Zentrum Veringhöfe"). An already existing project supported by local designers and economist aims to increase independent income for women with a foreign background (Project example: "Made auf Veddel"). They also support local entrepreneurs with small companies by creating new, affordable industry accomodations for a better spatial situation (Project example: "Welt-Gewerbehof"). Several new housingprojects integrate working space in the homes with the goal to reconcile family life and work (Project example: "Neue Hamburger Terrassen").

In all renewal processes, important pre-conditions are created for access to labour market and local economy. Despite these efforts it becomes clear that the local spatial and social interventions could't turn all problematic trends. In the comparison of economic enhancement, the favourable market situation in

Hamburg as well as the effect of a greater project area stands out. Within the small structures of the other two projects it is much more difficult to react to the general critical economic situation.

5.4 Are there planning criteria for accessibility and safety of public space and transport?

To ensure that open spaces and parks are attractive for the potential users and that public transport will be used be the inhabitants they have to be (and feel) safe and accessible. Safety is a subjective experience that varies amongst user groups. One of the main responsibilities for open space- and transport planners is to apply a diverse set of planning criteria. After design, the quality needs to be garanteed by maintainance.

Vahrenheide

In Vahrenheide different approaches for enhancing accessibility and safety of open spaces have been applied. They resulted in high quality green areas, and the open space usage is sophisticated. Accessibility and mobility for vulnerable groups has improved, for example: the heighth of the curbs in the whole quarter was reduced for people with limited mobility. More benches at crossroads for giving the possibility to rest were installed. And a reduction of street width for children crossing is realised. The tramstop was provided with a ramp as part of the general policy of the transport company.

Pendrecht

Pendrecht was already very accessable by public transport, and its quality is improving because of a city-wide programme for safety in public space. The same can be said for the 'schoon heel veilig' [clean, intact, safe] programme of monitoring and maintaining open space and streets. Safety is an important criterium for the Rotterdam Planning department, not just taking place in Pendrecht. However some plans are more successful than others. For the specific urban structure in Pendrecht, new solutions for public space have been sought, partly aiming to better articulate the difference between green for private and public use. Recently, Pendrecht has implemented a so-called 'Kindlint' i.e. a safe route for children connecting relevant destinations such as home, school, playground, library etc.

IBA Hamburg

Creating a save and accessible open space for the citizens lays mainly in the hands of international garden show igs 2013. After the Exhibition from April to October 2013 the renewed park will be open for the public. Other types of open spaces are created with the participation of the located citizens in order to fit their needs of safety and accessibility. (Project example: "Weimarer Platz")

IBA Hamburg has no authority in transport planning but tries to play a consultant role. Because of complex plans for the relocation of federal motorways, there are many citizens who demonstrate against this transport projects. The IBA as a stakeholder stands between the two positions. A major obstacle is the access to the northern S-Bahn station, which is not barrier free (Deutsche Bahn AG is owner and responsible). The main busses and the S-Bahn have a short interval (5-7 min) and the southern S-Bahn station will be renewed on the basis of an IBA competition.

In each of the projects we can find planning criteria to improve accessability and safty of open space and public transport, with in a very different level of scale. Since the responsabilities in this field are mostly in the hands of the public planners, there are more possibilities for participation and decision-making. Pendrecht and Vahrenheide have a similar urban structure with much open space and departed from a same problematic of changing use and lacking maintenance. While Pendrecht has chosen to partly privatise green areas, planners in Vahrenheide have implemented more ecological measures. In Vahrenheide very punctural interventions take place. Pendrecht makes use of existing city planning criteria. In the IBA area an additional organisation for creating innovative public spaces for everyone after 2013 was created.

6 CONCLUSION

We understand planning proceedings as political processes (cf. Fainstein/Fainstein 1996:282ff). Therefore we started from the standpoint that when politics aren't only to serve authority interests, but also potential compensatory equity (s. §2), this has to be rooted in planning processes.

In the paper, three different planning processes were introduced. The common feature consists of a complex spatial- and social planning area. Vahrenheide as well as Pendrecht come along with bad housing conditions and a negative social image. This was also a problem in Wilhelmsburg, but there also a strong pressure on

the rental market exists. Against this background we expected that planning and renewal in these areas are difficult and had to be very cooperative. We expected a high level of participation, as for reaching the goals of spatial and social enhancement, teamwork with the local stakeholders was needed.

In every process we found instutionalised ways of information and participation. Mostly they are more or less consultant, or related to the Arnstein 'ladder of participation' the level is still mostly oriented to "tokenism". The residents have the possibility to hear and to be heard, but there is no power to insure that their views will be heeded (Arnstein 1969: 216ff). The budget for the Stadtteilforum in Vahrenheide is a positive exeption.

More principles of equity planning can be found in the choice of the local projects, for example activities for education, employment, better housing conditions and upgrading the urban environment.

In the Vahrenheide case there was no longterm strategic concept of development. This had a negative effect on a major planning decision: in order to finance improvement of public space, apply sustainable energy and invest in social development, several blocks of Social housing units were sold to a private investor. With this the public housing corporation lost the power to create livable housing and living conditions for low income households. In Pendrecht, the corporation had a clear strategy of selling to home-owners, or on condition of renovating or upgrating the housing conditions. Due to the working group model to create the Masterplan (2004) the original urban structure could largely be saved as well as qualities in public space and transport, and for the existing architecture. However, contrary to Vahrenheide the implementation of social fonds was started later than the spatial planning process. Stabilisation, participation and social mixture was harder to achieve.

In the example of IBA Hamburg, the prestige object amongst our three cases, mainly the small projects are equity orientated. Typically, the main project of the IBA Hamburg: "Wilhelmsburg Mitte" is not mentioned in §5. IBA Hamburg needs its attracting activities to create a unique selling position, since it is not a part of a federal renewal campaign like "Soziale Stadt".

IBA Hamburg postulates that it is not an exhibition as expected but an urban development process integrated in the movements of Wilhelmsburgs society. At the same time it has to be a role model in themes like innovative building, climate change or creation of new concepts dor work- and living spaces. That is the very reason why IBA is choosen as a planning instrument. The image of a disadvantaged district should be improved by flagship projects. The Pendrecht team worked rather in the shadow of public (and experts) attention, in order to have room for decision making for- and with the residents and direct stakeholders. This approach is much closer to the thoughts of adjusting power and for reaching a just and lasting society.

The questions we explored were: "are the political agenda of equity planning expressed in the planning instruments?" And if so: how does this affect the substance of planning? Does it make cities more liveable, bringing health and prosperity to more citizens?

In the cases we have analysed there is evidence that this could work: conditions of collective decision-making and representative staffing shift the priorities in projects and design criteria.

Secondly, the renewal processes are very problem oriented, however these problems are mostly tight to some target group (i.e. vandalism > youth, safety > elderly).

A third conclusion is that the objectives of equity planning are frequently mentioned in the policy documents (i.e. European development perspective –Lisbon- or local documents), but far from being embedded structurally in planning processes. It needs a 'martial law' such as IBA, ISV or Soziale Stadt enforcing criteria of integration, participation etc., to have a real impact on the planning process. To articulate the political will is the first step to create new, prosper living places, but by itself a paper tiger.

Finally: have we found a role model? No plan or planning team is perfect, yet the potential is there. Inasmuch circumstances can be improved at local level, the spatial environment and the residents certainly benefit from equity planning. Sharing and analyzing the experiences with new planning tools will help practitioners to operate more effectively.

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🏆 *reviewed paper*

Crime prevention through environmental design in residential developments in Tehran

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1 ABSTRACT

Security is an essential factor in residential communities, without security any residential community will not form and there will be no more meaning for it. Residential complexes which face with various crimes or there is a fear of being victim by various crimes in them will be damage or won't work well.

Actually creating security without attending police and guards in them especially in large residential complexes is impossible; but we can use some other factors such as participation of residences and suitable urban design to decrease the need of attending of police and guards for creating security and peace.

In my metropolitan, Tehran, there is a high density in residential communities and in result highrise buildings with a large numbers of residential units have been created.

This problem causes to create some districts that their residences don't know each other and the concept of "neighborhood" has no meaning in them.

Besides ,there are many spaces in residential communities which are indefensible and the security of residences will be in danger.

Lack of separation of "stranger" and "familiar" in residential communities and especially in residential complexes causes to increase the crimes and lack of security for people especially for vulnerable people such as children, women and elderly.

In this article I will try that after surveying various residential complexes and categories them, I will present some suitable methods to avoid crimes.

In the other words, residences themselves can be able to create defensible spaces in their residential environment.

Residential land use is a major land use in a city, creating a sustainable and safe for citizens in their residential environments is a very essential factor in creating a livable, healthy and prosperous city.

2 CPTED IN RESIDENTIAL AREAS

Every day we live with crimes and unfortunately it becomes a fact in our life. Crimes can be ranged from a simple vandalism to greater crimes such as rubbery and murdering and even global terrorism.

In relation with this term the rules usually haven't any attention to prevention and restriction but they often have some rules for arresting and punishment. These criteria that can't be applied before the crime occurred.

Giving attention to this proverb "preventing is always better than curing" can lead us to some guidelines that can be impose in the phase of designing by this techniques a potential offender will feel the risk of being "noticeable" and "identified" and then he will be disappointed.

So the essential question is that how we could design an environment that people feel risk to do illegal activities and in versus encourage doing logical activities.

The other question is that how we can introduce the quality of life in a residential area and how we can improve it to create a livable, healthy and prosperous city.

For this we will try to survey this term in three scales: 1- neighborhood 2- residential complex 3- residential unit

2.1 What's the neighborhood

Neighborhood is a geographically localised community within a larger city, town or suburb. Neighbourhoods are often social communities with considerable face-to-face interaction among members.

2.1.1 Neighbourhoods in the Past: Preindustrial Cities

In the words of the urban scholar Lewis Mumford, "Neighbourhoods, in some primitive, inchoate fashion exist wherever human beings congregate, in permanent family dwellings; and many of the functions of the

city tend to be distributed naturally—that is, without any theoretical preoccupation or political direction—into neighbourhoods."

The sociology of modern neighbourhoods

- Neighbourhoods have several advantages as areas for policy analysis as well as an arena for social action:
- Neighbourhoods are common, and perhaps close to universal, since most people in urbanised areas would probably consider themselves to be living in one.
- Neighbourhoods are convenient, and always accessible, since you are already in your neighbourhood when you walk out your door.
- Successful neighbourhood action frequently requires little specialised technical skill, and often little or no money. Action may call for an investment of time, but material costs are often low.
- With neighbourhood action, compared to activity on larger scales, results are more likely to be visible and quickly forthcoming. The streets are cleaner; the crosswalk is painted; the trees are planted; the festival draws a crowd.
- Visible and swift results are indicators of success; and since success is reinforcing, the probability of subsequent neighbourhood action is increased.
- Because neighbourhood action usually involves others, such actions create or strengthen connections and relationships with other neighbours, leading in turn to a variety of potentially positive effects, often hard to predict.
- Over and above these community advantages, neighbourhood activity may simply be enjoyable and fun for those taking part.
- But in addition to these benefits, considerable research indicates that strong and cohesive neighbourhoods and communities are linked –quite possibly causally linked – to decreases in crime, better outcomes for children, and improved physical and mental health. The social support that a strong neighbourhood may provide can serve as a buffer against various forms of adversity.

3 THE RELATION BETWEEN THE DESIGN OF NEIGHBORHOOD AND CRIMES

Various people have some theories about the relation of the design of neighborhood and crimes. Jane Jacob and Oscar Newman are two of the most famous of them . Oscar Newman presents the „defensible space „ theories to create ownership feeling for residences of a neighborhood and Jane Jacob defends the theory of attending the residences specially children in urban spaces for long time and different activities.

Here are short explanation of this:

3.1 The relation between urban design and crimes as Newman theories:

Oscar Newman is an architect and urban designer whose books and theories in urban designing , public houses and pereventing crime are so famous.

Newsman says when there are some public spaces in highrise buildings such as public spaces and open spaces , the residences can't feel any reponsibility for their security and maintenance of them and these spaces will be vulnerable. The surveys show that two factors are the most important factors. The physical factors include the size of family and the number of families sharing common entrances.

Two social factors include the rate of income of the family and the ratio of teenagers to adult. So as changing the social structure of residence is impossible, the only possibility to modification is physical improve, it means changing in project size and the number of apartments that are sharing in a common entries.

The size of project is a measure to concentrate of families, Newman reached to this result that the more concentration, the more insulation of residences from the whole of community. The size of residential complex has a direct relationship with the amount of crimes in it. A large project create a continuous area that even a gang of drug sellers can polluted all of the common areas. The rate of sharing in entries of buildings, elevators and common stairs is an important factor. More people who are sharing in common areas, the more difficulties will be appeared. The main problem is in recognizing residences from offenders

and there are more difficulties for residences to corporate with the rest of residence on the care and control of these areas.

The size of building has some effects on the behavior of residence as follows:

- using shared spaces in residential complex
- social interaction with neighbors
- sense of control over the interior and exterior public area of their development

The results of this surveys shows that the size of buildings has a great effect on the fear of crimes and on the community instability.

Newman defends from creating the sense of ownership for these spaces by dividing and allocating them to people to use and control them like private areas.

3.2 The relation between urban design and crimes as Jane Jacob

One of the offenders of theory of the natural surveillance is Jane Jacob that in her book "the life and the death of American cities" states that to reach a safe and health life in communities, the relation between neighbors and users of public areas is a fundamental factor and so the urban space should create this possibility.

It should be said that Jacob emphasizes on designing urban spaces and social patterns.

Jacob believes that in a neighborhood for caring and surveillance from street we need some "eyes", the eyes of whom that she calls them "natural owner of street". The buildings that are near the street should be faced toward it. These building shouldn't turn back to the street and shouldn't present their blind facades to them.

The walkway should be used continuously; this is the only possibility to increase the number of eyes in the street and to attract the look of whom that are attending in buildings , nobody don't like to look on an empty street and in versus many people like to make them busy by looking on a crowd street in a day.

Jane Jacob by her theory presents some walkways with 10 to 12 meters width for adapting various things such as planting, children activities, passing the people, and general life for adults.

3.3 CPTED and social police :

CPTED and social police can be as a part of comprehensive strategies to prevent crimes.

In the ways of preventing crimes and social police the main emphazise in it is on the solving problem than preventing crimes, such as close cooperation between police and residence in reducing crime and fear of crime. Because these principles emphasizes on systematic analyzing of crimes in a special place, this fact directly support social police with creating strategies for preventing crimes than solve special problems. Police, citizens and government has a great role in preventing crimes by making policy for preventing crimes and urban designing:

Police interfacing and his contact with neighborhood can be included both walking and grouped working to enforce the sence of safety of citizens and solviong the problem of neighborhood that are sharing in crime or fear of it.

Residence can be cooperated with each other to improve the apearance of community and prevent from crimes.

The government can use building codes and inspector forces to increase the safety of environment and district.

3.4 Surveillance on neighborhood :

The first step to prevent crimes begins by removing criminal activities from neighborhood and then with developing neighborhood relationship can prevent from crimes.

Crime prevention through environmental design will cause by removing the opportunities of occurring the crimes ,so we can create "target hardening". These ways includes:

- increasing the ability of looking and lighting

- landscaping with access control
- the possibility of interfacing the neighbors with each other by organized relationships
- creating outdoor activities for young and adult people

4 CPTED IN RESIDENTIAL COMPLEXES

Introduction:

A residential complex means a place that includes some residential units with a special arrangement. We can categorize residential complexes in several types that each of them has some negative and positive points.

The surveys show that two physical factors and two social factors are effective in most of crimes.

Two physical factors include the size of project and the number of families who are sharing in common spaces in a building.

Two social factors are the percentage of low-income families and the ratio of teenagers to adults.

How much the size of project or concentration of family is getting lager the residences will feel more irresponsibility about their environment, this irresponsibility will reach to the other services such as police, refuse collection , education and so on.

The more residences who are sharing in a common place, the more difficulties to distinguish residences from offenders then there are more problems to control these spaces.

4.1 The recommendations for safety design in residential complexes

Generally most of the safety strategies that can be applied in these complexes such as high fences and gates with electronic eye may have negative effect instead of positive effect on residences.

With applying these ways in the complexes we can create a safe environment without using usual devices. For instance, designing street with using gateways, squares, speed signs and other devices which reduce the speed of traffic and by making public spaces visible we will say to offenders to think again before doing a crime.

Implementation of these policies is simple and inexpensive and in compare with doors and gateways, they have a positive effect on residences.

We can categorize safety design recommendation for residential complexes as follows:

Natural access control:

- the access should be limited (without complete segregation of complex with adjacent complexes)
- the design of streets should reduce traffic.
- The pavements, planting and architectural design should take away visitors from private spaces.
- The walkways should lead pedestrian traffic well and don’t be hidden

Natural surveillance:

- The landscaping shouldn’t create blind or hide points
- Open green spaces and recreation spaces should be visible from adjacent houses
- We should use special lighting for streets and for pedestrian to light high traffic walkways.

Enforcing territories :

- The lots , streets and houses should be designed to increase the contacts between neighbors
- The entrances should be emphasized by using different material , variation in facades of street, architectural design , and landscaping
- Residences should be leaded by the signs of streets clearly; the numbers on the signs should have 15 cm height and should be lit very well.
- The ownership of boundaries should be indicated with column and fences and gateways and planting to lead pedestrian.

- All of the parking should be identified well.

5 CPTED IN RESIDENTIAL UNIT:

Introduction:

The residential unit is the last scale for our surveying. In this section a residential unit means a single family unit to multifamily less than ten families.

5.1 The suitability of type of building with the style of life of groups:

Generally high-rise buildings are not suitable for low-income family with children but this conclusion isn't true that high-rise buildings aren't suitable to live.

For example, elderly even low- income ones can live very well in high-rise buildings.

Elderly don't like climbing stairs but they welcome to elevators. Retired people often live far away their children and their old neighbors become a vast family for them. With pressing a button they can reach to hundred families in a high-rise building.

If we design the ground floor of high-rise building for elderly as a recreational and shared place, we can create a safety station in the entrance of building that can be managed by some volunteer from elderly.

If there is a problem they can aware police with pressing a button.

Of course it should be said that applying such things needs some special guideline and notes that follow local codes and social characters of that place.

6 SAFETY GUIDELINES FOR SINGLE FAMILY OR MULTI-FAMILY BUILDINGS

Multi-family buildings have the same problems of single family buildings, although these problems will increase with more residences, in multi- family houses we face with more common spaces: local corridors, elevators and parking.

By giving attention to this note "safety is in numbers", so existing a limit number of neighbors who feel responsibility about each other there isn't any reason that a multi- family building couldn't be a safe place to live.

Safety guidelines for a residential single family unit or multi-family unit are these:

6.1 Natural control access:

- The fence of balcony should never be built by opaque and solid material and its height shouldn't be more than 1 meter
- The entrance of parking lots should be indicated with landscaping or architectural design or have guard
- The dead spaces should be closed with fence or gateway
- Common entrances of the buildings should have some locks that could be locked automatically
- The corridors should be lit well
- Elevators and stair should be placed in center
- The access to building shouldn't be more than two points

6.2 Natural surveillance:

- The exterior doors should be visible from the street or by neighbors
- All of door that open to outdoor spaces should be lit well
- Every side of building should have window
- Parking should be allocated to the adjacent unit and should be marked with the number of the apartment
- A keeper for parking should be indentified

- Parking should be visible from windows and doors
- Recreational spaces should be visible from most of windows and doors
- The bushes shouldn't have more than 1/1 meter height
- The buildings should be located in a manner that the windows and doors of one unit can be seen by other units
- The stairs should be lit well and outdoor sense should be seen , it shouldn't be surrounded by solid walls

6.3 Enforcing territories:

- The boundary of ownership should be identified with landscaping or column and fences
- Bushes and fences should be short to be able to see the street
- Entrances of building should be indicated with architectural elements , lighting or landscaping
- The handhold of the door should be 90 cm lower from the glass of door
- All of buildings and residential units should be indicated clearly with the number of street (the min height should be 12 cm) and should be lit well in night
- The common entrances should have windows and the lock should control by residences
- The post box should be near residence

6.4 THE CASE STUDY: SAHRE-ZIBA BOULEVARD IN TEHRAN CITY

Sahre-ziba Boulevard located in the west of Tehran is a residential district with about 600 residential units that was built about 50 years ago.

The houses of this area are some blocks with four levels which are located around a boulevard whose name is Shahre-ziba Boulevard.

Aerial photogragh of Share-Ziba region

According to the interview that had been done with the residences of this district the majority of residences claimed from its old situation and its disordering. Unsafety and gathering of strangers for crime activities such as drug selling were some other complaint that they pointed.

General view of buildings in Share-Ziba residential complex

Because of a large school that was located in the end of this complex, the entrance of strangers and making a large crowd while closing up the school was the other cases to claim.

The main reason of creating unsafety in this district is the possibility of entering the strangers to this residential complex which causes that familiar people can't be distinguished from strangers as well as tall trees which obstacle view permit offenders to hide in many places of this area.

Undifiened spaces around the buildings

The solution for this problem is surrounding this area and creating limited access for residences or by facilitating the open spaces between blocks and creating the possibilities for presenting of children and elderly in this area create a very effective natural surveillance for that complex.

Adequate lighting and specially lighting the hidden places will be an effective factor to threaten the offender from doing crime as well.

Meanwhile providing a local shopping center along with other facilities such as a coffee shop and so on will increase natural surveillance as well.

In this area private spaces have been arranged in front of houses as some courtyards with transparent fences. We can add some semi-private spaces for this area that people feel responsibility for maintaining plant and grass and other services of these areas and don't release these areas.

Building with its front courtyard

7 CONCLUSION

The ways of preventing crimes through environmental design have a long way to reach environmental safety. Of course these principles can't keep a community safe lonely. These ways can recognize problematic places and reduce their difficulties, such as distinguishing a blind lane, bad lighting in parking and crowd entrances.

Fortunately implementing these ways create a sense of safety and relaxation along with responsibility for neighbors which is the greatest tool to prevent crimes.

At the end it should be repeated that the final aim of all of these strategies is promoting the qiuality of life in city and creating a livable, healthy and prosperous city.

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Delhi towards Carbon Neutrality through Sustainable Mobility

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1 ABSTRACT

Cities in all parts of the world face mounting challenges such as population shifts, water shortages, air pollution, inadequate or aging infrastructure, land degradation, sprawl, spread of informal settlements and traffic congestion. Metropolitan cities grow beyond imaginable proportions. Concentration of intense economic processes and high level of consumption in cities increase their resource demands. The main problem with cities today is that they have become centres of mobilisation rather than civilisation. The city of the future, to be sustainable, will have to re-establish the concept of civilisation, with sustainable mobility.

2 INTRODUTION

During the Last Century Urban Population of India increased ten folds from 27 million to some 270 million. Cities today are in the centre-stage of environmental pollution, and degradation and loss of bio-diversity. Concentration of intense economic processes and high level of consumption in cities increase their resource demands. Beyond their boundaries, cities affect traditional rural economics and their culture. The main problem with cities today is that they have become centres of mobilisation rather than civilisation. They are nodes of an increasingly intense economic activity, with the volume of travel having reached unprecedented levels in recent years. The urban economic culture has a deep impact on the human mind, which has become too pre-occupied with the pursuit of personal gain. The city of the future, to be sustainable, will have to re-establish the concept of civilisation, with sustainable mobility.

Delhi, the fast growing Capital City of India has presently a population of about 17 million persons and is estimated to grow in a 23 million population Mega City by the year 2021. After Independence Delhi had 1.43 million populations by 1951 and has increased to 8.42 million by 1991. According to 2001 Census of India it has reached to 17 million just 100 percentage increase. Ever increasing population with end lasting demand can be sustained with adopting an integrated approach towards Urban Transport System. The Ministry of Urban Development, Govt. of India formulated National Urban Transport Policy (NUTP), 2006 with broad objective to ensure safe, affordable, quick, comfortable, reliable and sustainable access for public transport within cities. One of the objectives is to “enabling the establishment of quality focused multi-modal public transport systems that are well integrated, providing seamless travel across modes”.

Sustainable mobility is defined as the primary goal of transport policies together with rising importance of environmental quality in the city. The concept of sustainability within transport policies need to accommodate at least three main objectives: economic growth, social equity and environmental sustainability. Usually it is not easy because all three objectives are multi-dimensional themselves.

3 NEED OF STUDY

Delhi today is emerging as one of the largest and most populated cities of the world. Out of a total area of 1483 sq km about 50% has already been urbanised and the rest is under heavy pressure of urbanisation. In spite of the plans for decentralisation and to restrict the growth of the city by development of National capital Region (NCR), the runway growth of Delhi continues. Putting several strain and demands on mobility Delhi has been evolved for creation of a sustainable transportation model for reducing its carbon foot.

Effective and reliable transport systems are crucial for the functioning of the post industrial economies, yet such systems generate significant negative externalities like air pollution, noise vibrations, energy consumption, and emission of greenhouse gases and loss of open space. Worldwide examples show that there is a small reduction of energy consumption and CO2 emissions in motorized modes of transport. It is proved that reducing CO2 emissions from the transport sector is much easier than cutting those from the building sector. However it is promising, that any new approach that involves a change in vehicle technology or a shift to different mobility technologies and techniques can be implemented in a relatively short time. Transport, therefore, is a very important element in our race toward sustainable life on earth.

4 STRATEGY OF SUSTAINABLE MOBILITY

In the above stated background the following three fold approach and strategy needs to be adopted:

- Multi modal transport system with Pedestrian Policy (walkable city)
- Motorized Vehicles in Mass Rapid Transit System
- Policy for local environment and safety.
- Institutional /Regulatory Interventions.

5 WAY TO CARBON NEUTRALITY THROUGH SUSTAINABLE MOBILITY

5.1 Modality and Landuse Efficiency

Urban Form: Delhi city is an assemblage of buildings and streets, system of communication and utilities, places of work, transportation, leisure and meeting places. Delhi had a traditional Urban Design which is reflected in the glory of 17th century the Walled City of Shahajahanabad and New Delhi in 1916, the Central Vista was conceived as a landscaped stretch to form continuity between the ridge and the river Yamuna.The boulevard of Chandni Chowk was its commercial centre piece Red Fort and Fateh Puri Mosque as its two ends. The stretch with the Rashtrapati Bhawan and the India Gate at two ends has tremendous visual quality. The Jama Masjid a dominating feature located on hill top was visually linked with Parliament House, Connaught Place in the same axis. To make city with footstep of carbon neutrality several measures have been taken integrity of land use in urban form.

Delhi, like most Indian cities, has a mixed pattern of land use. This is partly because large numbers of people need to walk between their places of residence and their places of work. No clear-cut concentric zones of different activities exist. Central core areas comprise not only commercial development but also high-concentration housing, and working-class developments are found in the core and vicinity of the city. Manufacturing activity is spread geographically not only in the peripheral zone but also in the intermediate and inner zones.

In Metropolitan Centre and Extension: Connaught Place: Landscape Schemes are prepared to integ-rate MRTS stations, safe pedestrian walkways, parking areas, recreational and cultural areas, etc.with planting of trees and street furniture. The intermediate public transport such as monorail, battery oper-ated / high capacity buses, sky buses are introduced to increase the mobility within the City Centre. Use of alternative renewable sources of energy is encouraged for new buildings (especially those of commercial or institutional nature), traffic signals, public signages, etc.

In Walled City And Extensions: Conservation approach to retain the overall traditional character of the Walled City. Pedestrian made completely free of vehicular traffic so as to restore the human scale and convenient living, controls considering built to edge typology to enhance environmental state.

In District Centres: The district park adjoining to the district centre proposed in the master plan / zonal plan should be properly integrated with the district centre. The area provided for landscape as part of the district centre should weave through the entire district centre to create a pleasant environment with access to main circulation system. Either ring road or outer ring road.

5.2 Management of Natural Resources

Natural Resources: The major natural features and eco-systems of Delhi are the river Yamuna, together with a network of streams/drains that empty into the river, and the Aravalli Range. Both of these are in a state of considerable degradation, and it is of vital importance to conserve and rejuvenate these ecosystems. This has regional carrying capacity, therefore, surrounding states also have to contribute towards their conservation and rejuvenation. Measures for Rejuvenation of River Yamuna is maintain minimum flow in river Yamuna to be ensured by Riparian states by releasing adequate water. The annual rainwater harvesting potential has been carry forward to substantiate the total flow. In this respect all the new bridges/flyovers must have the provision for rain water harvesting.

Air: Various initiatives and measures taken over the past few years, like introduction of CNG and EURO II norms etc., the air quality in the city, in terms of pollution levels, has continued to be a matter of concern, and has been responsible for a number of respiratory diseases, heart ailments, eye irritation, asthma, etc. The

three main sources of air pollution in Delhi are vehicular emission (around 70 percent) industrial emissions (around 20 percent) with a major element of this coming from the three thermal power plants, and from other sources such as diesel generator sets and domestic cooking, burning of biomass, etc.

The major area of planning and intervention would relate to transportation planning. With the phenomenal growth in the number of vehicles, almost 8-10 times in the last two decades in absolute terms, the most significant aspect in the context of congestion and pollution, relates to the growth in personalised transport as compared to the availability of public transport. It has been estimated that buses, which constitute barely 1.2 percent of the total number of vehicles, cater to around 60 percent of the total transport load, while personal vehicles –cars and scooters, though almost 93 percent of the total number of vehicles, cater to around only 30 percent of the travel demand. Such a huge share of private vehicles in Delhi, while serving a relatively limited purpose in terms of the transportation modal split, obviously creates tremendous pressure on road space, parking, and pollution directly and through congestion. Public transportation planning must, therefore, drive the future policy. So far public transport is largely seen as the transport mode for the not so well off and poorer sections of the community, who cannot afford to own/use personal transport. An important element of policy would now also have to aim to make public transport a mode for personal vehicle owners and users through a mix of incentives and disincentives. Apart from aspects like frequency, inter-modal integration, a possible single ticketing system, use of parking policy as a means to influence vehicle use, etc., the quality of public transport, particularly buses, would need to be significantly upgraded, inter-alia, keeping the element of clean transport in view. Another issue which has been raised in the context of vehicular congestion and pollution relates to the policy of mixed land use.

The Metro Rail system has a big footstep for reducing carbon footprint. The Metro Rail system has provided a big relief to the city and placed it on higher demand for providing relief to the 100% metro with adequate feeder system. Use of CNG on public transport has experienced a journey of reducing Carbon emission. It is further paving way for utilization in private vehicles. Bus Rapid Transit is meant to be a high quality public transport system, oriented to the user that offers fast, comfortable and low cost urban carbon mobility. The overall green cover in this zone should be enhanced and protected

MRTS Corridor: In prior master plans, city structure was thought in terms of hierarchies with CBD, District Center and Community Centres in descending order of importance. But with due course of development and introduction of MRTS, need is felt to connect these scattered districts with more imaginable components. These components with enhanced built up areas and activities form a network by which the experience of various district and commercial centres becomes a part of continued experience.

As per the Government of India Notification, it is mandatory for all construction agencies to use Fly Ash bricks or tiles or clay fly ash bricks along with pond ash in the construction of roads/flyovers embankments and reclamation of low-lying areas. To control the ambient air quality of Delhi, it may be made mandatory that all commercial vehicles (like trucks and tempos) are converted into CNG.

5.3 Conservation and Development of Resources

Energy Efficiency:

The concept of energy efficiency should begin with the idea of Zero-fossil Energy Development (ZED) which envisages to reduce the demand for power to the point where it becomes economically viable to use energy from renewable resources. This involves a holistic approach combining the issues and actions at various levels of planning, design, construction and maintenance leading to a sustainable and energy efficient regime. The city geometry, restructuring and zoning with self-contained neighbourhoods could minimise the need to travel and substantial saving of recurring energy/ fuel consumption. Integrated mass transport system, traffic and transit operation and management, better tele-communications, promoting bicycles and NMV transport, is another major area of energy efficient habitat. The introduction of energy audit and design of energy efficient form, construction and materials and reducing energy demand by passive micro-climatic design approach, intelligent energy controls, heat recovery, landscape, opening design, furnishings, etc., are the critical considerations. The key to future is a cybernetic form of sustainable energy, which integrates symbiosis, recycling and energy chains.

Non-conventional energy sources like recovering energy from solar energy, etc. should be used for street lighting, lighting at public spaces, open areas, traffic signals, hoardings, etc.

To supplement part of the estimated growing power requirement, non-conventional sources/solar energy and other actions proposed are as follows:

- Compulsory Solar Panels for public advertising, lighting in open areas, public utilities, streets, etc.
- Adoption of Load Management Technique.
- Tariff restructuring and improved metering arrangement to minimize power thefts/losses.
- Private Sector Participation in different stages for Inter Modality system and adapt of new techniques.
- Incentivising energy savings and use of energy efficient gadgets.
- Public awareness, capacity building and training.

As per Asian Development Bank's report (1997) potential in saving due to better overall efficiency in Transport Sector by adopting following measures:

- Incandescent bulbs, neon tubes and fluorescent lamps are giving way to light-emitting microchips that work longer, use less power and allow the use of light in new ways. The chips, known as light emitting diodes, or LEDs have huge performance advantages in many mundane tasks (such as traffic lights). These consume 80 per cent less electricity than the bulbs and have longer life. Moreover, they have the safety advantage of gradually fading instead of burning out. This eventually results in huge savings in terms of energy and maintenance costs.

6 CONCLUSION

Management of logistics in Transport Sector provides an opportunity to use renewable solar energy for saving energy and green Clean Gas for saving gaseous emissions in climate, Mass Transit System for door to destination with inter modality service towards Carbon Neutral City.

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Der Beitrag regionaler Verkehrspolitik zur Realisierung der Vision lebenswerter, gesunder und prosperierender Städte für alle: Beispielfall Burgenland

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1 EINLEITUNG

Im Rahmen einer Studie der Landesstelle Burgenland der Österreichischen Verkehrswissenschaftlichen Gesellschaft (ÖVG) und des Instituts für Transportwirtschaft und Logistik der WU Wien wurde die Verkehrspolitik des Burgenlandes einer genauen Betrachtung und Analyse unterzogen. Zahlreiche Interviews mit Entscheidungsträgern auf Landes-, Bezirks- und vor allem auf kommunaler Ebene sowie mit Vertretern von burgenländischen Verkehrsunternehmen zielten darauf ab, die aktuelle Situation und Entwicklungen in der burgenländischen Verkehrspolitik zu analysieren und dadurch die Rolle der regionalen Verkehrspolitik bei der Gestaltung gesunder und prosperierender Lebensräume darzustellen. Es konnten sehr interessante Ergebnisse erarbeitet werden. Unter anderem werden unterschiedliche Maßnahmen aufgezeigt, die Entscheidungsträger aktuell ergreifen, um Städte und Dörfer im Burgenland für die Bevölkerung lebenswert und attraktiv zu gestalten.

2 PROBLEMSTELLUNG

Attraktive Lebensräume haben für den Menschen viele unterschiedliche Eigenschaften: gute Erreichbarkeit (sowohl durch Individual- als auch den öffentlichen Verkehr), gesunde Umwelt, (Nah-)Versorgung, bedarfsgerechte Infrastruktur und Nähe zu Ausbildungsstätten und Arbeitsplätzen sind nur Beispiele dafür, was Menschen in Betracht ziehen, wenn es darum geht, ihren idealen Lebensraum zu beschreiben. Diese Faktoren sind auch von großer Bedeutung, um das Grundbedürfnis des Menschen nach Mobilität und Freiheit befriedigen zu können. Um einen optimalen Lebensraum für die Bevölkerung gewährleisten zu können, stehen Entscheidungsträger auf regionaler Ebene vor vielfältigen und teilweise konfliktären Aufgaben. Dabei gilt es, neben den Wünschen und Forderungen der Bevölkerung auch die Anforderungen von Wirtschaft, Umwelt und Politik in Lösungen einzubeziehen und unterschiedliche Interessenlagen zu berücksichtigen. Steht für die Wirtschaft eine maximale Erreichbarkeit und optimale Verkehrsanbindung im Zentrum des Interesses, so beeinflusst dies die Umwelt mitunter aufgrund des steigenden Verkehrsaufkommens negativ. Die Anforderungen einer intakten Umwelt stehen also manchmal im Gegensatz zu jenen von Wirtschaft und Industrie.

Neben den unterschiedlichen Ansprüchen der verschiedenen Akteure („Steakholder-Ansatz“) beeinflussen auch regionale Besonderheiten, demographische Trends (Stichwort „Landflucht“ oder „alternde Bevölkerung“) bzw. auch die sozio-ökonomische Lage das Entscheidungsspektrum von politischen Akteuren. In größeren Ballungsräumen sind dabei naturgemäß andere Maßnahmen notwendig als in kleinen Gemeinden. Entscheidungen müssen also auf der jeweiligen Ebene spezifisch getroffen werden.

Das Burgenland stellt seine Entscheidungsträger dabei vor große Herausforderungen, wie der folgende Überblick zeigen soll:

Die Gesamtfläche von 3.965,5 km² ist auf sieben politische Bezirke aufgeteilt[1]. Die Bezirke Neusiedl am See, Eisenstadt-Umgebung und Mattersburg bilden dabei das Nordburgenland, der Bezirk Oberpullendorf das Mittelburgenland, die Bezirke Oberwart, Güssing und Jennersdorf das Südburgenland. Die drei burgenländischen Großregionen weisen dabei äußerst unterschiedliche Siedlungsdichten auf: Das Nordburgenland hat mit 82,29 Einwohnern/km² die höchste Siedlungsdichte, im Südburgenland beträgt die Dichte durchschnittlich 66,42 Einwohner/km². Das Mittelburgenland ist mit 53,46 Einwohnern/km² am

[1] Vgl. Amt der Burgenländischen Landesregierung (2009), http://www.burgenland.at/media/file/226_flaeche_burgenland.pdf

dünnsten besiedelt[2]. Dabei gilt die Streusiedlungsstruktur im Landessüden als besondere Herausforderung für verkehrspolitische Entscheidungen[3].

Insgesamt beherbergt das Burgenland 171 Siedlungsgebiete, darunter zwei Freistädte, elf Stadtgemeinden, 65 Marktgemeinden und 93 Gemeinden[4]. Die Karte auf der folgenden Seite zeigt das Burgenland mit seinen Gemeinden, Bezirken und Bezirksvororten im Kontext der Nachbarstaaten und -bundesländer.

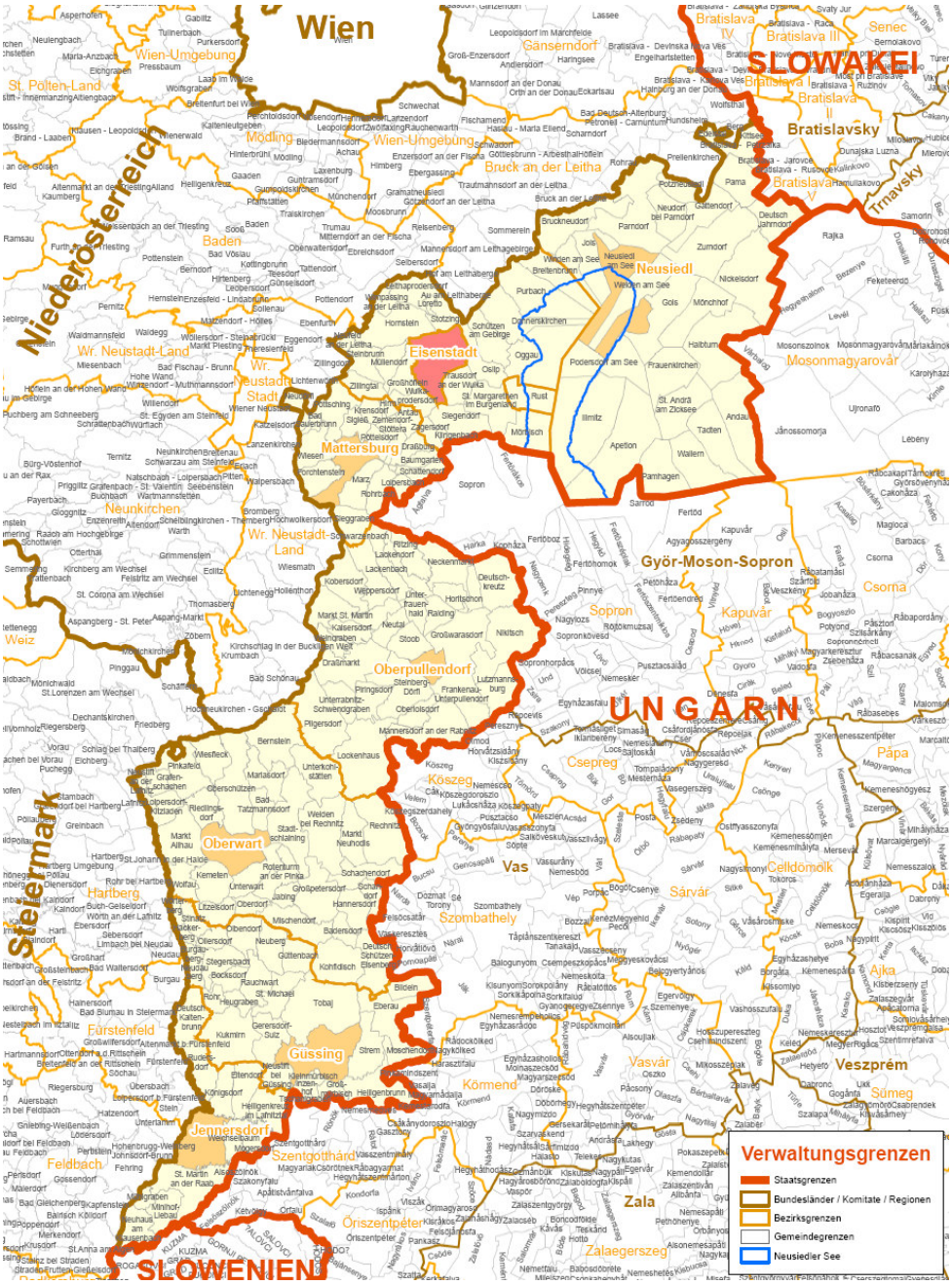

Abbildung: Gemeinden des Burgenlandes [Quelle: Amt der Burgenländischen Landesregierung (2006), http://www.gis.bgld.gv.at/docs/Verwaltungsgrenzen_Bgld.pdf]

[2] Vgl. Statistik Austria (2008), http://www.statistik.at/web_de/static/berechnung_des_vorlaeufigen_bevoelkerungsstandes_31.10.2008_nach_gemeinden_034212.pdf und Amt der Burgenländischen Landesregierung (2009), http://www.burgenland.at/media/file/462_Gemeinden_Bgld.xls

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[4] Vgl. Amt der Burgenländischen Landesregierung (2009), http://www.burgenland.at/media/file/462_Gemeinden_Bgld.xls

3 GESTALTUNGSMÖGLICHKEITEN DER REGIONALEN VERKEHRSPOLITIK

Inwieweit die regionale Verkehrspolitik konkret Einfluss auf die Gestaltung attraktiver Lebensräumen nehmen kann, wird nun im Vorfeld der Besprechung diesbezüglicher Ergebnisse der Studie kurz erläutert.

- Gerade in ländlichen Gebieten sollte verstärkt darauf geachtet werden, dass diese verkehrsmäßig gut erschlossen sind und gute Anbindungen in die nächstgelegenen Ballungszentren – und somit zu Versorgung, Ausbildung oder Arbeitsplatz – geschaffen, erhalten und ggf. weiter ausgebaut werden. Dies sollte sowohl für den Individual- als auch für den öffentlichen Verkehr beachtet werden, um Mobilität für alle Bevölkerungsgruppen gewährleisten zu können. Individualverkehr und öffentlicher Verkehr können sich dabei ergänzen, um auch umweltpolitischen Zielen gerecht zu werden (Stichwort „Park-and-Ride“). Auf diese Weise erfährt die betroffene Region eine Aufwertung, was die Attraktivität steigert und das Gebiet lebenswerter macht bzw. Entleerungen in Richtung der Ballungsräume hintanhält.
- Betreffend den öffentlichen Verkehr kann Rentabilität nicht im Mittelpunkt des Interesses stehen. Öffentlicher Verkehr kann unter dem gegebenen Regime der Objektfinanzierung – gerade in dünn besiedelten Gebieten mit wenigen Nutzern – oftmals nicht durch die eingehobenen Tarife finanziert werden, die Finanzierung obliegt folglich der öffentlichen Hand im Rahmen gemeinwirtschaftlicher Leistungsverträge. Aber gerade ÖV-Verbindungen sind vielfach notwendig, um die Lebendigkeit und Attraktivität einer Region zu erhalten.
- Von großer Bedeutung ist auch die Einbeziehung der Bevölkerung in die Gestaltung von Lebensräumen. Neben den Entscheidungsträgern und Fachleuten sind es auch oft Ideen der Bevölkerung, die innovative und kreative Lösungen im Verkehrsbereich ermöglichen. Dabei kann die Politik etwa durch Förderung von Ideen oder auch Bereitstellung von Plattformen (z.B. Bürgerforen, Ideenwettbewerbe, etc.) zu einem verbesserten Verhältnis zwischen Politik und Bevölkerung beitragen und im Zuge dessen mit der Bevölkerung zusammenarbeiten und Verbesserungen erreichen.
- Ein großer Anteil der burgenländischen Bevölkerung pendelt über die Bundeslandgrenzen hinweg zum Arbeitsplatz. Die tägliche Überwindung von langen Strecken wirkt sich naturgemäß auf die Lebensqualität der betroffenen Menschen aus, da durch die langen Anfahrtszeiten wertvolle Freizeit verloren geht. Diese Problematik kann entschärft werden, indem Ansiedlungen von Betrieben angestrebt werden. Diese Vorhaben sollten bereits in der Flächenwidmung berücksichtigt werden, um eine optimale Ausgangsposition für Unternehmensansiedlungen zu schaffen. Der Faktor Zeit wird für die Menschen, die eine gesunde Work-Life-Balance erreichen möchten, immer wichtiger.
- Eine intakte Umwelt bildet die Basis einer lebenswerten Region. Daher sollte bei Verkehrsprojekten stets der Aspekt des Umweltschutzes – über den gesetzlichen Rahmen hinaus – im Auge behalten werden. Starke Eingriffe in die Natur (z.B. durch Trassenführungen), die Führung von sehr stark frequentierten Strecken durch Siedlungsgebiete (Lärm- und Abgasproblematik) oder auch die Verwendung von veralteten Technologien (Fahrzeuge mit hohem CO2-Ausstoß) führen zu Effekten, die sich negativ auf den Menschen und dessen Zufriedenheit auswirken. Der Umweltbezug sollte sich nicht auf Aktivitäten von Entscheidungsträgern beschränken, vielmehr sollte die Bevölkerung idealerweise frühzeitig in Planungsprozesse involviert werden, was Planungs- und Zeitkosten aufgrund von Verzögerungen infolge von Widerständen („Bürgerinitiativen“) senkt. Politische Entscheidungsträger können dabei durch Bewusstseinsbildung in der Bevölkerung wichtige Schritte in Richtung lebenswertes Land, Region und Gemeinde erzielen.

4 EMPIRISCHER BEFUND

4.1 Methode

Um im Rahmen der Befragung Repräsentativität auf allen Ebenen zu gewährleisten, wurde ein detaillierter Stichprobenplan erarbeitet:

Die Landesebene sollte möglichst umfassend berücksichtigt werden, dabei waren vier Referate bzw. Institutionen der burgenländischen Landesregierung für den Verkehrsbereich von Relevanz. Es handelt sich um das Hauptreferat für Verkehrsrecht, das Hauptreferat Straßenausbau und das Referat Gesamtverkehrskoordination. Weiters spielt auch die Mobilitätszentrale Burgenland, welche Teil der

Regionalmanagement Burgenland GmbH ist, eine wichtige Rolle im Verkehrsbereich und wurde ebenfalls miteinbezogen. Alle Instanzen konnten für die Mitarbeit am vorliegenden Projekt gewonnen werden.

Auf Bezirksebene vier von sieben Bezirken erreicht, wodurch auch auf dieser Verwaltungsebene hinreichende Repräsentativität sichergestellt werden konnte.

Auf Gemeindeebene wurde eine Schichtung auf Basis der Einwohnerzahl[5] vorgenommen. Größere Gemeinden mit mehr als 3.000 Einwohnern bilden die eine Gruppe, die bevölkerungsärmeren Gemeinden die andere. Das Burgenland zählt aktuell 15 Gemeinden, mit einem Bevölkerungsstand von über 3.000. Aufgrund der regionalen Unterschiede sollte möglichst eine Vollabdeckung erzielt werden, letztendlich wurden elf Gemeindevertreter erreicht, die verbleibenden vier standen für ein Interview nicht zur Verfügung. In der großen Gesamtheit der kleinen Gemeinden wurden pro politischen Bezirk drei zufällig, ausgewählt im Ablehnungsfall wurde innerhalb des Bezirkes eine Ersatzgemeinde ermittelt. Insgesamt konnten die Vertreter von 18 Gemeinden mit weniger als 3.000 Einwohnern für ein Interview gewonnen werden, elf weitere kontaktierte Gemeinderepräsentanten standen für eine Erhebung in ihrer Gemeinde nicht zur Verfügung.

Die Gruppe der Verkehrsunternehmen bzw. -verbünde komplettiert die Stichprobe gleichsam als Kontrollgruppe oder Korrektiv. Es wurden sechs Unternehmen kontaktiert, davon standen vier Vertreter für die Befragung zur Verfügung. Diese Erhebungen wurden zur Reflexion der Ergebnisse der verschiedenen politischen Ebenen durchgeführt, können jedoch nicht als repräsentativ betrachtet werden. Dennoch konnte erreicht werden, dass die Tätigkeitsgebiete der befragten Verkehrsunternehmen bzw. -verbünde alle Landesteile des Burgenlandes abdecken.

Im Grundsatz erfolgte die Durchführung der Interviews in den Räumlichkeiten des Gesprächspartners, sämtliche Interviews wurden von der Mitverfasserin des vorliegenden Beitrags persönlich durchgeführt. In Ausnahmefällen wurde – um sich den Meinungen dieser Personen nicht zu verschließen – einer telefonischen bzw. schriftlichen Befragung zugestimmt. Dies ist erhebungstechnisch nicht optimal, ansonsten hätte man auf die Meinungen dieser Befragten gänzlich verzichten müssen. Insgesamt wurden im Zeitraum Februar bis Juli 2009 41 Interviews durchgeführt, von diesen erfolgten 32 persönlich, drei telefonisch und in sechs Fällen erfolgte die Befragung in schriftlicher Form.

Zum Zwecke der Durchführung der Interviews wurden Interviewleitfäden für sämtliche Träger der burgenländischen Verkehrspolitik und auch Verkehrsunternehmen bzw. -verbünde entwickelt. Behandelt wurden dabei folgende Themengebiete:

- Zusammenarbeit der unterschiedlichen politischen Ebenen
- Entwicklung der Mobilitätsansprüche der Bevölkerung
- Die unterschiedlichen Verkehrsträger im Detail
- Verkehrspolitische Zielsetzungen
- Güterverkehr
- Luftverkehr
- Aktuelle Verkehrsprojekte
- Finanzierung von Verkehrsprojekten
- Verkehrssicherheit
- Verkehr und Umwelt
- Das Burgenland im Zentrum der Europäischen Union
- EU-Förderungen im Burgenland
- Burgenländische Verkehrspolitik in der Zukunft

[5] Bevölkerungsstand vom 31.10.2008, analog zu den Ausführungen in der Problemstellung

Alle Interviewleitfäden zeichnet eine gleich bleibende Struktur aus, kleine Abweichungen waren allerdings notwendig, um den unterschiedlichen Tätigkeitsfeldern auf den verschiedenen Ebenen der Politik und der Unternehmen gerecht zu werden.

4.2 Ergebnisse

Die folgende Darstellung der Ergebnisse fokussiert auf ausgewählte Themen, die im Lichte des gegenständlichen Themas relevant sind, also auf den Beitrag regionaler Verkehrspolitik zur Realisierung der Vision lebenswerter, gesunder und prosperierender Städte für alle abstellen. Dabei wird einer konzisen, inhaltlich gesamthaften Darstellung gegenüber einer nach Befragten stark differenzierenden aus Platzgründen hier der Vorzug eingeräumt.

4.2.1 Mobilität

Das Mobilitätsbedürfnis der burgenländischen Bevölkerung folgt weiterhin einem steigenden Trend. Die in den 1970er und 80er Jahren im Burgenland angesiedelten Betriebe wanderten im Zuge des Globalisierungstrends wieder ab und verlegten ihre Produktionsstandorte in Länder mit niedrigeren Lohnkosten. Die Menschen wurden somit gezwungen, für ihren Arbeitsplatz weitere Distanzen zu überwinden und das Burgenland avancierte zum Land der Pendler. In kleinen Gemeinden stellt die schwindende Nahversorgung (Geschäfte, Bildungseinrichtungen, ärztliche Versorgung etc.) eine weitere Begründung dar, warum die Bevölkerung immer mobiler wird. Wurde die Versorgung vor diesen Entwicklungen zumeist ortsintern und zu Fuß oder mit dem Fahrrad erledigt, so ist heute ein Pkw kaum mehr wegzudenken, um in dünner besiedelten Gebieten versorgt zu sein. Gemeinden versuchen dieses Problem durch ortsinterne Bus- und auch Taxikonzepte zu lösen. Dabei wurde beobachtet, dass größere Gemeinden dahingehend stärker engagiert sind als kleinere. Mit dem Thema bedarfsgerechte Gewährleistung von Mobilität beschäftigen auch viele zukünftige Projekte in den burgenländischen Gemeinden, um der Bevölkerung attraktive Alternativen zum Pkw zu bieten.

4.2.2 Die Situation in den einzelnen Regionen

Wie erläutert, sind die einzelnen Regionen des Burgenlandes sehr heterogen. Dies trifft nicht nur auf die Siedlungsdichte zu, sondern wird auch bei der Betrachtung des Modal-split im Personenverkehr deutlich. Im nördlichsten Bezirk des Landes (Neusiedl am See) schlägt der massive Ausbau des öffentlichen Verkehrs auf der Schiene, die ständige Erweiterung der Angebote der Verkehrsverbünde und auch die Parkplatzproblematik bei Arbeitsstätten in Wien sehr stark auf den Modal Split durch: Nach Auskunft der Gesamtverkehrskoordination werden 60% des im Bezirk entstehenden Verkehrs mittels motorisiertem Individualverkehr bewältigt, 12% entfallen auf die Bahn, 6% auf Busverbindungen, 3% auf das Fahrrad und der verbleibende Rest wird zu Fuß bewältigt. Der Anteil von Bahn und Bus ist nicht nur im landesinternen Vergleich sehr hoch, sondern auch österreichweit ist die Beteiligung der öffentlichen Verkehrsmittel am Modal-split im Bezirk Neusiedl am See sehr beachtlich. Der gute Ausbau der Schieneninfrastruktur und auch die zahlreichen Verbindungen (vor allem für Pendler nach Wien) machen dies möglich.

Der gut ausgebaute öffentliche Verkehr trägt zur Lebensqualität in der Region bei, auch die Ende 2007 erfolgte Verkehrsfreigabe der A6 (Nordostautobahn) hat einen großen Anteil daran. Belastete die nördliche Region des Bezirks früher starker Durchzugsverkehr, konnte dieser auf das hochrangige Straßennetz verlagert werden, was zu einer Aufwertung der Region geführt hat.

Die an der A4 (Ostautobahn) gelegenen Gemeinden konnten von dieser positiven Entwicklung allerdings nicht profitieren. Die Autobahn stößt durch das hohe (Güter-)Verkehrsaufkommen an ihre Kapazitätsgrenze, was die Bevölkerung, die den Verkehrsweg täglich zum Pendeln nutzt, stark einschränkt. Hier werden vermehrt Stimmen für eine dritte Spur oder ein Lkw-Überholverbot laut, auf dahingehende Lösungen muss die Region allerdings noch warten. Neben dem Engpass auf der Straße stößt die Park-and-Ride Anlage am Bahnhof in Parndorf Ort seit längerer Zeit ebenfalls an ihre Kapazitätsgrenze. Die verantwortlichen Entscheidungsträger haben die Dringlichkeit des Problems erkannt, ein Ausbau des für die Bevölkerung der umliegenden Gemeinden äußerst wichtigen Verkehrsknotenpunkts befindet sich bereits in Planung.

Auch die Region entlang der B50 ist mit hohem Verkehrsaufkommen konfrontiert. Eine Umfahrung der Ortsgebiete auf der Strecke Neusiedl am See – Eisenstadt wird dabei stark diskutiert, Einigkeit ist allerdings nicht zu beobachten. Stellt eine solche Umfahrung für die einen Gemeinden einen Schritt zur Steigerung der

Lebensqualität dar, empfinden die anderen Gemeinden genau das Gegenteil. Aufgrund der Uneinigkeit konnte hier bisher keine Gesamtlösung gefunden werden. Immerhin ist eine Teillösung bereits in der konkreten Planungsphase, die Gemeinde Schützen am Gebirge im Bezirk Eisenstadt-Umgebung kann voraussichtlich ab 2013 umfahren werden.

Im Bezirk Oberpullendorf ist die Situation rund um die Versorgung mit öffentlichen Verkehrsmitteln gespalten. Das Schienennetz ist vom Nordwesten her bis zur Gemeinde Deutschkreutz elektrifiziert und auch gut verkehrlich bedient, allerdings muss die Bevölkerung der weiter südlich gelegenen Gemeinden auf die Dienste der Bahn weitgehend verzichten. Busverbindungen sind hier für regionale und auch überregionale Fahrten vorhanden. Zwar gibt es qualitative Verbindungen nur Richtung Norden (Eisenstadt, Wiener Neustadt, Wien), in Richtung Süden besteht laut Auskunft der betroffenen Gemeindevertreter Verbesserungspotenzial. Die Auslastung der Straßen in der Region wurde weitgehend als angemessen bewertet, lediglich der Vertreter des Bezirksvororts war mit der Verkehrssituation in seiner Stadtgemeinde nicht völlig zufrieden. Dieser Belastung wird allerdings mit der Verlängerung der S31 bis zum Jahr 2011 Rechnung getragen, die Burgenland-Schnellstraße endet künftig nicht mehr vor der Stadt.

Auch im Bezirk Oberwart haben fünf der sechs Vertreter der befragten Siedlungsgebiete mit starkem Durchzugsverkehr zu kämpfen. Speziell die dort angesiedelten Industrie- und Gewerbebetriebe (z.B. Steinbrüche) sorgen für ein starkes Güterverkehrsaufkommen. Teilweise sind Ortsumfahrungen bereits vorhanden und in Kopplung an diese werden Fahrverbote für das Ortsgebiet von den Gemeindevertretern angedacht, teilweise besteht noch der Wunsch nach Ausweichrouten für den starken Güterverkehr. Die von der steirischen Grenze über Pinkafeld nach Oberwart führende Bahnstrecke kann zum Leidwesen der Bevölkerung nur einen Teil des Güterverkehrsaufkommens auf sich konzentrieren. In kleineren Siedlungsgebieten der Region konnte allerdings beobachtet werden, dass Lösungen für das vorliegende Verkehrsproblem vorhanden sind. Eingeschränkte Befahrungszeiten der Durchzugsstraßen oder auch die Einhebung einer tonnenabhängigen Maut, die zweckgebunden für die betroffenen Straßen verwendet wird, sind Beispiele dafür.

Im südlichsten Bezirk des Landes beträgt der Anteil des motorisierten Individualverkehrs am Modal Split laut Auskunft der Gesamtverkehrskoordination bereits 80%. Lediglich 4% entfallen auf Busverbindungen, die Bahn bewältigt 2% des anfallenden Verkehrsaufkommens. Dabei muss allerdings die Streusiedlungsstruktur im Landessüden beachtet werden, diese Situation stellt verkehrspolitische Entscheidungsträger vor schwierige Aufgaben. Die Bereitstellung von bedarfsgerechten öffentlichen Verkehrsmitteln gestaltet sich hier naturgemäß schwieriger als im Norden. Dennoch wird durch Busverbindungen versucht, vor allem die Pendler des Südburgenlandes so rasch wie möglich zu ihrem Arbeitsplatz zu bringen. Auch hier sind Verbindungen Richtung Norden und Westen den Befragungen zufolge an die Bedürfnisse der Bevölkerung angepasst, Verbesserungspotenzial ist Richtung Süden vorhanden.

Zur Verbesserung der Lebensqualität im Bezirk Jennersdorf wird ab 2014 die S7 (Fürstenfelder Schnellstraße) beitragen. Interviewte Vertreter der umliegenden Gemeinden haben sehr hohe Erwartungen an diesen bevorstehenden Bau, die Lage auf der Strecke zwischen Graz und Budapest und dem dadurch hohen (Güter-)Verkehrsaufkommen sorgt in der Region für Unmut in der Bevölkerung.

4.2.3 Öffentlicher Verkehr

Mit der bereits erwähnten Problematik der Bereitstellung von bedarfsgerechten öffentlichen Verkehren beschäftigen sich die Gesamtverkehrskoordination und die Mobilitätszentrale Burgenland. Die aktuell verfolgte Bahn-Offensive beinhaltet Elektrifizierungen und Sanierungen von bestehenden Strecken im Nord- und Mittelburgenland, die Bevölkerung des Landessüdens kann davon allerdings nicht profitieren. Dort gilt die Erschließung der Fläche mit öffentlichen Verkehrsmitteln als besonders problematisch, denn Kostendeckung kann bei bestehenden Verbindungen oftmals nicht gewährleistet werden. Bedarfskonzepte speziell für die Regionen Mittel- und Südburgenland im öffentlichen Verkehr sind angestrebt und sollten gemeinsam mit den Gemeinden der betroffenen Regionen erarbeitet werden, so ein Vertreter der Mobilitätszentrale. Zielgruppengerechte Lösungen für die eingeschränkt mobilen Bevölkerungsgruppen (Senioren, Jugendliche) sind dabei dringend notwendig, um das Südburgenland für die Bevölkerung attraktiver zu gestalten.

4.2.4 Umwelt und Verkehr

Ein weiteres Augenmerk der Mobilitätszentrale Burgenland liegt auf der Erarbeitung von Konzepten für die Überwindung von kürzeren Distanzen alternativ zum Pkw. Diente das Fahrrad bisher hauptsächlich für Freizeitaktivitäten, so soll dieses auch zum Transportmittel im Alltagsverkehr avancieren. Verbesserungen im Radwegenetz des Landes (Ausbau der Wege und Abstellanlagen) sollen eine Entwicklung dahingehend forcieren. Das Fahrrad gilt dabei als besonders förderungswürdiges Verkehrsmittel, da nicht nur die Kostenersparnis, sondern auch die Gesundheit des Menschen aufgrund der Bewegung und die Schonung der Umwelt überzeugende Argumente darstellen.

Im Bereich der öffentlichen Verkehrsmittel achtet das Land Burgenland beim Abschluss von Verkehrsdienstverträgen darauf, dass Busse mit modernen Dieselmotoren oder auch alternativen Energien (z.B. Erdgas) eingesetzt werden, um die Umweltbelastung so gering wie möglich zu halten. Beim Neubau von Straßen wird der Umweltaspekt miteinbezogen, der Eingriff in die Natur wird für Flora und Fauna möglichst verträglich gestaltet.

Auf kommunaler Ebene ist zu beobachten, dass der Umweltschutz im Verkehr noch nicht jener Stellenwert beigemessen wird, den er auf Landesebene bereits hat. Vertreter größerer Gemeinden beschäftigt der Umweltgedanken im Verkehr stärker als jene der kleineren. Den Status „Klimaschutzgemeinde“ bzw. „Klima-Aktiv Projektpartner“ tragen Gemeinden des Burgenlandes der Erhebung zufolge nur vereinzelt.

4.2.5 Verkehrssicherheit

Bei der Frage nach der Verkehrssicherheit in Burgenlands Gemeinden gaben 28% der befragten Gemeinderepräsentanten an, kritische Bereiche im Ortsgebiet zu haben. In dieser Gruppe sind kleinere Gemeinden allerdings stärker vertreten als größere Siedlungsgebiete. Kritische Kreuzungen, stark frequentierte Straßen im Allgemeinen und ein verstärktes Lkw.-Aufkommen im Speziellen wurden dabei als Gefahrenpotenziale genannt. Um diese Probleme zu lösen, wurde eine Vielzahl an Maßnahmen angeführt, die die Sicherheit für die Bevölkerung in den Gemeinden aktuell bereits gewährleisten bzw. steigern soll. Maßnahmen zur Unfallvermeidung werden in jeder einzelnen der untersuchten Gemeinden getroffen, auch wenn nach Angaben der Vertreter keine kritischen Bereiche vorhanden sind. Der Schutz der Bürger ist auch stark in den definierten verkehrspolitischen Zielsetzungen der Gemeinden verankert.

Auf Landesebene spiegelt nach Auskunft von Landesvertretern das aktuelle Verkehrssicherheitsprogramm „Fair & Sicher“ den Stellenwert dieses Themas wider. Im Rahmen des Programms werden jährlich Schwerpunkte gesetzt und Aktionen durchgeführt, um die Anzahl der Unfälle im Straßenverkehr so gering wie nur möglich zu halten. Dabei soll das Bewusstsein der Bevölkerung geschärft werden und die Aufmerksamkeit im Straßenverkehr gesteigert werden.

Der „Pedi-Bus“ ist ein weiteres Projekt der Mobilitätszentrale, das gemeinsam mit der Landeshauptstadt Eisenstadt umgesetzt wurde. Dabei werden Gruppen von Kindern zu Fuß von Erwachsenen auf dem Weg zur Schule begleitet und auf das richtige Verhalten im Straßenverkehr geschult. Durch diese Aktion werden bereits die jüngsten Gemeindebürger auf die Gefahren des Straßenverkehrs vorbereitet. Dies ging aus den Interviews hervor.

5 FAZIT

Die Ergebnisse der diesem Beitrag zugrundeliegenden Studie zeigen, dass die regionale Verkehrspolitik durchaus einen beachtenswerten Beitrag zur Realisierung der Vision lebenswerter, gesunder und prosperierender Städte für alle Menschen leisten kann. Sie muss sich dabei an der Verflechtung der verschiedenen Ebenen orientieren. Im Land selbst ist auf ein gutes Zusammenwirken der Landes-, Bezirks- und Gemeindepolitik zu achten, jedoch müssen dabei die Rahmenbedingungen des Bundes und der EU berücksichtigt werden. Um jedoch ein gesamthaft optimales Ergebnis zu erzielen, ist es sinnvoll, die lokale Bevölkerung in konkrete Maßnahmen einzubinden bzw. ihr die Möglichkeit zu bieten, selbst Initiativen zu setzen.

Wie die Ergebnisse gezeigt haben, ist das vielerorts starke Verkehrsaufkommen auf Burgenlands Straßen ein wichtiges Kriterium für die Lebensqualität im Land. Der bereits erfolgte und in Zukunft stattfindende Ausbau des hochrangigen Straßennetzes trägt in hohem Ausmaß dazu bei, dass die betroffenen Lebensräume entlastet werden. Neben den Verbesserungen im Straßennetz sollen auch die auf Landesebene gesetzten

Schwerpunkte in den Bereichen Bahn- und Radverkehr Verbesserungen für die burgenländische Bevölkerung im Verkehrsbereich herbeiführen. Die schwierige Situation rund um den öffentlichen Verkehr in den südlichen Landesteilen stellt eine große Herausforderung für die Entscheidungsträger der unterschiedlichen politischen Ebenen dar, das vorhandene Engagement muss zu entsprechenden Lösungen führen, um die Lebensqualität der Bevölkerung positiv beeinflussen zu können. Im Bereich der Verkehrssicherheit haben sich sowohl Landes- als auch Kommunalebene der Bevölkerung verpflichtet, die zahlreichen Aktivitäten spiegeln dies wider und tragen dazu bei, um das Burgenland zu einer lebenswerten Region zu machen.

Es liegt in der Natur der Sache, dass eine Befragung von Politikern, respektive Trägern der Verkehrspolitik im Ergebnis politische Aussagen generiert. Die gegenständliche Studie soll daher nur ein erster Schritt in Richtung einer umfassenden Darstellung der verkehrspolitischen Situation im Burgenland gewesen sein. Es ist sinnvoll – und daher angedacht – Erhebungen im Bereich der Unternehmen sowie unter der Bevölkerung durchzuführen um ein vollständiges Lagebild zu erreichen.

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🏆 *reviewed paper*

Der Low-Carbon-Index: Ein Instrument zur Beurteilung der Energieeffizienz städtebaulicher Planungen

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1 ABSTRACT

Die Nachhaltigkeit und Energieeffizienz einer Stadt wird durch eine Vielzahl von Faktoren geprägt und geformt. Eine optimale effektive Lösung ist nur mit einem multidisziplinären, integrierten Ansatz zu erreichen. Um dabei den Planungsprozess nicht zu komplex werden zu lassen, sind mindestens die Disziplinen von Stadtplanung und Stadtgestaltung, Verkehr und Mobilität, Gebäude und Gebäudetechnik und regenerativer Energieproduktion einzubeziehen. Vor allem aber gilt es, bereits gleich zu Beginn eines Planungsprozesses sämtliche Aspekte zu berücksichtigen, um die Energieeffizienz auf allen Ebenen und in ihrem Zusammenspiel zu erhöhen.

Ein Forschungsprojekt in China/Shanghai zeigt, dass dieser Ansatz sinnvoll und effektiv sein kann, angesichts seiner Komplexität allerdings den Beteiligten gegenüber nur schwer vermittelbar wird - insbesondere Bürgern und Stakeholdern auf der politischen Ebene.

Vor diesem Hintergrund wurde als Planungs- und Bewertungstool der Low-Carbon-Index (LCI) entwickelt, der bei der Bewertung und Planung von Städten, Stadtteilen, Stadtquartieren ebenso wie einzelnen Bauensembles im Hinblick auf die Energieeffizienz und CO2-Reduktion gleichermaßen hilfreich ist.

Bei der Anwendung des LCI fließen die wesentlichen den Energieverbrauch und die CO2-Emissionen determinierenden Größen ein. Leicht ermittelbare Hilfsgrößen dienen der Einschätzung der Bedeutung des Indikators in der konkreten Situation für den Energieverbrauch. Bei der Bewertung muss zwischen quantitativer oder qualitativer Ausprägung eines Indikators (z.B. Energieverbrauch oder Energieverbrauchsdifferenz) und der Bewertung dieser quantitativen oder qualitativen Ausprägung unterschieden werden. Während die quantitative oder qualitative Ausprägung noch objektiv einen realen Sachverhalt beschreibt, erfolgt die Bewertung des Sachverhalts auf einer subjektiven Grundlage. Wissenschaftlich begründet ist das Erstere. Das Letztere, die Bewertung des Sachverhalts, unterliegt hingegen individuellen oder – bei öffentlichen Planungen – politisch legitimierten Grundsätzen und Zielen.

Der LCI arbeitet auf den unterschiedlichen Planungsebenen zwischen dem Maßstab 1:25.000 (Regional- bzw. Stadtentwicklungsplanung) bis zur Realisierungsplanung eines Bauwerks, um jeweils frühzeitig im Hinblick auf die Energieeffizienz bzw. die Reduktion der CO2-Emissionen intervenieren und den Planungsprozess bis hin zur Durchführung begleiten zu können.

Der LCI bleibt trotz des sehr komplexen Wechselwirkungen und der verschiedenen Maßstäbe in Struktur und Bewertung einfach und schnell anwendbar. Dieses unterscheidet den LCI von anderen bereits bestehenden und aufwendigen Zertifizierungsmethoden deutlich.

Derzeit liegt der LCI in der Version 1.0 vor, er wird aber durch die Erkenntnisse aus den verschiedenen Anwendungen laufend weiterentwickelt.

2 EINLEITUNG

Der LCI (Low Carbon Index) ist eine Methode, die entwickelt wurde, um mit geringem Aufwand bestehende Stadtteile, Quartiere und Gebäudegruppen ebenso wie Planungskonzepte in Bezug auf ihre Energieeffizienz und - in einem späteren Schritt - auch in Bezug auf ihren CO2-Ausstoß zu bewerten. Sie wird zunächst für chinesische Megacities ermittelt, soll aber langfristig auch in anderen Erdteilen Anwendung finden können.

Der LCI bewertet die Energieeffizienz / CO2-Effizienz (Energieeinsatz pro Person und Jahr, Energieeinsatz pro Tonnenkilometer und Jahr) in den Themenfeldern Städtebau, Mobilität, Gebäude und regenerative Energieproduktion.

Für jedes der vier Themenfelder wurden jeweils eine Reihe von Kriterien definiert, die auf einer Skala von -2 bis +2 bewertet werden können.

Bei der Anwendung des LCI werden drei Phasen unterschieden: Die erste Phase kann bereits bei einer relativ großmaßstäblichen Planung im Maßstab ab 1:25.000 ansetzen. Hier werden Strukturen und übergeordnete Aspekte einer Planung in den Themenfeldertn Stadt und Mobilität betrachtet.

Für die zweite Phase muss die zu bewertende Planung bereits stärker detailliert sein (Maßstab bis 1:500); für bestehende Quartiere müssen dementsprechend kleinteilige Daten vorliegen. Es werden insbesondere im Bereich Gebäude Details zur Berechnung des Energiebedarfes und der CO2-Emissionen benötigt.

Die 3. Phase (ab 1:500) bezieht sich auf konkrete Detailplanungen während der Realisierung bzw. vor entsprechenden Umbauten. Hier sind die Bereiche Mobilität und Stadtplanung nur noch am Rand vertreten während Gebäude und regenerative Energieproduktion große Bedeutung haben.

3 ZIELE

Ziel ist es, Aussagen zur Energieeffizienz und zum CO2-Ausstoß von Stadtbereichen, Quartieren oder Gebäudegruppen mit einem geringen (finanziellen und zeitlichen) Aufwand zu ermöglichen. Dabei sollen qualitative und quantitative Aspekte gleichermaßen betrachtet und in einer Bewertung zusammengeführt werden.

Die LCI-Methode soll die Energieeffizienz von Planungen nachvollziehbar bewerten, um etwaige Fehlplanungen in frühen Planungsphasen zu erkennen und zu vermeiden helfen. Zudem hilft es bei detaillierten Planungen, Schwachstellen zu lokalisieren und aufzudecken, die bis zur Realisierung geändert werden können.

Mit dem LCI soll kein weiteres Zertifizierungsinstrument eingeführt werden, welches genaue Berechnungen von Energieverbräuchen und CO2-Emissionen aufstellt. Vielmehr ist es ein Instrument, welches hilft, eine erste Einschätzung von Planungen in Bezug auf CO2-Emissionen und Energiebedarfe zu treffen.

Weiterhin gehen aus dem LCI Guidelines hervor, die von Investoren bei der eigentlichen Realisierung beachtet und umgesetzt werden müssen. Diese Guidelines können auch Vertragsbestandteil bei Grundstücksverkäufen in neu geplanten Gebieten werden.

Langfristig sollte angestrebt werden, den LCI gesetzlich als Bewertungsinstrument für alle Planungenvon der Stadtentwicklung bis zur Quartiersplanung heranzuziehen, um bereits in der allerersten Planungsphase Fehlentwicklungen und Planungen, die absehbar einen hohen Energieverbrauch haben werden, zu verhindern.

4 METHODENENTWICKLUNG

Die Methode wird zunächst für die Region Shanghai innerhalb eines Forschungsprogramms entwickelt, soll aber in einem weiteren Schritt auch auf andere Megacities und Regionen übertragen werden können.

4.1 Aufbau des LCI

Die Bewertung eines Plans mit Hilfe des Low Carbon Index ist ein komplexer Ablauf mit einigen iterativen Prozessen (siehe 1). Ausgangspunkt ist ein bestehender Plan, welcher mit Hilfe einer Reihe vorab definierter Kriterien bewertet wird. Dazu wird die bereits angesprochene Bewertungsskala nach Punkte genutzt. Dies ergibt eine Analyse der unterschiedlichen Themenbereiche Stadt, Mobilität, Gebäude und regenerative Energien, welche zu einem Gesamtbild zusammen gefasst wird. Diese Bewertung wird mit den ursprünglichen Zielen der Planung abgeglichen. Sollten sich nun Abweichungen und Unterschiede feststellen lassen, muss die Planung überarbeitet werden. Die Bewertung der einzelnen Kriterien hilft dabei, die Schwachstellen genau zu lokalisieren und schneller zu neuen Lösungsmöglichkeiten zu gelangen. Das Ergebnis daraus ist ein neuer bzw. modifizierter Entwurf, der abermals geprüft und bewertet wird. Dieses Verfahren kann so oft wiederholt werden, bis ein gutes Ergebnis entstanden ist.

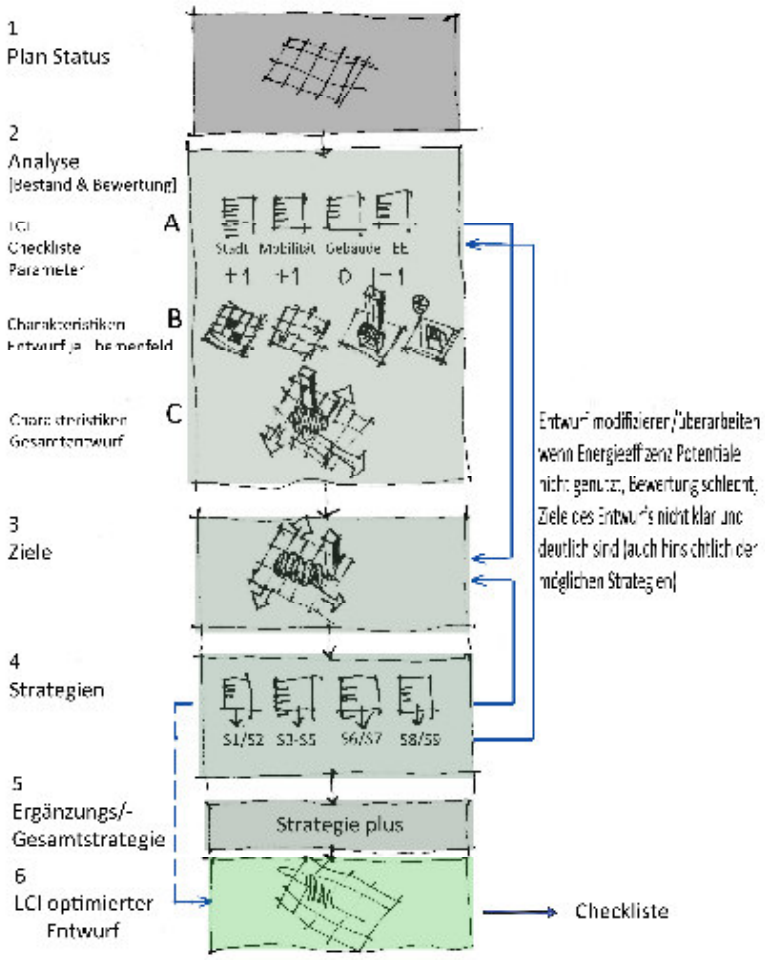

Abbildung 1: Ablauf der Bewertung mit Hilfe des LCI; Quelle: eigene Darstellung

Aus der Bewertung des Entwurfs werden Strategien ermittelt, nach denen die Planung aufgebaut wurde. Dies könnten z.B. im Bereich des Städtebaus „Transit-Oriented-Development“, „Walkability“ oder auch eine „Stadt der kurzen Wege“ sein. Analog dazu gibt es auch Strategien in den anderen Themenbereichen.

Aus den unterschiedlichen Strategien wird anschließend eine Gesamtstrategie für den vorliegenden Entwurf entwickelt, unter der das neu geplante Gebiet entwickelt wird. Der Entwurf muss abschließend an diese Strateige angepasst werden.

Aus dem Entwurf ergeben sich für die eigentliche Umsetzung mit dem Kaufvertrag verknüpfte Guidelines und Checklisten, die von den Investoren und Bauherren eingehalten werden müssen. Diese Checklisten muss während der Realisierung abgearbeitet werden, die Einhaltung wird später von den Verantwortlichen kontrolliert.

4.2 Bewertungsphasen

Wie der Ablauf des LCI zeigt, werden während der Planung eines Gebietes immer wieder neue Bewertungen notwendig. Dies liegt zum einen an der stetigen Verbesserung der Planung und der Anpassung an die Kriterien, zum anderen liegt es daran, dass die Planungen im Laufe des Verfahrens immer stärker detailliert werden. Zu Beginn einer Planung wird auf einem ganz anderen Maßstab gearbeitet als bei der eigentlichen Umsetzung.

Daher wurde der LCI mit seinen Themenfeldern und Bewertungskriterien auf drei Phasen aufgeteilt, die auf unterschiedlichen Maßstabsebenen arbeiten und daher auch unterschiedliche Bewertungskriterien nutzen:

Grundlage von Google Earth und Google Maps

In Phase 1 werden die Grundlagen für die weiteren Planungen gelegt. Es wird auf einem Maßstab zwischen 1:25.000 und 1:10.000 gearbeitet. In dieser Phase steht lediglich das grobe Konzept der Planung im Vordergrund. Daher werden hier ausschließlich die Themenfelder Städtebau und Mobilität bewertet. Es werden Kriterien wie die Standortwahl und die verkehrliche Anbindung an die Stadt betrachtet.

In Phase 2 wird die Planung bis zum Maßstab 1:500 bewertet. Die Planungen sind bereits deutlich konkreter und es können mehr Details bewertet werden. In Phase 2 werden alle vier Themenfelder mit in die Bewertung aufgenommen.

Phase 3 bezieht sich bereits auf die Umsetzung (ab 1:500). Die Bereiche Städtebau und Mobilität spielen nur noch eine untergeordnete Rolle, da auf diesem Maßstab kaum noch Maßnahmen getroffen werden können, die großen Einfluss auf den Energieverbrauch und die CO2-Emissionen haben. Das größte Einsparpotential beim Energieverbrauch liegt in diesem Maßstab bei der Gestaltung und technischen Ausstattung der Gebäude. Zudem kann die Nutzung erneuerbarer Energien eine deutliche Einsparung bei den CO2-Emissionen bewirken.

Im Überblick werden innerhalb der drei Phasen folgende Kriterien mit unterschiedlichen Unterpunkten mit in die Bewertung aufgenommen (Abb. 2).

5 BEWERTUNGSSKALA

Die Skala der Bewertung soll von +2 Punkten bis -2 Punkte reichen. Damit stehen 5 Punkte für eine Bewertung zur Verfügung. Diese relativ einfache Einteilung von sehr gut bis sehr schlecht begründet sich aus dem Umstand, dass der LCI eine relativ grobe Einteilung benötigt. Eine feinere Messskala würde den überschlägigen Einschätzungen zur einfachen Anwendung nicht gerecht werden.

Damit muss die nächste Frage beantwortet werden, welche Planung die obere Grenze (+2 Punkte) erhalten soll und welche Planung umgekehrt die untere Grenze (-2) markiert. Grundsätzlich soll dabei gelten, dass sich die zu entwickelnde Bewertungsskala an der Frage orientieren muss, wie viel die Planung zum Erreichen des vorgegebenen Klimaschutzzieles beiträgt, d.h. welcher Energiebedarf bzw. welche CO2-Emissionen im betreffenden Jahr zu erwarten sein wird.

Festgelegt wurde bereits in den vorhergegangenen Abschnitten, dass eine Planung die maximale Punktezahl erhalten soll, wenn sie erwarten lässt, dass das Effizienzsteigerungsziel erreicht wird. Die Frage ist, welche Planung mit 0 Punkten belegt wird und welche gar mit negativen Punkten bewertet werden muss. In der gegenwärtigen Testphase LCI 1.0 wird der Referenzfall mit 0 Punkten belegt. Die Praktikabilität dieser Festlegung muss selbstverständlich an Beispielen verifiziert werden. Es macht aber Sinn, den Referenzfall, demgegenüber die Verbesserung erreicht werden soll, als Ausgangspunkt aufzufassen. Wenn also die Planung nicht zu einer Verbesserung führt, kann sie auch nicht mit mehr als 0 Punkten bewertet werden.

Aus dieser Festlegung folgt automatisch auch, dass danach die -2-Grenze festliegt. Der Abstand von 0 zu +2 soll gleich groß sein wie der Abstand von 0 zu -2.

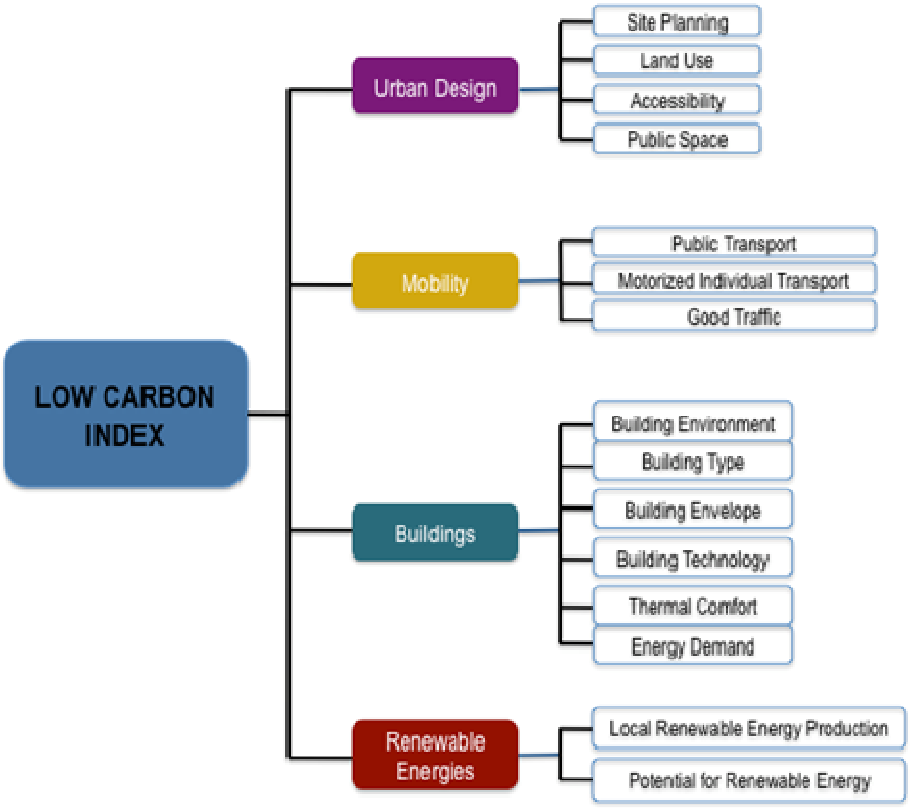

Abbildung 2 Kriterien des LCI nach Themen; Quelle: eigene Darstellung

6 PROBLEMATIK

Die Problematik bei der Entwicklung des LCI liegt vor allem bei der Bestimmung der Bewertungskriterien bzw. ihrer Bewertungsskala. Um die Bewertung eines Low Carbon Indexes festzulegen, ist es notwendig, zunächst zu definieren, was Low Carbon eigentlich bedeutet. Dies ist insbesondere bei der Arbeit in China bzw. in Shanghai besonders schwierig, da es kaum Referenzwerte oder Referenzen aus der Literatur gibt. Die Werte aus europäischen Studien sind darüberhinaus nicht vergleichbar, denn sowohl die Charakteristika der Städte als auch das Richtwerte sind sehr unterschiedlich.

Zudem müssen qualitative und quantitative Kriterien in ein Bewerttungsschema eingepasst werden. Die Problematik liegt insbesondere darin begründet, dass die quantitativen Kriterien berechnet werden können und somit die Einordnung in die Bewertungsskala leicht fällt. Die qualitativen Kriterien müssen jedoch abgeschätzt werden, was die Methode angreifbar macht und zudem die Bewertung in Teilen willkürlich erscheinen lässt. Dazu ist es besonders wichtig, Erfahrungen mit der Anwendung des LCI zu sammeln und diese in die Bewertung einfließen zu lassen.

7 WEITERES VORGEHEN

Der Low Carbon Index ist im Rahmen eines Forschungsprojektes in Shanghai entwickelt worden. Hier wird er zur Zeit an zwei verschiedenen Modellprojekten angewendet und erprobt. Ein Gebiet ist eine Low Carbon Business Area. Das andere Gebiet ist ein großes Wohngebiet für sozial schwächer gestellte Menschen, annähernd vergleichbar mit dem deutschen Sozialwohnungsbau.

Bis zur Konferenz werden die ersten Ergebnisse der Pilotgebiete vorliegen. Außerdem werden die Untersuchungen für Referenzgebiete in Shanghai begonnen haben. Dieses werden präsentiert. Dabei werden sich die Schwachstellen der Methode und des Bewertungsschemas zeigen. Im Verlauf der weiteren Anwendung wird die Methode ständig verbessert und aktualisiert.

🏆 *reviewed paper*

Die Potenziale aktueller WebGIS- und Web-2.0-Entwicklungen als Planungsinstrumente – der Planer als Eichhörnchen?!

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1 ABSTRACT

In Zeiten des WebGIS und des Web 2.0 entstehen für Planer beinahe täglich neue Daten und Instrumente, die frei kombiniert werden können. Diese sollten bereits heute von Planern nicht nur erkannt, sondern auch aufgegriffen, zusammengesetzt und weiterentwickelt werden – denn es kann heute bei der Entwicklung neuer Konzepte nicht mehr darum gehen „das Rad neu zu erfinden“. Wie ein Eichhörnchen kann der Planer sich auf die Suche nach bestehendem Material begeben und dieses zusammen tragen. Mit wenig Aufwand kann so innerhalb kürzester Zeit eine spezifische Sammlung an Informationen und Instrumenten „angehäuft“ werden. Dienlich kann diese gezielte Sammlung in nahezu allen Planungsbereichen sein. Zwei Beispiele, die die Effizienz und den Nutzen einer solchen „Ansammlung“ zeigen, sollen an dieser Stelle dargstellt werden: Zum einen ein Monitoringsystem, bei dem es darum geht Baulandpotenziale im Innenbereich zu überwachen um eine Ausweisung im Außenbereich zu verhindern. Zum anderen wird anhand eines Beispiels aus der Tourismusbranche aufgezeigt, wie mit dieser Methode sowohl die Touristen als auch die Bewohner der Destination und deren Planer davon profitieren können. Beide Projekte zeigen, wie Planer als „Eichhörnchen“ die Städte der Zukunft, auf einfache Art und Weiße, lebenswerter gestalten können und sich nebenbei immer wieder neue „Nüsse“ für ihre nächste „Ansammlung“daraus ergeben.

2 EINLEITUNG

2.1 Die Notwendigkeit des Sammelns

Zunächst stellt sich die Frage, warum der Planer sich überhaupt an der Sammelwut beteiligen soll - zumal immer mehr Unternehmen mit ihrer blinden Sammelwut negativ auf sich aufmerksam gemacht haben. Die Antwort liefert ein altes, aber doch bewehrtes Sprichwort: „Wissen ist Macht!“. Wissen erlangt der Planer jedoch nur durch eine umfassende Informationsbasis, die wiederum aus Daten generiert wurde. Ein einfaches Beipiel aus der Praxis verdeutlicht dies: Die Bestandsaufnahme, die vor jeder Planung durchgeführt werden sollte, ist ebenfalls nichts anderes als das Sammeln von Daten und deren anschließende Auswertung. Je mehr Daten dem Planer vorliegen, desto mehr Informationen kann er später daraus generieren. Die Planung wird dadurch weniger anfällig für Fehler oder Komplikationen. Im Endeffekt gilt damit: Je umfassender die Datengrundlage (Sammlung) umso besser kann geplant werden. Denn nur so kann aus guten Daten „Information“ werden, die anschließend zu „Wissen“ übergeht, mit dem ein (planerischer) „Mehrwert“ generiert werden kann. Dies ist die primäre Aufgabe von Planungsinformationssystemen: Sie sollen Wissen generieren und bereit stellen, um Planungsdiskurse zu unterstützen und Planungsentscheidungen herbeizuführen [Streich 2005:248]. Dabei sollten Informationen und Wissen unter anderem nach folgenden Gesichtspunkten aufgearbeitet werden [nach Kaiser et al. 1995:90]: Die Beschreibung historischer Abläufe und und der gegenwärtigen Situation, die Vorrausschätzung zukünftiger Entwicklungen, und vor allem das Beobachten (das „Monitoring“) also die Erfassug und Interpretation von Veränderungen und deren Diagnose und Bewertung.

2.2 Das Objekt der Begierde

Wie zuvor erläutert wurde, lohnt sich die Sammlung vieler Daten – doch diese stellen nur einen Teil dessen dar, was sich für den Planer zu sammeln lohnt. Denn neben den Daten können auch frei verfügbare Softwaretools als Arbeitswerkezug mit den zugehörigen Methoden und der Anwender, der Mensch an sich, Daten liefern, Daten generieren oder in einen neuen Kontext stellen.

Geoinformationssyteme sind aus dem heutigen Planungsalltag nicht mehr weg zu denken. Sie binden Geodaten in eine anwendbare Struktur und erleichtern so unseren Alltag. Im Grunde könnte man bereits hier sagen, dass es sich um Sammeln handelt, denn schließlich werden die Geodaten in einer Datenbank „gesammelt“. Neben den Geodaten besitzen Geoinformationssysteme jedoch noch drei weitere

Komponenten: Hardware, Software und den Anwender. Das interessante ist nun, auch in den beiden letzt genannten zu sammeln. Im Folgenden wird dies an zwei praktischen Beispielen aufgezeigt. Die „Sammelschwerpunkte“, sprich das „Objekt der Begierde“, ist dabei recht unterschiedlich.

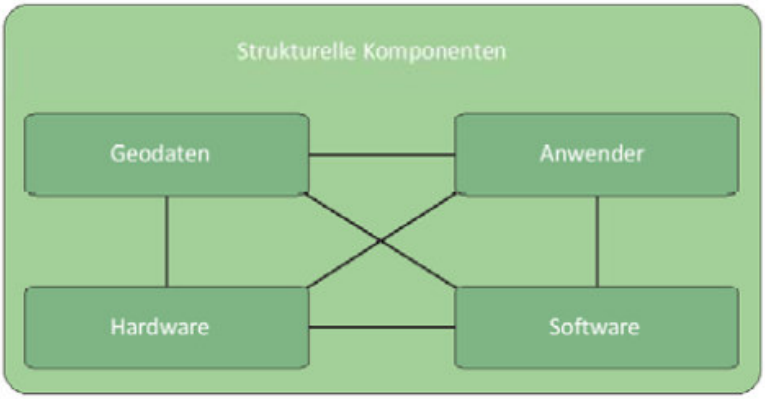

Abb. 1: Strukturelle Komponenten eines Geoinformationssystems

3 ARBEITEN ODER ARBEITEN LASSEN? DIE ZWEI MÖGLICHKEITEN DES SAMMELNS!

Die Herangehensweise des Sammelns unterscheidet sich in den beiden Beispielen von Grund auf. Das erste Beispiel erläutert die Sammlung von Daten „per Hand“. Das heisst, der Planer generiert die benötigten Daten selbst. Im Folgenden wird diese Vorgehensweise als „aktives“ Sammeln beschrieben. Das zweite Beispiel hingegen, veranschaulicht, wie durch Social Networking die begehrten Informationen durch die Anwender generiert werden. Diese Vorgehensweise wird als „passives“ Sammeln beschrieben, da der Planer hier nach erfolgreicher Einrichtung des Systems nur noch auf den Input der Anwender warten muss. Das sogenannte Crowd Sourcing kann, bei richtiger Anreizschaffung, die Zukunft der Datenbeschaffung für die Planung stark verändern.

3.1 Aktives Sammeln am Beispiel eines Flächenmonitoring-Systems

Wie bereits erwähnt, nimmt der Planer bei dem Flächenmonitoring-System eine aktive Rolle als Sammler ein. Er muss sich im Vorfeld auf die Suche nach den passenden Daten begeben und diese sinnvoll miteinander kombinieren. Im Rahmen dieses Projektes bezieht sich der Sammelprozess hauptsächlich auf die Auswahl der richtigen Softwarekomponenten sowie die Erstellung einer Geodatenbank, in welcher die Flächeninformationen gesammelt werden. Aufbauend auf dieser Sammlung ist ein WebGIS basiertes Flächenmonitoring-System entstanden, welches den Flächenverbauch langfristig reduzieren soll.

3.1.1 Problemstellung und Zielsetzung des Projektes

Siedlungswachstum und –schrumpfung liegen heute in deutschen Kommunen oft nah beieinander – obgleich es sich hierbei um konträre Entwicklungen zu handeln scheint. Doch während in vielen Kommunen die Innenstädte zunehmend von Leerständen, Baulücken und Brachen geprägt sind, werden im Außenbereich Neubaugebiete ausgewiesen. Etwa 100 ha werden so bundesweit jeden Tag an natürlicher Landschaft verplant oder zum Bau freigegeben. Diese Entwicklung muss zusätzlich im Kontext der schrumpfenden und zunehmend überalterten Bevölkerung gesehen werden.

Die Problematik des zunehmenden Flächenverbauchs wird auf Bundesebene unter anderem in der Nationalen Nachhaltigkeitsstrategie behandelt. Hier ist das Ziel verankert, die Flächeninanspruchnahme bis zum Jahr 2020 auf 30 ha zu reduzieren. Als unterstützendes Leitbild ist in diesem Kontext die Flächenkreislaufwirtschaft zu verstehen. Diese liegt einer Strategie zu Grunde, bei der die systematische Abschöpfung von Potentialen der Bestandsentwicklung und eine Inwertsetzung von Brachflächen im Vordergrund stehen. Die Flächenkreislaufwirtschaft ist das langfristige Ziel der nachhaltigen Siedlungsentwicklung. Ein Etappenziel auf diesem Weg ist das Flächenmanagement, welches ein Instrument zur Steuerung und Regulierung der künftigen Nutzungen und Flächeninanspruchnahmen ist. Flächenmanagement baut auf den umfassenden Vorarbeiten des Flächenmonitorings auf. Dieses Instrument ermöglicht eine Erfassung, Beobachtung und Dokumentation von Potentialflächen. Daher ist Flächenmonitoring als der wesentliche Startpunkt hin zu einem Flächenmanagement bzw. langfristig zu einer Flächenkreislaufwirtschaft zu sehen. Das Flächenmonitoring-System, das im Rahmen dieses Projektes

entwickelt werden sollte, bietet den Gemeinden ein kostengünstiges Instrument mit welchem Sie die gesammelten Informationen übersichtlich erfassen und aufbereiten können, um so einem weiter wachsenden Flächenverbrauch entgegenzuwirken. [KEBBEDIES, et.al., 2008]

3.1.2 Aufbau des Flächenmonitoring-Systems

Für den Aufbau des Flächenmonitoring-Systems muss der Planer als Sammler aktiv werden. Hierbei muss er die unterschiedlichsten Daten zusammensuchen und miteinander kombinieren. Diese Daten lassen sich in zwei unterschiedliche Kategorien bzw. Sammlungen unterscheiden. Die erste Sammlung stellt dabei den Aufbau des WebGIS dar. Zunächst muss eine passende Benutzeroberfläche für das WebGIS des Flächenmonitoring-Systems gefunden werden. Hierfür wurde die mapbender Software zurückgegriffen, da diese alle benötigten Funktionen mit sich bringt. Da der mapbender allerdings alleine nicht lauffähig ist wurden noch weitere Softwarekomponenten gesammelt werden. Hierzu zählen neben dem Webserver Apache, die PostgreSQL Datenbank sowie die Erweiterung Postgis. Aufbauend auf den nun vorhandenen Softwarekomponenten wurde im Rahmen des Projektes ein Flächenmonitoring-Portal für die Verbandsgemeinde Altenglan in Rheinland-Pfalz errichtet. Bevor mit der Ansammlung der eigentlichen Inhalte begonnen wurde musste noch eine Kartengrundlage gefunden werden. Eine passende Liegenschaftskarte wurde durch einen WMS-Dienst des Landesvermessungsamtes Rheinland-Pfalz (LVermGeo.RLP) gefunden. Für die Einbindung eigener Karteninhalte wurde ebenfalls ein eigener WMS-Dienst eingerichtet, wobei hierfür auf die UMN MapServer Software zurückgegriffen wurde.

Nachdem die erste Sammlung komplettiert und die technische Infrastruktur des WebGIS aufgebaut wurde, kann mit der zweiten Datenansammlung begonnen werden. Diese enthält die eigentlichen Inhalte des WebGIS. Da sich das Projekt auf ein Flächenmonitoring-System für Baulücken bezieht, ist das Objekt der Begierde nun zunächst die Baulücke ansich. Nachdem zunächst der Begriff der Baulücke definiert wurde, konnte ein passendes System zur Filterung der Baulücken erstellt werden. Dieses war notwenig, da zwar alle benötigten Daten vorhanden, aber nicht frei verfügbar waren, d.h. sie konnten nur behördenintern bearbeit werden. Ein weiterer Grund für die Erstellung einer eigenen Sammlung war, dass sich bestimmte Daten auf grund unterschiedlicher Formate nicht miteinander kombinieren liessen. Nachdem ein passendes Filtersystem für die Baulücken erstellt wurde, liessen sich diese schnell identifizieren. Neben den Flächen an sich mussten diese noch mit Attributen beschrieben werden. Hierfür wiederum waren zum einen die Open Source Software QuantumGIS sowie bestehende WMS-Dienste des LVermGeo.RLP hilfreich.

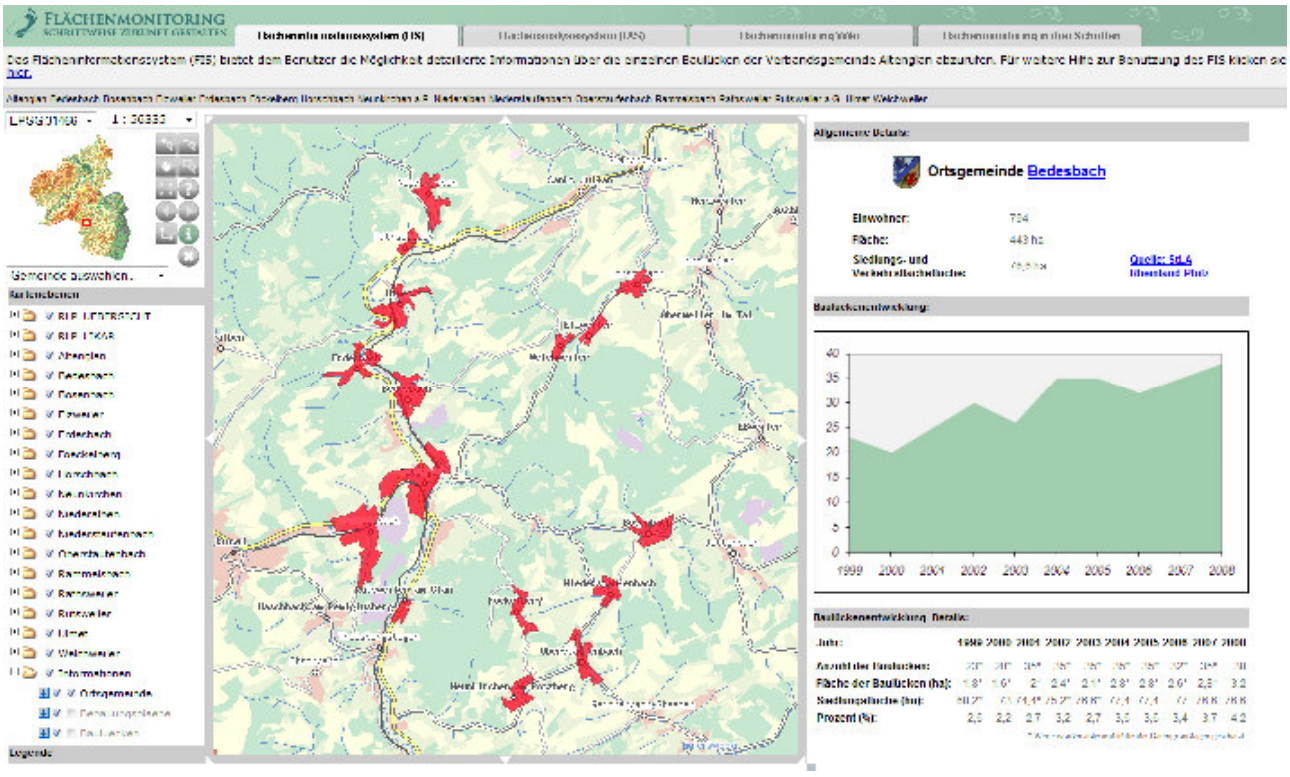

Abb. 2: Baulückenentwicklung der Ortsgemeinde Bedesbach

Nachdem nun alle notwendigen Daten gesammelt wurden konnten diese in das WebGIS, welches unter http://flaechenmonitoring.arubi.uni-kl.de erreichbar ist, eingebunden werden. (Vgl. Abb. 2,3,4)

Durch eine kontinuierliche Aktualisierung und Fortschreibung der Daten ist es der Gemeinde möglich ihre Flächenpotentiale in Form von Baulücken zu erfassen. Werden die Daten über einen längeren Zeitraum gesammelt kann die Gemeinde Statistiken über ihre Baulückenentwicklung erstellen (Vgl. Abb. 2) und darauf aufbauend ihr weiteres Handeln anpassen.

Das bestehende System lässt sich problemlos zu einem behördeninternen Flächenanalysesystem (FAS) erweitern. Dieses bietet der Gemeinde die Möglichkeit ihre Flächenpotentiale weiter zu analysieren. Auf grund von sensiblen Daten ist dieses durch ein Passwort geschützt und nicht öffentlich zugänglich. Der Gemeinde stehen hier zusätzliche Analysewerkzeuge zur Verfügung mit denen es möglich ist ihre Flächeninanspruchnahme gemäß der Nationalen Nachhaltigkeitsstrategie zu reduzieren. Hierzu werden die bestehenden Baulücken je nach ihrer Verfügbarkeit in zwei Kategorien unterteilt, unterschiedlich gewichtet und mit dem Schwellenwert des Regionalen Raumordnungsplanes verrechnet. Durch diese Verrechnung lässt sich eine Handlungsempfehlung für die weitere Entwicklung der Gemeinde ableiten. Sind so z.B. noch genügend Flächenpotentiale in Form von Baulücken vorhanden ist von einer neuen Baulandausweisung abzuraten.

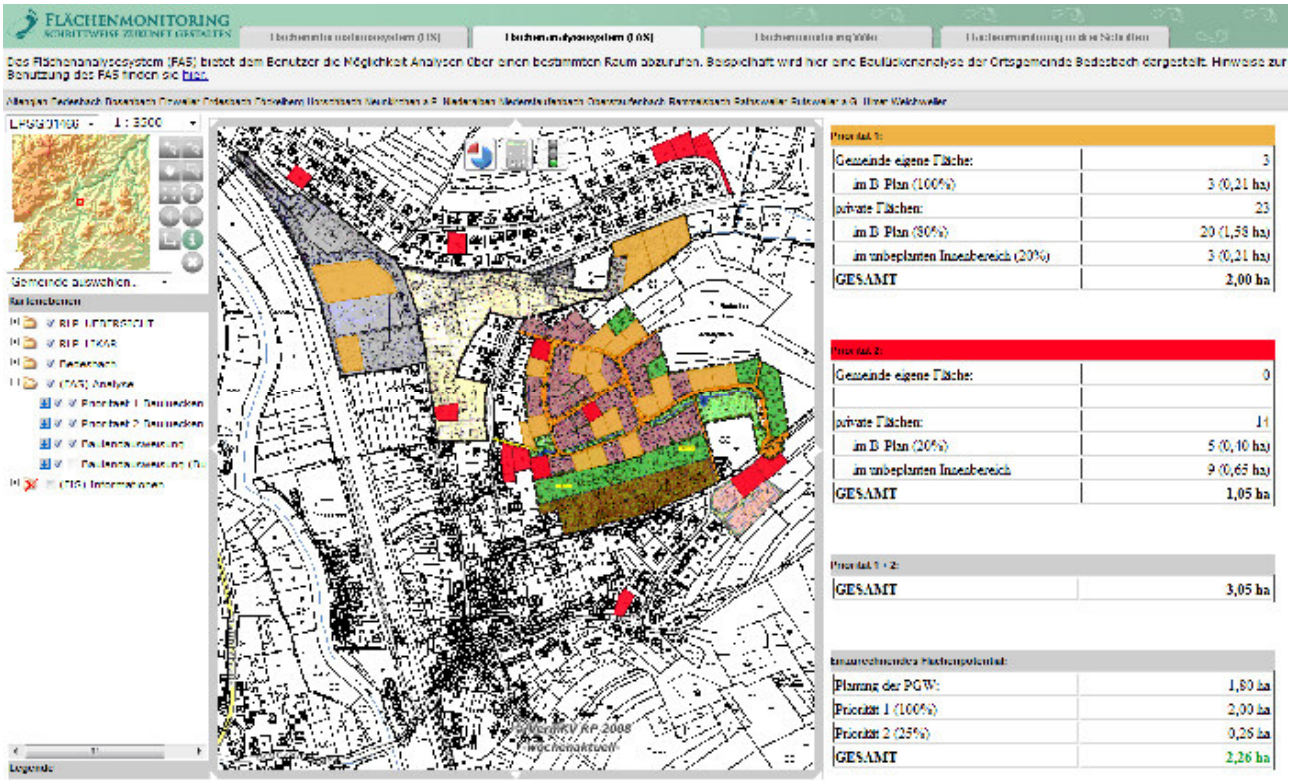

Abb. 3: Flächenpotentialberechnung des FAS

Neben dem behördeninternen FAS lässt sich auf Grundlage der zuvor gesammelten Daten ein Flächeninformationssystem (FIS) einrichten. Dieses bietet der Gemeinde vor allem die Möglichkeit, der Öffentlichkeit allgemeine Informationen über die Baulücken zur Verfügung zu stellen. So können interessierte Anwender, welche z.B. auf der Suche nach einem Baugrundstück sind, sich detailliert über alle für Sie in Frage kommenden Flächen informieren. Der Anwender kann so z.B. die genaue Größe des Grundstücks, den Preis pro m² oder die Flurstücksnummer erfahren (Vgl. Abb. 4). Wichtig hierbei ist, dass aus Datenschutzgründen keine persönlichen Informationen, wie z.B. die Namen der Grundstückseigentümer, veröffentlicht werden.

Das Beispiel des Flächenmonitoring-Systems zeigt, wie das Sammeln von Daten in mehrfacher Hinsicht hilfreich für den Planer und die Gemeinde sein kann. Zum einen können durch die gesammelten Daten und deren Kombination nützliche Informationen für die Gemeinde und die Bevölkerung generiert werden, welche es der Gemeinde ermöglichen kann aktuell nicht oder fehlgenutze Flächen wiederzubeleben. Zum anderen kann durch die Erweiterung des FAS die aktuelle Situation der Baulücken besser erfasst und

analysiert werden, wodurch eine ggf. unnötigen Flächeninanspruchnahme im Aussenbereich vermieden werden kann. [KEBBEDIES, et.al., 2008]

Durch eine Einbindung der Daten in bestehende Portale wie z.B. das Geoportal Rheinland-Pfalz (www.geoportal.rlp.de), kann eine flächendeckende Sammlung angelegt und somit eine Grundlage für ein landesweites Flächenmonitoring geschaffen werden. Das Geoportal Rheinlandpfalz ist eine eine Informations- und Kommunikationsplattform für Geodaten, Geoinformationen und Geodienste in Rheinland-Pfalz, das von allen Kommunen des Landes genutzt werden kann.

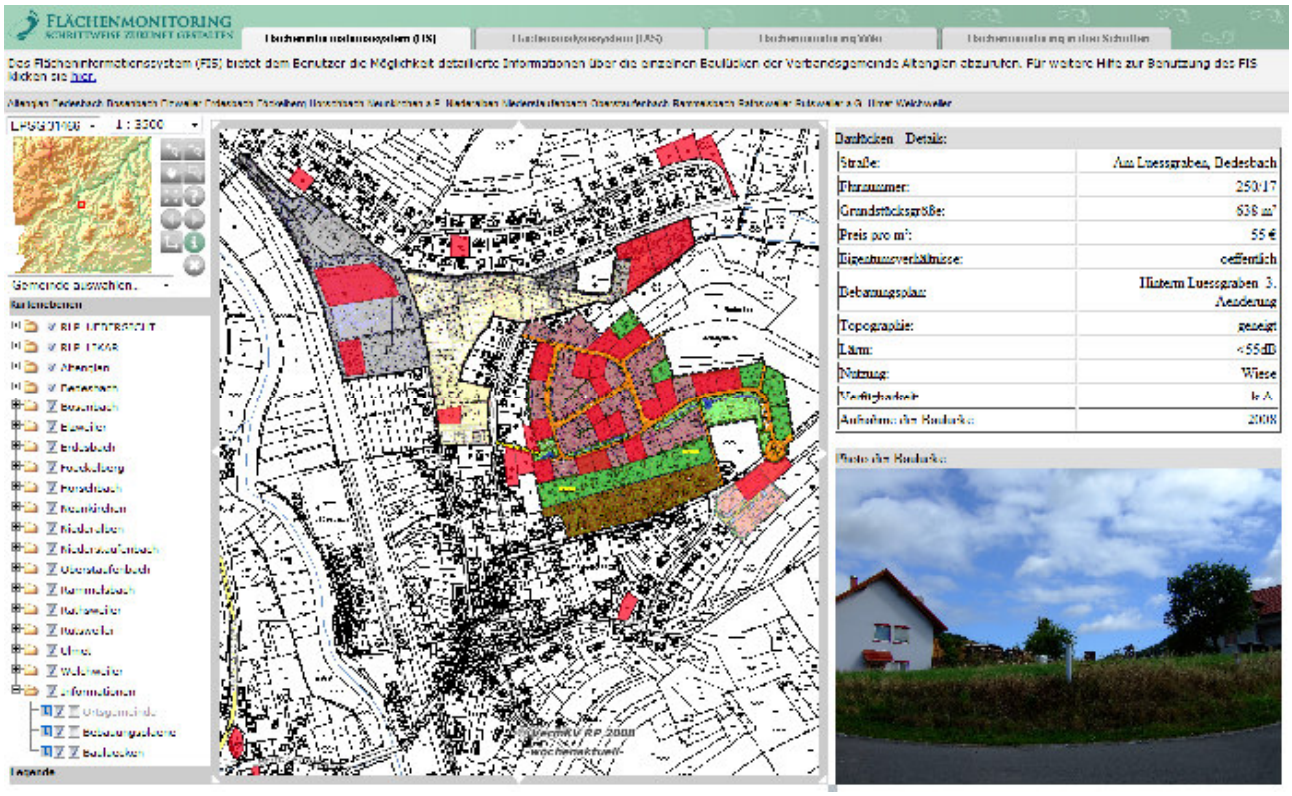

Abb. 4: Das Flächenmonitoring-System als öffentliches Flächeninformationssystem (FIS)

3.2 Passive Sammeln am Beispiel eines Social Networks

Das zweite Beispiel in diesem Rahmen ist ein touristisches Social Network, das für die Stadt Alexandria in Ägypten entwickelt wurde. Im Grunde genommen sind Social Networks nichts anderes als ein gigantischer Pool an Informationen – je nach Bereich in dem das Netzwerk angesiedelt ist (Kontaktpflege, Wandern, Fotos etc.), handelt es sich folglich um unterschiedliche Daten. Touristische Social Networks sind deshalb in diesem Zusammenhang so interessant, weil sie Geoinformationen generieren- schließlich ist jedes auf FlickR lokalisierte oder auf Qype (www.qype.de) bewertete Restaurant nichts anderes! Viele dieser Netzwerke sind daher im Grunde auch als Geoinformationssysteme zu verstehen. Im Gegensatz zu dem zuvor aufgeführten Beispiel des Flächenmonitoring-Systems müssen Planer hier jedoch nicht selbst mühsig Daten eingeben. Die aus der Menge generierten und damit Passiv gesammelten, Daten (Stichwort „Crowed Sourcing“) können direkt verwendet werden. An dieser Stelle kann nun noch einen Schritt weiter gegangen werden: Durch die geschickte Erstellung eines eignen Social Networks können Städte, bzw. Destinationen allgemein, gezielt Informationen für Planungsentscheidungen erzeugen. Wie einfach diese Idee umzusetzen ist sollte im Rahmen eines Experimentes namens „Alexplore“ in der Mittelmeermetropole Alexandria getestet werden. [PICH, 2009]

3.2.1 Problemstellung und Zielsetzung des Projektes „Alexplore“

Social Networking ist mittlerweile in nahezu alle Lebensbereich eingedrungen. Schon lange geht der Nutzen darüber hinaus, den Kontakt mit ehemaligen Schulfreunden aufrecht zu erhalten. Vor allem im Geschäftsleben (z.B. Xing) und im Bereich des Tourismus haben sich die Netzwerke bewährt. In Letzterem wird dabei in Form des bereitgestellten Contents eine Fülle an Informationen generiert, die unsere Städte beschreiben und auch analysieren. Es ist daher eine logische Schlussfolgerung, dass die Planer dieser Städte

sich mit dieser Materie beschäftigen sollten. Dabei ist es jedoch nicht nur wichtig, sich aktiv in den Austausch einzubringen, sondern auch die daraus entstehenden Potentiale zu erkennen und zu nutzen. So entstehen in den Netzwerken beispielsweise Geoinformationen, die für die Planung elementar sein können. Durch den zunehmenden Einsatz mobiler Endgeräte (Stichwort: Mobile Social Networking) werden diese generierten Daten zudem immer aktueller und die Anwendung benutzerfreundlicher. Vorteile können dabei für alle entstehen: Touristen, Planer, Stadtverwaltungen und auch die lokale Bevölkerung. Die Schlüsselrolle für das Aufgreifen dieser Potentiale besitzen die Planer der Städte. Sie sind es, die in der Verantwortung stehen, die Potentiale zu erkennen und sie sowohl für ihre Gäste wie auch Bewohner der Stadt, verfügbar zu machen. Diese Mühe lohnt sich, denn Social Networking birgt ohne jeden Zweifel die Chance einen Beitrag zur nachhaltigen Verbesserung oder Wahrung der Qualität unserer Städte beizutragen.

Die in Folge von Social Networking entstehenden Potenziale werden bislang aber noch zu wenig erkannt oder gar genutzt. Vor allem im Bereich touristisch relevanter Netzwerke können äußerst hilfreiche Informationen generiert werden. Zum Teil sind diese bereits vorhanden und müssen lediglich erkannt werden, zum anderen bieten die Portale eine geeignete Basis um gezielt Informationen nach Bedarf zu gewinnen. Ziel des Projektes war es die Potentiale, die in Folge des Social Networking im Tourismus entstehen, aufzuzeigen und darzulegen in wie fern diese von Planern bereits aufgegriffen und verwendet werden können. [PICH, 2009]

Aufbau des Social Networks

Bei näherer Betrachtung touristisch relevanter Social Networks fällt rasch auf, dass sich zwei Trends herauskristallisieren: Zum einen wird die Verortung der Informationen (z.B. Fotos im Portal FlickR, Videos auf YouTube oder auch Wikipedia-Artikel) immer wichtiger und zum anderen haben die Netzwerke die Potentiale der mobilen Nutzung erkannt und darauf (zum Teil) reagiert. Beide Trends haben dabei einen großen Vorteil: Wie bereits zuvor erwähnt, werden durch die Verortung des Contents Geoinformationen erzeugt – Mobile Social Networking macht diese zusätzlich „top aktuell“. Entscheidend ist dies in diesem Zusammenhang vor allem bei Bewertungen. Diese werden nun nicht mehr drei Wochen nach dem Urlaub ins Portal eingegeben, sondern direkt wärend des Restaurantbesuchs. So können die tatsächlich aktuell vorhandenen Emotionen „aufgefangen“ werden, ohne dass sie durch übrige Erfahrungen des Urlaubs verfälscht werden. Zudem besteht so die Möglichkeit eine größere Bandbreite an Daten zu erhalten, da die Bewertung vom Touristen nicht vergessen wird. (Vgl. RUFFING, 2009] Da in das zu entwickelnde Netzwerk Bewertungen eingebunden werden sollten, war es ein Ziel dieses Netzwerk auch auf Smartphones nutzbar zu machen.

Eine weitere Determinante gab die Stadt Alexandria selbst vor. Die ägyptische Mittelmeerstadt, besitzt kaum Touristen aus dem Ausland – obgleich sie durchaus das Potenzial hierzu hätte: Lange Sandstrände, türkisblaues klares Meer und Spuren des „Alten Alexandrias“ machen die Stadt zu einer Interessanten Destination. Hinzu kommt, dass das 20. Jahrhundert die Stadt zu einem Schmeltigel der Kulturen gemacht hat. Noch heute ist der griechische, englische und italienische Einfluss in der Stadt spürbar. Das größte Problem ist jedoch recht simpel: Niemand weiß das alles außerhalb der Landesgrenzen oder gar in Europa. Alexandria wird meist von den großen ägyptischen Zielen, allen voran Hurghada und Assuan, überschattet. Die meisten Reisebüros haben die Stadt allenfalls als „Abstecher“ von Kairo aus oder im Rahmen einer Mittelmeerkreuzfahrt im Programm. Folglich kommt wohl kaum jemand auf die Idee, Alexandria zu besuchen. Ein weiteres Ziel des Portals war es daher auf die Stadt aufmerksam zu machen und ausgiebig über sie zu informieren. Zudem sollte dort auch die Angst vor einem individuellen Besuch der Stadt (also nicht im Zuge einer Pauschalreise) gemildert werden.

Auf der Basis dieser definierten Determinanten wurde anschließend das Portal „Alexplore“ entwickelt. Der Name setzt sich dabei aus der Abkürzung Alexandrias (Alex) und dem englischen Verb „to explore“, was auf Deutsch soviel bedeutet wie „erforschen“ oder „erkunden“, zusammen. Genau dazu soll mit Hilfe des Portals motiviert werden: Alexandria zu erkunden, denn es ist eine Stadt, die eine Vielzahl erlebnisreicher Momente bereit hält - sofern sich die Touristen darauf einlassen.

Alexplore besteht sowohl aus einem „normalen“ Webauftritt als auch aus einer mobilen Anwendungsmöglichkeit. Der Webauftritt wurde mit Hilfe des Content-Management- artigen Blog-Systems Wordpress (www.wordpress.org) aufgebaut. Die Nutzung eines Blogs als Basis hat den Vorteil, dass er leicht zu erstellen und pflegen ist. Zudem kann problemlos eine Community erstellt und verwaltet werden.

Neben verschiedenen Informationskategorien, die alle von der Community mitgestaltet werden können, gibt es eine Sidebar. Diese dient hauptsächlich der Vernetzung mit weiteren Social Networks, wie FlickR, YouTube oder Facebook. Das eigentliche Kernelement der Seite ist jedoch die „AlexInfoMap“, die auf GoogleMaps basiert. Hier ist es für jeden, jederzeit möglich Content einzuzufügen, der direkt für alle anderen Nutzer der Seite verfügbar ist. Dies birgt natürlich das Risiko fehlerhafter, „unpassender“ oder schlicht illegaler Informationen. Daher gibt es jeweils eine Unterscheidung in Community- und Official-Layer. Das heißt jeder der Layer ist doppelt vorhanden. Die Layer entsprechen einzelnen, für den Touristen interessanten, Kategorien, wie beispielsweiße Hotels, Strände oder Shoppingmöglichkeiten. (Vgl. Abb. 5)

Abb. 5: Die AlexInfoMap ist das Zentrum von Alexplore

Mit Hilfe eines entsprechenden PlugIns wird Alexplore für Smartphones optimiert. Zu Nutzung der AlexInfoMap müssen jedoch die Layer als ZIP-Paket heruntergeladen und über die GoogleMaps-Applikation auf dem Smartphone geöffnet werden – ein großes Manko, da hierdurch die Aktuallität der Daten verloren geht. Zur Nutzung der top aktuellen Daten muss daher (noch) die unangepasste Seite auf dem Smartphone verwendet werden. Zur Nutzung der AlexInfoMap bedarf es jedoch einiges an Fingerspitzengefühl (Vgl. Abb. 7).

Entscheidend für das eigentliche Datensammeln sind die unterschiedlichen Bewertungstools, die an mehreren Stellen angebracht wurden. Zum einen gibt es jeweils am Ende der Wordpress-Seiten einen „MicroPoll“, zum anderen kann jeglicher Content der AlexInfoMap bewertet werden. Hierzu werden in den Official-Layern ebenfalls MicroPolls verwendet. Die Bewertung des Contents der Community-Layer wurde hingegen selbst programmiert. Hierzu diente eine entsprechende Vorlage aus dem Internet, die für diese Zwecke modifiziert wurde. Dies ist natürlich weitaus aufwendiger als die Nutzung der MicroPolls, die recht einfach in einem Internetportal erstellt und über einen Einbettungscode integriert werden können. Allerdings bietet es auch mehr Möglichkeiten. Da die Möglichkeit des Hinzufügens von Content ohnehin selbst programmiert bzw. ebenfalls auf Basis einer Vorlage modifiziert werden musste, bot sich an dieser Stelle der Versuch an. Mit bis zu fünf Sternen können so vier Kriterien (Wohlfühlfaktor, Sauberkeit, Preise, Service) bewertet werden. (Vgl. Abb. 6)

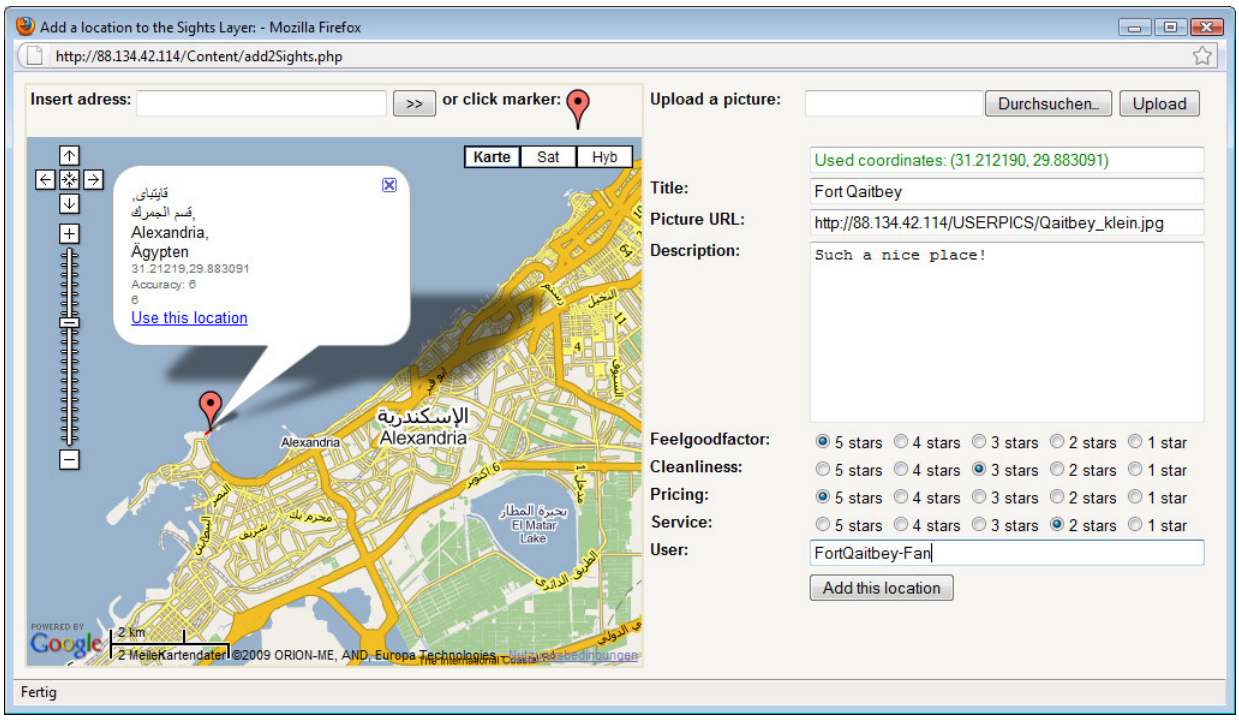

Abb. 6: Auf der AlexInfoMap können eigene POIs gesetzt und direkt bewertet werden

Abb. 7: Darstellung von Alexplore auf Smartphones, links mit Mobile-PlugIn – rechts ohne

Ein zusätzlicher Layer “außer der Reihe” ist der “Feelgood”-Layer. Er soll Ortsfremden einen Anhaltspunkt bieten, wo “man hingehen kann” und wo besser nicht. Touristen die den Stadtteil bereits besucht haben können hier Angaben dazu machen wie sich sich dort gefühlt haben und wieso. Hier ist nun der Punkt, an dem das gezielte Sammeln die größte Überschneidung mit der Raumplanung besitzt. Durch geschickte Auswahlmöglichkeiten können dem Besucher hier Aussagen entlockt werden, an die er so sonst wohl nicht gedacht hätte. Geben nun zum Beispiel viele Besucher an, es gäbe zu wenige Querungsmöglichkeiten an der Straße, kann entsprechend reagiert werden. Die Probleme zu kennen ist der erste Weg sie zu lösen!

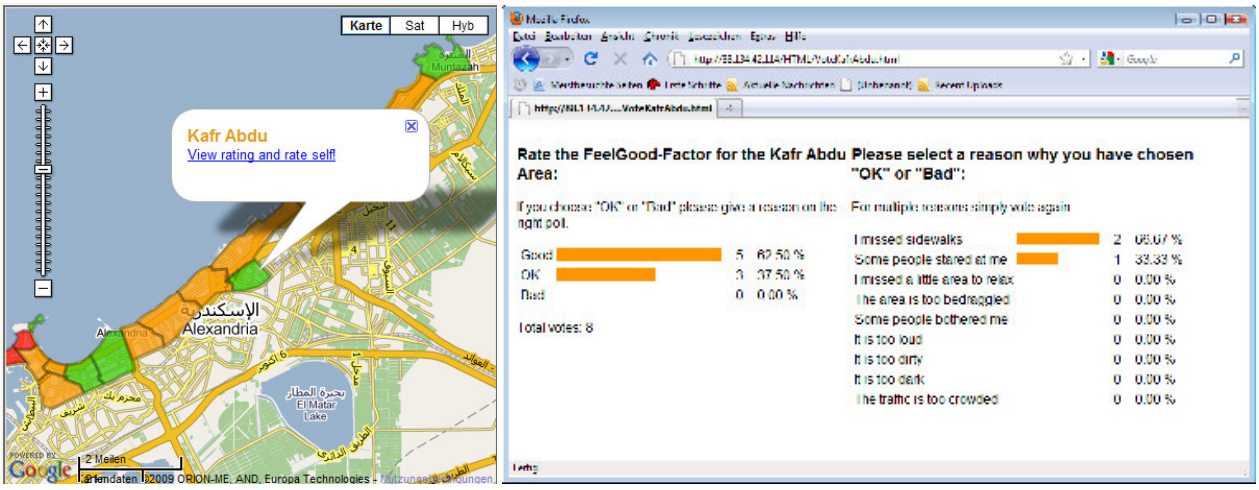

Abb. 8: Im Feelgood-Layer werden städtische Komponenten direkt bewertet

Je nach städtischer Problematik kann dieses Bewertungstool (und natürlich auch alle anderen) angepasst werden. Das Beispiel Alexandria zeigt, dass es auf viele verschiedene Arten möglich ist, gezielt Informationen zu erhalten – ohne wie bislang aufwendige Erhebungen durchzuführen. Selbstverständlich ist hier nicht „alles Gold, was glänzt“, zweifelsohne wirft das Konzept zahlreiche Probleme auf. Dennoch zeigt es die Möglichkeiten, die wir als Planer bereits heute besitzen. Es zeigt durch dass durch die Sammlung verschiedener Instrumente (Worpress, GoogleMaps, MicroPolls, etc.) und durch den Aufbau einer Community (dies entspricht im weitesten Sinne der „Sammlung von Menschen“) ein Pool an raumplanerisch interessanter Informationen angelegt werden kann. [PICH, 2009]

4 CONCLUSION

Die beiden Beispiele zeigen auf sehr unterschiedliche Weise zum einen wie gesammelt werden kann und zum anderen, was hierdurch möglich ist. In beiden Projekten wurde ein eigenes Geoinformationssystem aufgebaut. Während das Flächenmonitoring-System dem klassischen Planungungsalltag entspringt, ist Alexplore als ein Experiment zu sehen, dass die Grenzen des Sammelns austesten sollte. Neben der Sammlung von Geodaten und möglicher Software wurden für Alexplore auch die Anwender „gesammelt“. Beide Ansätze, haben zweifelsohne ihre Daseinsberechtigung – es ist allerdings unbedingt notwendig sie hinsichtlich ihrer Intention zu unterscheiden. Passives Sammeln wird immer nur dort Sinn machen, wo ohnehin Bürger eingebunden werden sollten bzw. sich dieses zur Information anderer Bürger anbietet (z.B. im Sinne von Bewertungstools). Damit hätte dies beispielsweise für den Aufbau eines Flächenmonitoring-Systems keinen Sinn ergeben. Hier geht es darum zielgerichtet Daten zusammenzustellen – der Nutzer dieser Datensammlung ist meist auch der Ersteller. Bei Alexplore ist der Planer ebenfalls der Nutzer – jedoch steht er gleichberechtigt neben dem Bürger bzw. im Falle von Alexplore dem Touristen. Es geht hierbei um eine win-win-Situation. Der Planer erstellt die Infrastruktur zur Sammlung und bietet damit dem Touristen etwas. Dieser wiederum „revanchiert“ sich, indem er dem Planer Daten generiert, die dieser für seine Planungen verwenden kann. Hiervon profitiert letztenendlich auch der Bürger bzw. Tourist, denn durch eine bessere Planung, werden unsere Städte lebenswerter. Das Flächenmonitoring-System kennt diese Art von Kreislauf nicht. Hier erarbeitet sich der Planer eine Datengrundlage, die er -auch- als Bürgerservice zur Verfügung stellt. Daher ist eine Kombination der beiden Ansätze auch nur bedingt möglich. Im Falle des Flächenmonitoring-Systems ist eine genaue und zuverlässige Datengrundlage zwingend notwendig. Diese lässt sich allerdings nur mit dem nötigen Fachwissen erstellen, daher kann der Bürger die Gemeinde maximal auf mögliche Flächen aufmerksam machen, wodurch allerdings die „Datenfindung“ der Gemeinde beschleunigt werden kann. Eine ähnliche Situation bietet sich bei dem Beispiel Alexplore, hierbei wird insbesondere auf Aktualität und Subjektivität der Daten Wert gelegt. Da diese möglichst umfangreich bzw. breit gefächert seien sollen, ist das Hinzufügen von Daten seitens des Anbieters nur eingeschränkt sinnvoll.

Bei all den Potenzialen und Vorzügen, die das Sammeln bietet, dürfen Planer jedoch auch nie vergessen, dass sie neben dieser Verantwortung noch eine weitere besitzen: Sich zu fragen wo die Grenze all dessen ist! Dies bezieht sich sowohl auf die Bereitstellung von Daten (Stichwort: Datenschutz) aber auch auf deren

Generierung. Denn wenn die Daten nicht vom Planer selbst erhoben werden, besteht immer das Risiko, dass diese falsch sind.

Werden die Grenzen jedoch eingehalten, können alle Sammlungen der Planer gemeinsam die Städte von morgen nachhaltig gestalten – in diesem Punkt unterscheiden sie sich also doch vom Eichhörnchen!

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reviewed paper

Developing a Typology of Public Participation 2.0 Users: an Example of Nexthamburg.de

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1 ABSTRACT

This paper outlines the development of public participation 2.0 user types based on the existing Web 2.0 user types. The theoretical concepts were tested on nexthamburg.de, a public participatory platform enabling the users to exchange the ideas about the future of the city Hamburg. Existing Web 2.0 user typologies classify users according to their activity and according to their communication with Web 2.0. We adapt these user types for the needs of public participation and test them on our study case with nexthamburg.de. We classified users according to their interaction into passive, active and reactive users. The underlying functions of the website, on which the study is based, are the posting of ideas, commenting on ideas and voting for ideas. This article presents the results of the first study phase, based on the quantitative data gathered with the help of eTracker and the website's database. eTracker is a software that tracks the behaviour of the users and their interaction with the platform. We aim at getting on overview of how people interact with a public participation platform and to classify the interaction forms and the user types in order to better understand the possible uses of public participatory platforms.

2 INTRODUCTION

The use of multimedia technologies facilitates new forms of integrating citizens into urban planning. The implementation of multimedia and interactive functions has the potential to introduce innovative forms of participation based on Web 2.0 technologies. With the integration of this concept, public participation becomes public participation 2.0 (PP 2.0) "using the new media to reach out to wherever citizens are active, including cyberspace" (Sommer and Cullen 2009: 2). Public participation 2.0 describes the usage of Web 2.0 technology for the purpose of public participation. Both concepts, Web 2.0 and PP 2.0, encourage and enable citizens /users to produce content, an idea, or even a network on the internet.

Providing content and instruments for public participation 2.0 necessitates the need to know who the users are, and how they interact with web-content and with each other. These two questions are of interest to us. On the basis of our research on interaction with a public participation platform we aim at developing innovative methods of presenting web-content for the purpose of public participation to foster an "active participation" and a high level of interaction. "Active participation" has a high position on the ladder of participation, introduced by many researchers such as Arnstein (1971) and Kingston (2007), and includes two-way participation and involvement in the decision-making process.

Our work introduces the development of a user typology for the case study nexthamburg.de. Nexthamburg is a public online think tank for the Hamburg of Tomorrow. On the basis of online postings, nexthamburg.de develops visions, strategies and concrete ideas about contemporary issues of concern by citizens in Hamburg, Germany. Everybody is welcome to post an idea; and every idea or vision that appeals to the other users, who have the option to vote for a contribution, has a chance to be applied in a study and possibly implemented.

For our study of the user typology of public participation 2.0 users, three variables for classification are of interest: interaction (passive, reactive and interactive), level of communication (peer-to-peer, intra-community, public) and spatial reference, which indicates if the idea applies to a specific geographical location or if it concerns the area of Hamburg in general. In the first phase of the study we concentrated on the interaction of the users with the selected public participatory platform. The level of communication and spatial reference are the focus of the second phase of our study, not presented in this article. Having data about their interaction would be of enormous advantage to understand user behaviour and thus to tailor applications to the users' needs. To know about users' needs and to react to them aligns with the objective to integrate more citizens into planning processes.

The main contribution of this article is in the analysis of the public participation 2.0 user types. We describe the process of developing a user typology of public participation 2.0. The underlying hypothesis is that by

knowing how the users interact with the platform, we can tailor the web content and interaction to their needs and their interaction with the PP 2.0 platform. Sharp et al. (2007: 11) states "Designers need to know many different things about users, technologies, and interactions between them in order to create effective user experiences. At the very least, they need to understand how people act and react to events and how they communicate and interact with each other."

The article is organised as follows. We present the previous work on web users in general, on different forms of interaction, and on developing Web 2.0 users' typologies. Section 3 gives a brief overview of the public participatory platform nexthamburg.de selected for our case study. Section 4 presents our research methodology and first results. We conclude the article with a discussion about the results and our future work.

3 PREVIOUS WORK ON WEB USERS AND USER TYPOLOGIES

3.1 Understanding the Web Users

There are many interpretations of the term 'user'; some even include the stakeholders in the user group (Sharp et al. 2007). The most applicable definition for our study is "people who interact directly with the product to achieve a task" (Sharp et al 2007: 430). We are interested in the users of public participatory applications offered on the Web 2.0.

There is broad consensus that web applications have to be tailored to users. Plenty of literature and approaches elaborate on this and how a website should look like and function (Tidwell 2006, Nielsen and Loranger 2008, Raskin 2001, Shneiderman and Plaisant 2005). These books offer a good view into interface- and interaction design and describe general guidelines. They propagate user studies, especially for sites with specific content. Questions that can be raised to get a broader picture of the user are: Who are the users of the system: experts, lay-men, men, women, what age, which ethnicity, etc.? What language and words do they use to describe what they are doing on the website? What do they want to achieve? What are the general tasks of the users? User studies vary with every specific application because some questions may be answered using general guidelines, but other specific problems need additional research and studies.

Most often the user specifications that influence the development of applications concentrate on the physical abilities, physical workplaces, diverse cognitive and perceptual abilities, personality differences, cultural and international diversity, disabilities and age (Schneiderman and Plaisant 2005). Some applications are only developed for und used by a certain group of people who have similar user specifications. Similar user specifications can also describe an interest that is shared, or the same goal that users want to achieve. Examples for webpages that have users with similar specification are websites that present information to a specific topic e.g extreme mountainbiking in the Alps, landscape photography or online maps like google maps that are used by users that have the goal to find a place. These websites are designed to follow the users' goal. For example, the application "google maps" is simple, it offers the user an easy search capability. The goal that a user, whatever age or personality, wants to accomplish, with the help of this application, is to find the selected place.

To find a common denominator on a low level of interaction and a simple design is on the one hand an option, but on the other hand it bears the risk of offering content that is insufficiently challenging and uninteresting for some users. This is especially a concern as applications for PP 2.0 have the potential to deliver a lot more than the information about a route or a place. To design attractive applications we suggest analysing web users according to their interaction with an application instead of describing them with pre-defined age classes or the level of education, as some user typologies do. This article is our first study of users topologies based on the users' behaviour and their interaction with the participatory application based on the Web 2.0 technology.

3.2 Interaction and Interaction Design

In the most general terms, interactivity simply describes an active relationship between two things (Salen and Zimmernann 2007: 58). It comes in many forms. For the purpose of designing interactivity it is important to understand what forms of interactivity the designers create. Interactive design is, according to Shedroff (2000: 269), "at once an ancient art and a new technology" because media "have always affected the telling of stories and the creation of experiences". Even passive experiences such as reading or watching a video can

be understood as interactive, because they "involve an interaction between the mind and the device or the imagination and the story" (Shedroff 2000: 283). Salen and Zimmermann (2007: 59) describe "cognitive interactivity" and "beyond-the-object interactivity" as two of four modes of interactivity. While the first describes the psychological, emotional interaction with a system, the second describes the participation within the culture of the system, e.g. the fan culture of a game. According to Salen and Zimmermann (2007: 59), the explicit interactivity referes to the interactivity mode which enables reciprocal interactivity; the user manipulates the application and the application responses. This mode of interactivity is especially of interest to us and our study presented in this article. The fourth mode of interaction according to Salen and Zimmernann is "functional interactivity" (2007: 59). This mode describes the "functional, structural interaction with the material components of the system" and thus refers rather to the interface than the manipulation of an application (Salen and Zimmernann 2007: 59).

Different approaches of interactivity vary according to the specific activity of the user. Interaction with an application starts with looking at the interface and operating the system, e.g. typing the address of a website or choosing it from the bookmarks. Sharp et al. (2007: 64) substantiates different interaction types by distinguishing four types: Instructing, users issue instruction to a system; Conversing, users have a dialog with a system; Manipulating, users interact with objects like holding, opening or placing; and Exploring, users move through a virtual environment or physical space.

Basic interaction design starts with analysing the needs and requirements of the users (Sharp et al. 2007). However, the users are not always capable of describing their desires related to an application. This is because they are often not aware of what is technically possible. Suzanne Robertson terms these the "undreamed-of requirements" (Sharp et al. 2007: 432). These requirements can be approached "by understanding the characteristics and capabilities of the users, what they are trying to achieve, how they achieve it currently, and whether they would achieve their goals more effectively and have a more enjoyable experience if they were supported differently" (Sharp et al. 2007: 432). Indentifying requirements should be partly done by the stakeholders, but they are not always aware of the users´ requirements and needs. This is one of the reasons why it is the definition of the requirements, to a large part, as the task of the interaction designers. Requirements can consist of a variety of different specifications such as look and feel requirements, usability requirements, operational requirement, etc. (Sharp et al. 2007: 526). In our study we concentrate on the explicit interactivity and observe in which way the users manipulate and use the existing online public participatory platform.

3.3 Online User Groups

In Germany, several studies of online users (Markt- und Medienforschungsinstitut Result 2007, ARD/ZDF Online Studie 1997-2009) try to describe the typologies of the Web 2.0 users. Their analyses focus basically on the users of the web-based platforms for market research. They suggest the distinction between the following two basic types of users: the users that participate actively by creating content and the users that participate passively by watching and reading content. Both groups contribute to the Web 2.0 in a mutual dependence. Passive users form an audience for the active users' inputs and contributions. According to the study "Typologie Web 2.0" (Markt- und Medienforschungsinstitut Result 2007) around 30 percent of the Web 2.0 users are respectively information- and entertainment seekers. The first group uses the internet to obtain information; they participate optionally by asking questions in e.g. forums to get more information. The second passive group consists of users that seek entertainment in form of e.g. games, music or videos.

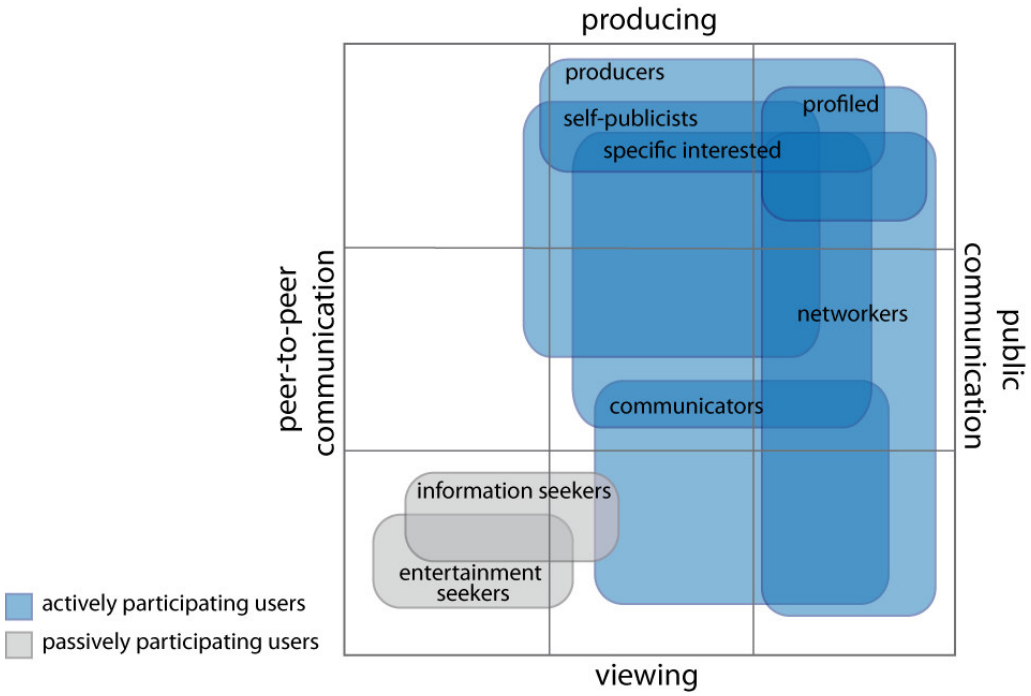

Fig. 1: Typology of Web 2.0 users (Markt- und Medienforschungsinstitut Result 2007: 37)

The group of the active users is more fragmented. Figure 1 shows the categorisations of the different users. The subgroups of the active users are developed on the basis of two axes: One axis for the level of creation; producing to viewing; and the other for the level of communication; from individual communication to public communication. The users are classified into groups according to the mode of their communication and the art of their interaction, beginning with just viewing on to producing content. The sub-groups are defined as: communicators, profiled, specific interested, networkers, producers and self-publicists. Communicators do not have a basic interest in creating content, they use Web 2.0 to communicate. The classical Web 2.0 user, in the study called “profiled”, uses all options to communicate and to create to the same extent. “Specific interested” use the Web 2.0 potential to communicate and to produce in the service of their interest. They are not as extroverted as the producers and self-publicists and can overlap with networkers. Networkers take advantage of the communicative aspects of Web 2.0, but they also create. Typical Networkers are the users of social-networking-sites. Producers are interested in publishing their photos, videos, music etc. Their focus is on showing their work, and the community and communication with other people are secondary. Self-publicists have the aim to present themselves by e.g. writing diaries on a weblog. They can overlap with the producers.

In this study, the basic goals of the users are added in order to be able to classify the users characteristic traits. The goals are, for example, to produce, socialize, or to present oneself. Without adding those traits self-publicists would show almost the same characteristics of action and thus the same position in the table as producers or networkers. However, because they follow different goals, their range of possible activities varies.

4 CASE STUDY NEXTHAMBURG

Our study case nexthamburg.de is a public think tank available on the Internet. Its main focus is the city of Hamburg and its future development. The citizens can post their comments and ideas directly through the online platform nexthamburg.de. Visions, strategies and concrete ideas are developed in a diologue between citizens and the nexthamburg team, on the basis of online postings by citizens. The posted ideas are about contemporary issues citizens in Hamburg are concerned with. Everybody is welcome to post an idea. Citizens can contribute by commenting on posted ideas or by voting for the ideas posted by other citizens. Every month three ideas that get the highest number of votes are appointed top ideas. These top ideas are featured in an extra area on the website. Every half year a session is organized where the voted top ideas are discussed and one final winner is selected. The sessions are organised as events where people interested in

future developments of the city can physically meet and discuss the issues. The winning top idea is further developed and analysed in a feasibility study.

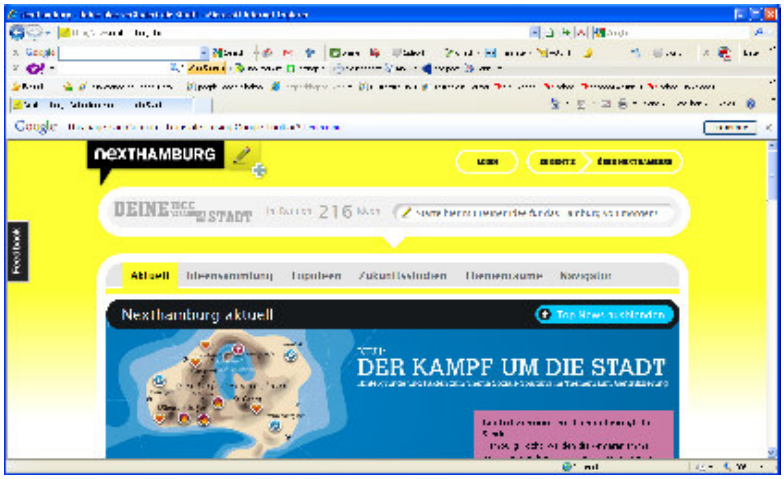

Fig. 2: Nexthamburg user interface (www.nexthamburg.de)

The philosophy of nexthamburg.de describes a bottom up process in public participation. Citizens can post every idea they have, even if it is not plannable at first sight. Nexthamburg does not promise that ideas will be put into practice, but offers a platform for discussions and exchanges among the citizens and planning experts.

During our study period from July 2009 until the end of January 2010, the first version of the platform was online. Citizens had the possibility to post their ideas about the planning issues in the city of Hamburg, comment on the posted ideas and vote for the best idea. The public participatory platform was available online to every potential user without login. This was changed with the second version of the application as of February 2010. During our study period, 78 ideas were posted that resulted in 213 comments for these ideas and 7265 votes. These three interaction forms are the focus of our study. The methodology and our first results are presented in the following section.

5 STUDY OF PP 2.0 WEB USER TYPES: AN EXAMPLE OF NEXTHAMBURG.DE

In our research we are interested in users typologies and their possible classifications. This study is focused on the analyses executed on the example of a Web 2.0 public participatory platform. The data available were gathered with the help of the software package eTracker, which tracks the users and their interaction with the system. The data is gathered in the form of simple statistics. For our study we combined it with data from the nexthamburg.de database, that gives information about postings, comments and votes. In this section we present our initial analysis of the user types on the example of nexthamburg.de.

5.1 User Types and their Levels of Communication

According to the data analysis, we identified the following three interaction types of users (table 1): active, reactive and passiv. Active users produce content, which means that they post ideas, vote and comment. Reactive users react on the existing content by voting or commenting, but do not produce any content themselves. Passive users visit the website and gather information presented on the nexthamburg.de platform.

For our further classification of the users and their interaction with the nexthamburg.de platform we used the characteristics of the user typologies based on the web user types 2.0 (Medienforschungsinstitut Result 2007). We distinguish among several levels of communication. Peer-to-peer communication refers to the communication among peers. Intra-community communication describes the communication within a community. For both kinds of communication a log-in is needed. Public communication, without log-in, is the communication which is visible for every visitor of nexthamburg.de. Based on these interaction types public participation user types such as the information seeker, the producer, the special interested or the networker can be identified on the nexthamburg.de platform.

Interaction types		Level of Communication
passive	Visiting the website without commenting, voting or posting	Peer-to-peer
active	Posting ideas	Intra-community
reactive	Commenting on ideas or voting	public

Table 1: Interaction types

Further parameters interesting for this study include the spatial and thematic reference of the users' postings; Specifically, postings that apply to a specific location or if it concerns the area of Hamburg in general and which theme it applies to. Some initial research in these two categories was done by Matern and Petrin (2010, forthcoming). We aim at extending our study with these parameters in the next stages of our research.

5.2 Data for the Analysis

The data concerning the interaction of the users with nexthamburg.de Web 2.0 public participatory application was gatherd with eTracker. eTracker is a software which enables real-time webanalytics based on pixel technology. By loading an invisible 'counter pixel' with every web-page, the number of page impressions can be retrieved. Additional information is gathered through interaction of the user with the website and stored in a database on the server. We used the data collected in the period from July 2009 to the end of January 2010 and combined statistics compiled from the software eTracker with data from the nexthamburg data base where the postings, comments and appendant information is saved. The data gathered in this way gave an overview about how many users visited the webpage nexthamburg.de in the test period, where they entered the website, how long did they stay, which browser they used, etc. The eTracker data was, due to the website technology that was used during the study period, not able to display information about the number of postings, comments and votes.

One of the interesting categories measured by eTracker was the "value unique visitors". This parameter counts the number of users in a specific time frame, usually 30 minutes. During this time the user is counted as one visitor no matter how often she leaves or visits the website. The value of unique visitors is only an approximation; more accurate data about users can be retrieved if they have to log in. The available data also includes the number of postings and comments per user and the number of votes per posting. These data gives ample information about the distribution of interaction. At this phase of our study no data about intra-community and peer-to-peer communication was available, as the website did not have a login area during the study period.

5.3 Results of the Analysis

With the help of the nexthamburg.de database we were able to reconstruct some basic types of interaction. In table 2 we show an overview about the overall number of interactions during the study period from July 2009 to the end of January 2010. Votings are, with 96,1%, the most attractive form of interaction. 2,8% of the users commented on the posted ideas, and only 1% of interactions are postings of ideas. A possible reason for this is the simplicity of voting. If you like an idea, you click on the "support" button and give your vote anonymously. It does not take much time. Posting an idea needs more involvement. First one needs a good idea and then she has to describe and post it publically on the platform. Although not many users post, the number of the average posting per user is quite high. The users that post, post in average 4,5 ideas. Users that comment, write in average 7,6 comments (table 3). These numbers indicate high involvement by the users that actively contribute. It indicates that once they are attracted by the platform, they tend to stay active a rather longer period of time.

Overall number of interactions (postings, votings, comments) during the study period		7556
Number of postings	78	1%
Number of comments	213	2,8%
Number of votes	7265	96,1%

Table. 2: Overall number of interactions (postings, votings, comments)

Postings/ comments per active user that has posted/ commented	
Average number of postings (per user that has posted)	4,5
Average number of comments (per user that has commented)	7,6

Table. 3: Postings/ comments per active user that has posted/ commented

During the study period we identified 100 users that interacted either by posting an idea, by commenting or by doing both (table 4). 60% of the users contributed only by commenting, 21% posted an idea and only 20% did both. This means that almost all users that posted an idea also commented on other ideas. 100 users interacted in an active, respectively, reactive way with the website. The remaining vistors tend to interact rather passively. The number of the remaining vistors can only be approximated (table 5). If we use the parameter "unique visitor" to get an overview about how many people have visited the website, only 1% of the users interact actively by posting and commenting. Data about votings were not available for single time users. Votes are only recoded per posting. Every 125 th user decided to post something on the platform, every 50th user commented, and every 1.25th user voted for the posted idea.

Number of users that interacted	100
Users that have posted an idea	21
User that commented an idea	59
Users that posted and commented	20

Table. 4: How users interact actively and reactively

Unique website visitors in the study period 02.07.2009-26.0.2009	9.028	
Average number of postings per unique vistor	0,009	Every 125th user
Average number of comments per unique visitor	0,02	Every 50th user
Average number of votes per unique visitor	0,80	Every 1.25th user

Table. 5: Unique website visitors

On the basis of these results it is almost impossible to build a reliable user typology for PP 2.0. Classes that could be built according to this data are the producer, which belongs to the group of active and reactive users, and the information seeker, which is the largest group and rather passiv. Producers are all users that create content in the form of posting or commenting, and information seekers are the remaining users that visit the website but do not contribute.

6 CONCLUSIONS

Knowing the users and their requirements is crucial for the developers of public participatory 2.0 applications. It is especially important to understand the functionalities the users use and the ways they interact with the system. The better an application serves the user´s interests and behaviour while they are online, the more motivated the citizens will be to participate. Knowing the requirements of the nexthamburg.de users, the designers of the platform would be able to tailor the platform to the users' needs and thus to serve the community by giving them the interaction styles they want and need to best communicate their ideas about the future of Hamburg. In doing so, the designers could be reactive to their needs.

In our study we analysed how the users interacted with the Web 2.0 participatory application in the period from July 2009 to the end of January 2010. We observed the following three parameters; postings, comments and votes. The aim was to define a user typology for public participation 2.0 users. In this phase of the research, we were only able to classify the users into active and reactive producers and passive information seekers. The majority of the users, 96%, voted. Voting followed by commenting with 2,8%, and postings with only 1% of all interactions. Obviously most users prefer to contribute in the less time consuming way, in this case by voting. Our study shows that the more involvement which is needed for an interaction, the less people would actually do it. Only 1% of the unique website visitors were active by posting or reactive by commenting and voting, the remaining users only read the content published on the website.

The results of our study give an overview about the usage of the three core-functions of the website. If we want to know more about "undreamed-of interaction styles and functions", we have to carry out additional interviews and gather some more data. Interviews are also needed in case we want to specify the public participation 2.0 user types. As long as we do not know what goals people have when they contribute on the public participatory platform, we cannot classify them into specific types of users. The only groups we were able to define at the moment are the producers and the information seekers. A possible classification into more detailed groups, such as specific interested, networker or communicator, requires additional research.

The new, second version of nexthamburg.de application has been online since the beginning of February 2010. It enables improved webanalytics due to its new concept. Every page is tracked separately, thus it is possible to know which page has been loaded and how often by the users. A login now is required for users that want to comment and vote for the presented ideas. These additional functionalities, which enable the gathering of additional data about the user´s behaviour, will enable the designers and researchers to gain better statistics about the users` behavior. With additional information about the way the users interact with the application, we will be able to classify the users into further groups, such as the networker, who communicates within the nexthamburg community, or the special interested, who cares for thematically related topics or for a specific geographical area. While data about the spatial and thematic reference is available and has not been examined for this study, data about the form of communication is only available since the launch of the second version of the website in February 2010. This data will enable us to continue our research on the Web 2.0 public participatory users and their typologies. In the next phase of our research we plan to analyse the new data related to the more specific information about the ways the users interact with the selected public participatory platform.

The analysis results concerning user interaction will be, among other things, the basis for our further research on interactive map-based applications for public participation. This research builds on our previous research in public participation in urban planning (Krek 2008; Wagner, Kulus and Krek 2008; Steinmann, Krek, and Blaschke 2004a and 2004b). Our vision is to overcome classical GIS functions like zoom, pan or layering. We aim at introducing an intelligent adaptable map that facilitates a high level of participation and communication, considering the way users interact with web-content. Studies about the users's interaction will be very helpful for the design of future interactive applications.

Acknowledgement

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reviewed paper

Development and environmental protection in the coastal urban area of the municipality of Glyfada (Greece)

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1 ABSTRACT

Nowadays, the urban environment faces several management problems such as planning and sustainability. The various policies that are implemented to solve the above problems must be consistent not only with the EU directives but also to take account of existing urban and spatial plans for the area. Reconstruction of man-made environment and the construction of infrastructure such as roads, schools, gymnasiums, is one of the directions of European policy on urban environment. These interventions should have the least possible effects on the natural environment of the city in which they take place.

This paper studied the effects of the construction of a gymnasium in the coastal urban area of the Municipality of Glyfada in Attica, on the natural as well as on the human environment.

Initially the physiognomy of the area, is studied. Then, via an estimation of the environmental repercussions on the natural as well as the human environment, and after interviewing all the organizations involved, the evaluation of the repercussions on the natural environment is assessed. The research showed that the specific work contributes to strengthening the infrastructure of the urban environment, the enhancement of education and generally the enhancement of its development.

2 INTRODUCTION

The area of Glyfada is situated geographically in the southern part of the coastal area of Athens. It is surrounded by the mountains of Hymettus to the east and by the Saronic Gulf to the western (Fig.1).It is an urban area that was developed due to good environmental conditions and proximity to the previous airport of Greece.

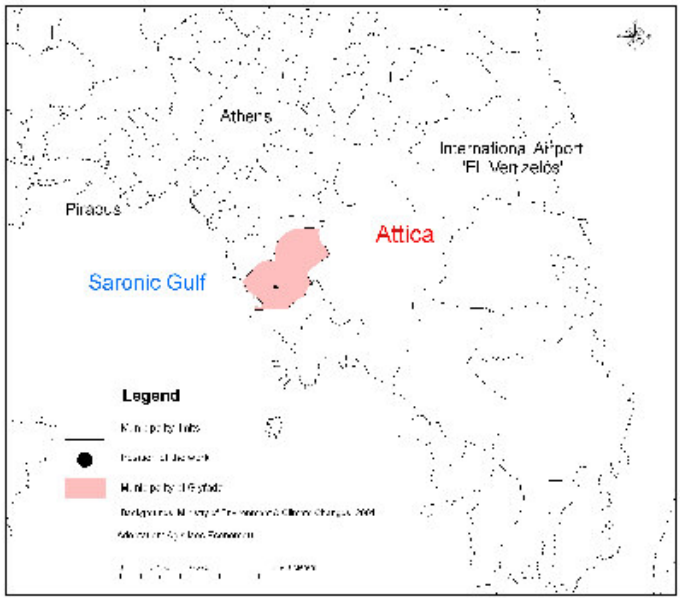

Fig.1. Research area

Regarding the development physiognomy of the municipality, the area of Glyfada has significant social, commercial, and sports facilities, modern school buildings and others.

The area of Glyfada is one of the best cases of permanent residence due to good weather conditions and the shopping centres which have been developed in the area. The area is a place for residents with high incomes.

In the Municipality of Glyfada a number of infrastructure works such as road works in order to improve the public transport an d development of the area and to serve the 2004 Olympic Games have been constructed.

This work refers to the construction of a gym and a building for cultural events near the 6th high school of Glyfada. These are designed to provide students with the opportunity for sports activities, entertainment and education in the form of cultural events that will take place during the year.

3 REGENERATION WORK

The regeneration works in the area of Glyfada are works which increase the standard quality of life. Such works are the road works, schools units, sports facilities - Gym, open space works, pedestrian roads, and others. Specifically in the area of Glyfada the regenaration works are (fig.2):

- Road works - Transport: The tram lines connect the coastal area of Glyfada with the northern border area of Glyfada as well as with the urban centre of Athens. The two major roads Poseidon and Vouliagmenis Avenues have connected the area with the rest of Attica area, as well as with the Piraeus Port and the Airport of Spata. The existing port mainly serves private tourist and fishing boats.
- School Infrastructure: In Glyfada there are 48 schools (17 nursery school, 17 primary schools and 14 high schools) in which there are 14 other co-housed schools. Totally, the school units have a potential of 8322 students. (ERC, 2007).
- Sporting facilities - Gym: In the area there are 5 Gyms and 25 athletic organizations which cover a large number of sporting activities (Sports Agency Municipality of Glyfada, 2008). In addition, 12 projects of the Sports Organization of the Municipality of Glyfada as tennis, volleyball, wrestling, athletics, basketball and others are taking place in this area with 2130 participants.
- Green (open areas) – pedestrian streets: In the area of the Municipality there are green zones and open area.

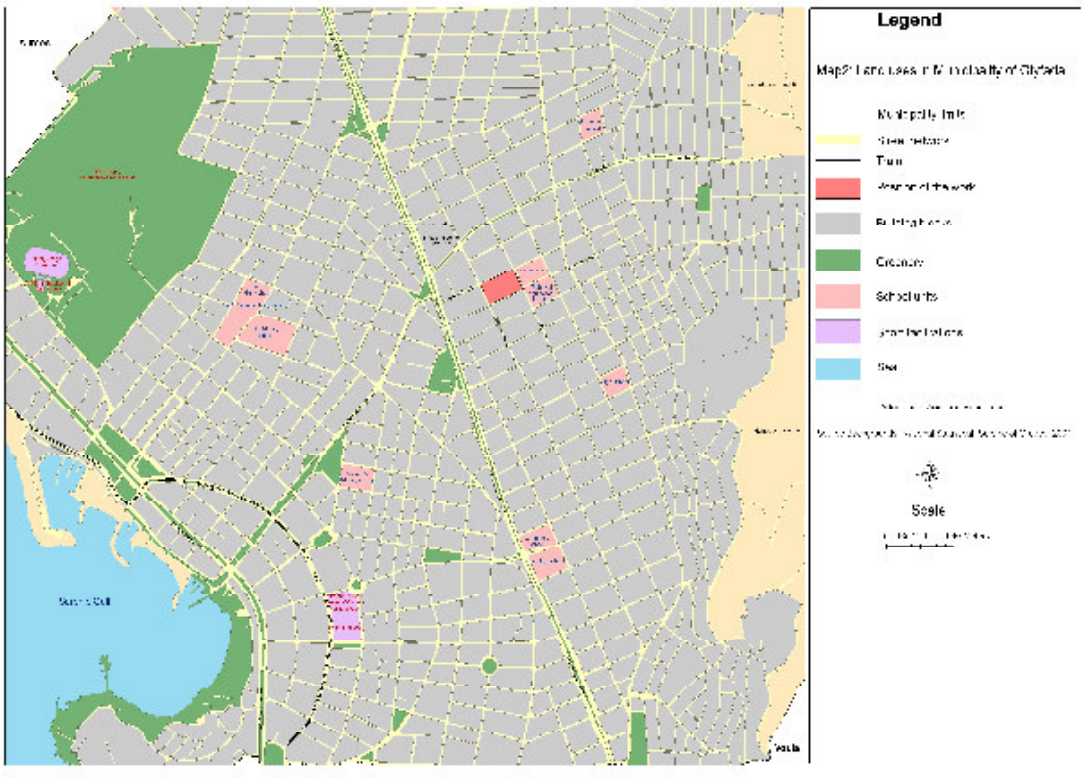

Fig. 2. Land uses in the Municipality of Glyfada

4 FACTORS THAT INFLUENCE THE REGENERATION AREA

Land uses

Land uses are an important factor for the further upgrading of the area. The main human activities in the area are:

- Commercial companies (Retail and Wholesale, the shopping centre of Glyfada is one of the biggest in south of Attica) and recreation and supra-local radiation
- Consultancy services (banks, business offices)
- A few scattered workshops and craftshops
- Hotels Units

Environmental problems

Flooding phenomena in the coastal roads that cause difficulties in traffic. The concentration of large quantities of rainwater is due to many factors such as: the rainwater collection is partial and does not cover the whole area of the Municipality of Glyfada, also there are great differences in height and the ground is rocky resulting in the reduction of soil absorption (Economou, 2008).

- Increased traffic in the centre of Glyfada and lack of parking spaces.
- Degradation of the beach of Glyfada due to the construction of the marina.
- Degradation of the urban environment due to increased building. By 1970, the text law for grating has contributed in the increase of the building area. In the area of Glyfada, the building factor is 0.8.
- Air pollution of carbon dioxide due to car traffic.
- Noise pollution due to vehicle traffic. The areas next to major roads face the biggest problem.

Development planning – Growth development – Policies

Other important factors for the development of the area are the development plans as well as spatial and urban plans which determine land use and the level of intervention with regenerations works.

Also, the economic growth gives the local authorities the possibility for more effectively interventions works in area.

Furthermore, various policies affect to a small or to a large degree the development of the area and therefore the regeneration works and upgrades.

The case of the construction of the gym and building for cultural events as a means of regeneration and upgrading of the area.

The gym includes: A gym, a basketball and volleyball court with 300 seats. The total area of the building is: E = 1390 m2 (724 m2 sports area, 263 m2 rows - about 300 spectator seats and 403 m2 of utility space).

Cultural events area: The space for cultural events including the exhibition hall - library by with PC spaces, exercise room - ballet, rhythmic gymnastics, aerobics room and exercise machines. The total area of the building with main and auxiliary areas is: E. = 1887 m.2

Surrounding area: In the surrounding area a basketball and a volleyball fields are to be constructed. Also, a part of the existing trees will be maintained, while new trees will be planted near the construction area.

5 RESEARCH

The research showed that:

The choice of the location the closed gym was made on the basis that site chosen shows the following advantages.

- The existence of the 6th high school next to the plot, has reinforced the choice of this location due to the possibility of providing students with an area for sports activities.
- The plot where the work will take place belongs to the SBO.SA, and has been characterised as school area by the No. 18036/360/05 decision of the Prefecture of Athens (Official Journal of the Hellenic Republic, 2006)
- Lastly, the position has access to the existing PPC network for electricity, water supply network

The proposed work is included in the total planning of the School Buildings Organization to strengthen school infrastructure with gyms and cultural events space. Also, the proposed location of the work has a goal

to acilitate the movement of high school students to sports facilities and to give motives for the development of sports activities during the school year independently of weather conditions.

Promote the cultural education of students of the area via cultural events (exhibitions, dances, and others) that will take place in the cultural centre. To act as a magnet for students for cultural education, entertainment and sports activities.

6 PROBLEMS DURING THE PERIOD CONSTRUCTION OF WORKS

According to personal interviews with local authorities and School Building Organization officials, in the area of Glyfada there was a strong reaction from residents who were in direct contact with the area. They have the opinion that these works will degrade the environment via the introduction of sports activities and the reduction of green areas.

This reaction was in contrast to the decisions of local authorities and the School building Organization for the upgrading school buildings, the management and promotion of the area.

Similar reactions existed in the construction of the gym in the school area of the Municipality of Pefki resulting in postponing the works.

According to the School Buildings Organization similar facilities have been constructed in many area of the country with no such reactions. In a country level during the period 2004-2007 7 class of multi-purpose uses and 27 gyms are being built with a total budget of 48,537,050.00 euros. Nowadays 3 multi-purpose halls and 11 gyms are under construction with a total budget of 22,713,730.00 euros (http://www.osk.gr).

In the case of the construction of the Indoor Sports Center in Glyfada, the above mentioned reactions were overcome after the adoption of environmental conditions from the Environment Directorate of the Prefecture of Athens. Thus, the construction of the work has started.

In addition, according to the Presidential Decree (Official Journal of the Hellenic Republic, 1987) such operations in urban areas which are in accordance with directive of the European Union for upgrading the standard of living of residents area authorized (Commission of the European Communities, 2006).

Studies – Environmental repercussions

A number of studies such as, architectural design, hydraulic, fire protection design, structural design, environmental study and others took place for the construction of these works.

According to the environmental assessment, the proposed work will not cause negatives effects to the surrounding area. Particularly the repercussion are (Economou, 2008):

During the work's construction period: During the period of construction the repercussion will be minimized at least due to measures. These measures concern: Safety of workers on site, reducing noise and dust production, protection of the residents from work activities and the movement of vehicles and machinery, and finally prevention measures for the collection and disposal of waste in appropriate areas.

Repercussions on the Anthropogenic environment: Taking measures in accordance with workers safety and protection legislation as well as the compliance with environmental procedures minimize the effects on the human environment. Also, with the appropriate configuration of the area (new plantings), there will be a positive influence on the students of neighbouring schools and the residents.

Repercussions on the Natural Environment: Compliance with the environmental conditions both for the management of liquid and solid waste reduces the environmental effects both during work construction and during the operation of the work. Consequently, the limits and measures for the management of solid waste, air emissions from industrial boilers which are used to heat buildings and noise limits during the operation of planting are followed. The liquid waste is disposed in the central waste pipe of the City and the solid waste collected by garbage trucks of Glyfada. Also, the uprooting and replanting of existing trees in another area of the municipality, contributes to the enhancement of vegetation.

7 CONCLUTIONS

According to the above it can be seen that the area of Glyfada is faced with environmental problems from the existing activities. A way to face these problems and to upgraded this area is through regeneration works. As has been shown above, the construction of a gym and a cultural events building as well as the regenerations

of the surrounding area will contribute to the development of sports activities and cultural education of students in the area.

Also, these works will not have negatives effects on the environment, due to the respect of environmental conditions while the regeneration of the environment will enhance the area. Consequently, these works can be considered in total as regeneration works which will enhance and elevate the area.

However, totally, the improvement of the quality of residents can not rely solely on such interventions. As I underlined above, a set of interventions is needed in the area such as high quality services, measures to protect the environment, green areas, and others so that the area may continue to provide high quality environment for the residents.

Finally, we should emphasize that the current practices for the construction of infrastructure works, require the active participation and consent of citizens. This is because in many cases there is apparently a delay or permanent cancellation of works, due to the reaction of the residents. We must move from the model of "authoritarian government" to the model, of “participatory governance” at a local level.

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reviewed paper

Development of municipal System as an instrument of planning approach transition toward integrated sustainable development– case of Serbia

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1 ABSTRACT

Major transitional changes can be recognized in Serbia in last ten years affecting all main sectors of society. Serbian firm political destination toward EU integration puts enormous challenges to the government reform processes due to comprehensive legislative and regulation harmonization. Even thaw many of new laws and national strategies have been adopted, their implementation is very hard and slow. Very specific challenges are faced in field of planning and governing sustainable urban development. Sustainability as a concept is introduced in everyday life of Serbia rather recently, with major delay comparing to the other European countries. In spite the fact the in academic circles sustainability was over twenty years the subject of planning approach redefinition argue, first important policy and regulatory documents ware adopted last year. Now major problems are faced in planning practice due to very low level of understanding and knowledge about methods and techniques necessary to achieve sustainable solutions. The situation is even harder when planning practice is additionally challenged with the local political priorities that are generated from philosophy opposite from sustainable. Therefore, now Serbia is the challenged to find creative ways to speed up the planning and governance practice transition towards contemporary European sustainability concepts and in the same time meeting the current economic development needs. In past five years several international support programs ware implemented, aimed to build municipal capacities for integrated strategic planning and governance using different ICT solutions. Experience of six Serbian municipalities where concept of Territorial Information Systems - TIS was introduced and implemented trough pilot projects showed that it could be used as an instrument of planning approach transition supporting methods and techniques that foster integrated development and sustainable community solutions. This paper will give the review how two years implementation of six pilot TIS projects affected and improved planning and governance practice in Serbian municipalities introducing different new instruments and methods. The potential of TIS as a bottom up instrument for planning and governance improvement was recognized and fostered by National Strategy of Spatial Development adopted few months ago.

2 PLANNING TRANSITION IN SERBIA

2.1 Planning context

In this chapter we will try to outline some key points of current planning position in municipalities of Serbia aiming to provide the base for understanding why we tried to use concept of TIS as an instrument to foster planning approach transition toward integrated sustainable development.

„Sustainability got to Serbia recently, and with significant delay in comparison to other European counties. In spite the fact that we use the term for almost the two decades, we recently approached to develop some of the key documents regarding sustainable development or country sustainable status assessment. This situation is a result of insufficient knowledge and understanding of issues of sustainability, adoption or consideration of other priorities while the "transition" on sustainable development is delayed, insufficiency of economic resources for sustainable solutions, and very often due to negation of sustainability as an "sustainable" development philosophy." (Bajic Brkovic, 2009)

2.1.1 Transitional blind forces and abandonment of planning

General overview of urban and spatial development trends in last two decades gives us the picture of much more negative than positive issues. Urbanization process turned out to be more informal than planed and controlled. That is a consequence of overall Serbian society transition process, absence of adequate and clear policies of urban and spatial development and incompatibility of current planning model with the socio-economic changes. Planning system, previously established in socialistic society, is unable to follow changing processes initiated by fostered private sector at the begging of nineties. Since then in Serbian cities

encounter enormous illegal construction and contempt of valid plans, decrease of quality and quantity of public spaces and communal infrastructure, endangerment of ecological natural values in urban areas. Restructuring of economic forces, working zones and overall decrease in social services investment fostered population migration toward urban centers, which as a consequence brought enormous imbalances in territorial development.

Planning and management practice started to change in last ten years due to two main groups of factors: 1) inner: numerous requests of investors for more efficient administration of investment procedures, legalization, communal commissioning of suburban areas, establishment of land legal status public/private etc., 2) outside – international community pressure to establish more efficient mechanisms in regional and economic cooperation in field of industry, agriculture, transport, energy, etc., in environmental protection and ecological vulnerability monitoring, informal settlement and social housing, which quite differ from Serbian practice so far.

2.1.2 Back to planning? – Deregulation and planning purpose change

Fostered investment activities, after ten year of stagnation due to unstable political situation in Serbia, initiated inner factors of planning approach change. Local authorities started to reevaluate existing plans and initiated development of "new" urban and spatial plans that will more suitable meet the current needs. Under the private sector forceful pressure and need for fast legal administration of investments, municipal planning become very active and at same time limited to numerous small "one parcel" urban deigns or eventually communal general regulation plans. In most cases, direct implementation of general urban plans is enabled, due to their flexible reformulation and more stress to construction rules. In that way detailed regulatory plans, which ware one of that main planning instrument so far, are put aside and almost abandoned. Among the disciplinary discussion that was usually justified with nature of market conditions, construction demand dynamics, and therefore the disability of planners to plan "precisely" urban development. Step by step planning becomes a service of "investment urbanism", followed more and more often by very sharp public resemblance to "informal" planners-politicians-investors coalition.

It was clear that planning system started to transform, in spite the fact that legal planning regulatory framework didn't change, in direction of deregulation and problem oriented planning which was distinctive in liberal capitalism many decades ago. The purpose of planning is now interpreted as efficient administration of investment market and main infrastructure problems solving. In this sense, there is no substantial part of planning purpose such as urban development guided by fostered socialistic consensus on equality of rights on standardized living conditions, neither as urban development fostered by community collaborative visions of quality living.

„Construction process in Serbia is characterized with ad hoc decisions, absence of regulatory mechanisms, and unclear relation toward standards while the old ones ware rejected or mostly denied and new ones still don't exist or are not accepted, and where the construction rules and regulation of city space are defined primarily by investment interest, and secondly by public interest. The rejection of planning and planning mechanisms is noticeable, and advocating of "market" commonly interpreted as context with no regulatory mechanisms, no respect of public interest and state role. However, in development and construction of cities in every regulated state, role of planning, policies, strategies and regulatory mechanisms is substantial and conditio sine qua non for qualitative urban development." (Bajic Brkovic, 2009)

Marked based urban development was actual in western countries in second half of nineteenth century during the industrial revolution. Consequences of market based urban development ware so serious, especially in domain of environmental quality and social inclusion, which eventually lead to significant theoretical, conceptual and institutional change of western planning practice. From this point of view, the main question that has to be asked is whether Serbia will have to pass the whole development process from the initial stage of liberal capitalism, all together with the consequences of market based urban development, or it will find strength to consolidate their own knowledge and experience in comparison to other experiences aiming to define the planning system appropriate for the current situation and its own context?

2.1.3 Back to planning? – planning objective change and new planning instruments

Thanks to the previously mentioned "outside" factors of planning transition, i.e. more intensive international community inclusion in development processes in Serbia trough initiated process of stabilization and EU

integration of Western Balkan countries, planning and management practice started to change more significantly. In numerous of cities and municipalities of Serbia, in past ten years large number of international donor programs ware implemented, with aim to built national and local awareness, knowledge and institutional capacities in field of economy, rule of law, and also in all fields where negative influence of market driven urban development are expected, such as environmental protection, social inclusion of vulnerable groups, informal settlements sustainable solutions, civil society building capacities in a field of institutional organization and articulation of civil society participation in community development, cultural-historical heritage ambient and identity preservation and protection etc.

Therefore, under the influence of the international factors, except questioning of planning purpose, process of questioning of planning subject also started, along with process of knowledge propagation about new planning and management instruments. In last five years many municipalities in Serbia adopted different strategic plans: economic, sustainable, territorial, master plans for significant development projects, local ecological action plans, different social integration and inclusion programs, etc., which ware aimed to redirect planning objective from problem solving toward strategic collaboration, and planning concept from physical planning toward integrated sustainable territorial development. International initiatives created on a local level atmosphere of openness toward utilization of new methods and instruments of urban development. Nevertheless, this openness is first of all motivated by the local authority's recognition that there are the potentials for access to the EU pre-accession structural funds, while in the same time there is still no clear consciousness and knowledge what these methods and instruments are actual for, why we create them in collaborative way and how they should be implemented now.

2.1.4 Current planning challenges

In this moment Serbia is still faced with the situation with no clearly defined policies of urban and spatial development, in spite the fact that the general necessary social fundament is much more articulated in Serbian determination to access EU. Ratification of Stabilization and Association Agreement (SAA) between EU and Serbia, committed bought sides, among else, to establish tight collaboration to contribute to the development and growth of the Serbian potentials thus the economic relations will be in generally fostered, and policies and measures will be formulated in a way to enable sustainable economic and social development of Serbia, in the same time taking in the consideration the issues of environmental protection (article 88., SAA, 2008). One of the most significant obligations that Serbia accepted by this agreement is to harmonize with the EU law. In last five years political focus in Serbia was on social development in rule of law and economy.

According the European Commission report about Serbian progress for year 2008., Serbia made almost insignificant, i.e. insufficient move in a fields of environmental protection, information society services, statistics, personal information protection, human and physical capital, education and research, in which more significant changes are expected in following period. If Serbia succeeds to implement adopted National program for integration by the 2012., it should be technically prepared to take all responsibilities that are derived from EU membership.

Nevertheless, there is still the question of Serbian essential and operative preparedness to implement obligations and regulations in practice. Integrated territorial development and actual policies of territorial cohesion in EU, where urban and spatial development have very important role, are very complex processes in which Serbia will not be able to actively participate unless serious effort is put in preparation of resources and capacities for this step. In that sense, the main question is how and with what instruments is possible to redirect and foster Serbian planning "transition" from actual toward collaborative communicative approach under the modern, organized and competent good governance, which takes into account principles of sustainability defined by EU and global development policies?

2.2 Directing the planning transition

Even though, as we could see from previous chapter, key disciplinary questions considering planning concept in Serbia started to be considered over a decade, more consistent institutional, legislative, regulatory and practical changes are still missing. On one hand, this situation is a consequence of still unclear social and political directions, and therefore unclear political determination on urban development strategies which remained on the margins of current political focus (Bajic Brkovic, 2009), and on the other, it is a

consequence of overall insufficiency in knowledge about nature, objectives and role of planning in new social conditions which will be actual in the moment of Serbian accession to EU.

„In the current conditions when in Serbia inclusion in global flows of capital and privatization is expected, planners have to adjust their own professional services to the reality dynamics" (Lazarevic Bajec, 1996). Upcoming law harmonization with the EU in a field of environmental protection, information society services, statistics, education and research, will not automatically put Serbia in a position of functional easy inclusion in EU regional development process. Current policies of urban and spatial development in EU member states are harmonized with numerous EU strategic documents, such as: European Spatial Development Perspective from 1999., Lisbon Sustainable Development Strategy 2000., revised in 2006 . in Goteborg, EU Territorial Agenda from 2007., Green Document on Territorial Cohesion from 2008. , and much more documents which are forming context for EU member states definition of national urban and spatial planning concept. In that sense accession to EU implies substantial changes in a field of urban and spatial development, especially in policy making, institutional arrangements and development of new instruments, methods and techniques. Except law harmonization, Serbia will have to position itself politically and strategically in context of EU and according to that finally redefine planning concept and system.

Considering the current development condition and available resources in Serbia and actual urban development trends in comparison to the EU member states, Serbian planning system should be very flexible in usage of variety of instruments and methods in order to follow up and manage inner change dynamics and in the same time to provide the capacities for development of Cities strategic visions as a part of EU network. That means that role of planners must be significantly changed in relation to the one defined in traditional planning. Planners must be competent and capable to analyze and recognize development mechanisms, choose different adequate approaches, creatively crate and innovate process of planning and plans production, which cannot be any more limited to list of plans defined by current planning law.

These facts redirect the disciplinary consideration toward serious consideration of possibility to apply institutional model of planning in Serbia. „Institutional approach starts from the structure and action of different actors in urban development, reveals their interests and activities and places them in wider context of structural process. On the contrary from systems theory which produces idealized models of choice which are often divided from real interests, the ways how certain social processes produce events are considered. We are interested in structural tendencies which shape social process and in those above directly observable phenomena, such as for example heterogeneity of social groups, power misbalance among them and economic process within which groups are constituted and resources divided among them. Main question within this approach is how planners, which are employees of the state, collaborate with the representatives of social and economic groups in society. Knowing the socio-economic position of these representatives is very significant for understanding the scope of the influence that planner could have on their actions." (Lazarevic Bajec, 1996).

The role of planner conceptualized in this way, especially of those which are employed in authorities, demands high awareness, very complex knowledge and skills. Knowledge is referred to quality information about administrative territorial phenomena and changes, inner and considering wider context, about subjects of change, their institutional position and power, socio-cultural specificities, preferences and interest, activities etc. Skills are referred to ability to use different methods, techniques and tools for fostering communication and collaboration of all development actors.

Accordingly, when we ask question how and with what are the instruments to foster planning "transition" in Serbia in order to be prepared for involvement into EU integrated territorial development policies, than certainly one of the answers can be find in intense knowledge and information capacity building of all development actors. The fact that SAA, among else, is focused on collaboration in a field of education and research, information society services and statistic, underlines the significance that Europe give to concept of the knowledge based society.

3 CONCEPTUAL APPROACH TO TIS DEVELOPMENT IN MUNICIPALITIES OF SERBIA

The idea to use the TIS as an instrument to foster transition of planning approach in municipalities of Serbia turned out during the preparatory phase of project document of SIRP - Settlement and Integration of the

Refugees Programme, lately implemented by UN-HABITAT in the period of 2005. to 2008. . The Italian government decided in 2004. to finance the programme aimed to help policy makers and local communities in adopting workable and lasting solutions, while getting up a grip on the human settlements and urban issues. Some of the main activities of this programme ware: - improving, in most of the Municipalities, the skills to elaborate plans for local development, - developing, in six Municipalities, Pilot projects on Territorial Information systems, and - establishing a regional network for the exchange of experiences and lessons learnt. (Ramirez, 2008) That was the base for the conceptual development of the idea to use TIS in order to make more comprehensive and substantial influence on municipal planning approach. In following chapters the short overview of the key issues of this process, an also of achieved results will be given.

3.1 Concept of building up the awareness about new planning approaches by using TIS

Second SIRP component –Municipal component, was capacity building component and it was designed to enable six selected Municipalities to improve their effectiveness in their functions of governance and implementation of more complex development projects. The capacity building interventions set up methodology for the delivery of the technical assistance and to provide the necessary support to the other programme components. Each programme component interacted with others, i.e. housing one, profited from capacity building and the support to the integration of its beneficiaries. Integration between components activities was a leading principle in the project management cycle. Aside from integration, other important key words and concepts of SIRP methodology ware: participation, enabling, confrontation, partnerships, didactic approach, bottom up, learning with others, knowledge spread, information flow, “acquiring skills, instruments and tools”, “exposure to EU good practises”, “key actors of the EU integration process”. (Ramirez, 2008)

“The challenge of decentralisation, transition and integration in Europe might imply looking at the European Union framework (policies and methodologies(, in which local governments not only contribute to the economic and social development of their territory but, due to their closer position to citizens, are often appointed to implement the EU legislation. In transition countries, Local Authorities are more and more becoming protagonist in the decentralization process and their role in promoting central reforms might be crucial. Local Authorities can be champions of change, taking up the role of transforming their territories being trainers /locomotive of development, from bottom to up. SIRP has experienced that applying the “bottom up“ approach can really make the difference.” (Ramirez, 2008)

During the preparatory phase of the SIRP project document, group of the national consultants altogether with major international support from Italian and other international partners, according the assessment of Serbian contextual resources came up with a conceptual principles that are to be followed during Pilot projects implementation.

3.1.1 Achieving integration

The integrated approach to territory (understood here as the scenario in which all actors play and actions take place), comprises different and important meanings when related to \local development: functional integration, which means providing unitary implementation and management of actions related to different sectoral aspects; financial integration (i.e. public, private funding); integration of actors and policies, which means that subjects, competencies and policies are coordinated towards a common strategy; horizontal integration of players actions, sectors and resources thus producing grater creativity and inventiveness; vertical integration of all levels of governance and planning : from community level and their action plans, trough municipal, district, regional and up to the central level with national development plans and policies. (Ramirez, 2008)

The implementation of the integrated approach to local development, as conceived throughout SIRP Programme, started with the integration of information necessary for effective and efficient decision making processes. Achieving the integration of information is a complex process because it implies not only integration of different, often incoherent, data bases, but also the integration of information activities between governmental, public and other non-governmental or private institutions and organizations, as well as integration of knowledge and technology resources that enable such integration.

In order to ensure that decisions in the process for local development are based increasingly on sound and integrated territorial information, it is necessary to develop a system that will improve data collection and

use, the methods of data assessment and analysis, the availability of information and the production of information usable for decision-making. Therefore, it was use the concept of TIS and experiences of good practices of the Italian partners. (Lalovic, 2008)

Concept of Territorial Information Systems –TIS is a new generation of decision support systems based on GIS technologies developed with aim to support integrated territorial sustainable development. Due to it openness to the all development actors, it represents also new planning and governance instrument. TIS concept comprises its scalable implementation from municipal up to the regional or national level and it is spatially correspondent to the territorial administrative division. It is structured in a way that first of all supports activities coordination and organization of different local institutions, public enterprises, non-governmental organizations, private sector in the process of planning and governance of integrated development. Therefore, it integrates data and information not only about the available resources but also on all activities that put them into function: economic, environmental, social, technological etc. (Lalovic, 2008,1)

The concept of Territorial Information System enables and supports integration in many ways:

- As a tool that provides efficient collection, storing, updating, sharing, publishing of data and information, enabling the integration of information activities among different local governmental and non-governmental institutions and organizations.
- As a tool that allows effective processing, analysis and displaying of all forms of territorially referenced data and information in order to produce accurate, appropriate, fast and integrated information on territorial resources: environment, society and economy. In that way it enables integration of scientific and expert activities, supports knowledge and technology exchange.
- As an instrument to support decision making processes in planning and management the development of the territory by providing integrated complex quality territorial information that reflect various interests and give the possibility of qualitative assessment of decision alternatives to all decision makers, increasing accessibility for all citizens to local development processes and supporting the implementation of the local community integrated development activities.

Territorial information systems are an instrument that initiates and foments integration of a very important part of local community life: knowledge and awareness of its territory and ongoing development processes. One of the main conceptual assumptions of TIS is also that it is developed as a tool which will provide wider territorial integration. For example, if TIS is developed in two neighbouring local communities following common basic rules and norms, it will provide integration of information activities between two local authorities enabling recognition of common interest and supporting development partnerships. In that way territorial “borders” divisions vanish. The assumption that all local communities have developed their local TIS provides the ground base for development of regional and national TIS. Data and information, which are in details collected and processed on a local level, can be integrated and processed to provide valuable information necessary to manage regional development and certify national development policies. Vertical information integration should be enabled by the established laws, normative and regulatory frameworks which define the common ground for data and technology sharing form local to national territorial levels.

3.1.2 Building up the awareness - information flow, knowledge spread, learning with others

A TI is structured in a way that should provide complex information derived from integrated package of very different data on natural and built environment, socio-economic resources and activities. It this way TIS integrates the information on community life and gives the base for rising the awareness of the citizens about specific details on available community resources, ongoing processes, about participating actors and the results of the actions taken. (Thomas, Humenik-Sappington, 2008) Integrated information on community life enables TIS to be an instrument of quality information production and therefore to support collective decision making. In this way, by activating the abilities of community to exchange knowledge and learn together, TIS stimulates integration of community activities and provides quality base for mutual communication and collaboration in decision making about local development. (O’Looney, 2003)

TIS should also support the community integration on higher territorial level, such as regional, by activating its ability to efficiently and effectively exchange knowledge and experience with partner communities. GIS technologies placed in a fundament of TIS, are providing the ability to join several local TIS in one and to

connect it vertically with higher territorial authorities. This ability of integration is not important only because the intention of vertical coordination but also to enable better territorial marketing or protection of the specific resources that several local authorities share. (Lalovic, 2010.)

3.1.3 Raising the public accessibility to local development processes

Functionalities of TIS are conceptualized in a way that supports public accessibility to local development process in a different ways. Firstly, concept of TIS implies the production of different kind of informative materials (e- publishing, interactive services, printed reports, books and brochures etc.), adjusted to different public needs, that enable public access to local development programs, policies, plans, projects and activities. Special potential of TIS is the ability to map and visually follow the impact of this documents or decision taken on across the community territory on the web in every moment. The main objective is to inform wide public on ongoing activities, and to enable citizens to involve more actively in the community development process.

Secondly, since concept compromises that TIS relies on different sources of data (public, private, civil society) in order to integrate different values in decision making process, it enables that all community groups have accessibility to public portal to express their own stands, opinions and needs on specific development issues.

Thirdly, since usage of TIS provides possibility to produce malty criteria reports and maps understandable and acceptable to all, it enables stakeholders' accessibility to decision making process in more effective way. Therefore, through its conceptual methodology of data acquisition, processing, reporting and dissemination of generated quality information, TIS is supporting local governance to develop its enabling competency.

3.1.4 Supporting the participation process

If we want to make certain decision, it is necessary to understand: what choice we have, what we all want, - what are benefits of our wishes, - what we will lose if we choose one or the other solution. So, in order to support decision making process TIS has to enable not only the overview of the territorial resources and the processes of changing during the past, but also to enable to "look" at the territory through the eyes of stakeholders and to evaluate the possibilities through their own value system or through the system of community shared values. In practice, this requires very often very hard, time and money consuming participatory process, especially in cases dealing with issues of high public interest and importance. (Healy 1997., Innes, 1994)

In these cases TIS can support participatory planning process by provision of complex but understandable and custom tailored information about community life, enabling the citizens to widen the knowledge of ongoing processes in community, raising the awareness of changes in the environment in development processes before they get to discussion arena. (O'Looney, 2003) It is very important that TIS, since collects and integrates data and information from all society levels, enables the stakeholders to built up the information base for specific decision making process in a way that they think is proper and necessary. In that case TIS becomes an instrument to build up the mutual trust and prepares the base for communicative action. In that sense TIS provides a possibility to increase efficiency of the participatory process. The community groups that are to be involved in participatory process can be with the support of TIS efficiently prepared for the collaborative process. (Greene, 2000)

Next, during the participatory collaborative process of alternative scenario definition, TIS with its abilities to process, analyze and simulate different territorial situations, can support generating the alternatives to decide upon. At the end, it has high operative and analytical potentials for establishment of malty criteria evaluation mechanism which will later on be used as a monitoring tool.

4 EXPERINCES OF TIS PILOT PROJECTS IN SERBIAN MUNICIPLAITIES

"TIS are instruments to support planning, managing and monitoring the territory, where "territory", as applied in European practice and conceived by SIRP, goes beyond its spatial connotations and it is understood to be comprised of all its spatial elements, all actors which constitute its communities, its socio-economic and cultural values, and the actions and dynamics that shape its form. The integrated approach to territorial development is thus intrinsic to its own definition, implying both vertical and horizontal integration trough coordinated planning of resources and the use of the territory."(Galassi, 2008)

Experiences from EU counties show the application of TIS to various fields and segment of planning. When considering the public administration and its governance functions, this translates into developing and improving the efficiency and effectiveness of a series of user-oriented services, enhancing the communication and information flow within the local administration itself and its segments, as well as cooperation within community and with state administration, enchasing services to the citizens and business and enabling their participation in decision making processes, trough 1) the development and strengthening of capacities of an organized system of qualified experts and administrators, 2) the definition, rationalization and standardization of administrative procedures and 3) development of data services and appropriate technological infrastructures in order to provide access to data and information to execute administrative process. (Galassi, Lalovic, 2008)

4.1 TIS Pilot projects – key structural issues

Territorial Information System, by its structural complexity, is the system of highly qualified persons skilled in the use of ICT technologies, all forms of territorial data records, and the sets of activities for collecting, storing, updating, processing the data and information in a given institution and organization, supported by the process of elaboration of appropriate and efficient technology-aided tools. The main elements of TIS structure are:

- Territorial data and data base: usability and quality of data and information to form the knowledge base about the territory is achieved by its organization and integration in a Data Base. In real life, numerous records, data and information are collected on different administrative authority levels and within public and other organizations. Experience so far points out that a lot of records and data currently gathered on a local level can't provide high enough qualitative information to support good participative decisions. This means that sources of data and information have to be expanded to a wide range of new alternative sources (field surveys, "non-official" sources from civil society and public sector).
- Human resources: essential elements for developing, managing and using the TIS, carrying out activities for its conceptualization, organization and performance. The engagement of human resources can be structured according to the following roles: developers (urban planners, civil engineers, public administrators or managers), administrators (skilled IT technicians) and users (politicians, managers, entrepreneurs, businessman, unemployed, citizens, even children).
- Information and Communication Technology (ICT): TIS technological element is structured as a combination of hardware, software and ICT supported services. This combination can vary in each specific TIS case and depends on very different factors. The main one being the existing IC Technology level on local level, financial resources and institutional and human capacities to implement high quality ICT solutions. GIS technology is a very important part of TIS. GIS tools allow capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to the earth, and to create interactive queries, analyze spatial information, and present the results of all these operations on thematic territorial maps. However, there will be data that cannot be processed in this way but still be part of TIS and processed by some other software tools.

In order for TIS to function, systematic relations between its key elements should be established and agreed upon:

- Modelling the TIS – integration of people and data: it is a complex process of choosing, structuring and integrating appropriate data on territorial resources in function of local communities' needs to decide upon something. In order to support group decisions in local development processes, data and information are needed, which will give us the best possible picture of the problem in the context that we have to address. The process of modelling the TIS, implies much more than simple collection and integration of existing data records. It implies the necessity of deep understanding of stakeholders needs and preferences. In order to model the TIS, a wide range of local community stakeholders should be engaged to select the specific data and meet their information needs. Only in this way data integrated in TIS can be processed and transformed in quality information for different users.
- Administering the TIS – integration of data and technology: it includes activities on coordinated TIS database development, maintenance and publishing, providing integration of information activities in

the local community. Contemporary solutions of TIS administration are centrally coordinated data sharing of distributed TIS data bases. That means that different local sectoral databases within different institutions and organizations, "owners" of specific set of data and entitled to collect, process and store them and having the responsibility to maintain the database and provide accurate and up to date information, are being shared and used by all community institutions and accessible to the public. In order to accomplish that, a TIS administration and management unit has to be established. The unit is usually placed within the local authority. It is entitled to establish and motivate inter-organizational data sharing and set up usability mechanisms through the establishment of data sharing and integration protocols, standards for data formats, standards for common ICT platform and metadata services. The administration and management of TIS at the local level can be set up in different ways according to the information, human and ICT capacities that the local community has. However, TIS administration should be also organized in a way that provides data and information that fit into norms and regulations that are usually set up on a higher territorial level (regional or national). This provides integration of information activities not only horizontally on local level but also vertically form local to national.

- Developing capacities for the TIS – integration of ICT and human knowledge: different TIS training programs should support the development of the necessary know-how to ensure sustainability of TIS and its proper efficient and effective development and usage. Since TIS by its definition means a permanent process of information services development, it should be matched with capacity building programs for different target groups organized by the unit entitled for TIS management and administration. Trainings should be tailored for different groups of people according to their role (public users, stakeholders, professionals, administrators) and usually scaled from basic trainings, which should provide common understanding on TIS basic concepts, raise awareness of benefits that TIS brings to the community and ways to use it, to advanced trainings, which should provide more sophisticated knowledge and skills necessary for further development of TIS information services. (Lalovic, 2008)

4.2 TIS Pilot projects – applied methodology

The methodology applied in Serbian Municipalities is based on a "step by step" approach, starting from thematic TIS Pilot projects, on an identified specific topic, specifically focusing on issues relevant to the development of the local context and as identified by any of local strategic documents and policies, in order to initiate the TIS and start up the ground for future upgrading and integration. Municipalities identified the implementation of Municipal TIS as an important tool to inform decisions and monitor development strategies and projects.

In each Municipality a Coordination body was formed, constituting from political and management representatives of the institutions and organizations related to pilot project topic. Their function was to support the development of the TIS project, to initialize and facilitate institutional collaborations for the implementation, evaluation and the assessment of achieved results. Technical working groups have been appointed by Coordination Body, comprised of members from different sectors, in order to ensure an integrated approach to setting up and developing the TIS.

Municipal working groups of experts and technicians have been following an iterative and incremental process for the development and further upgrading of the municipal TIS. The implementation process has been tailor made for each municipality and comprises several cycles of similar activities: - Designing and programming – conceptual definition and modeling of the database and identification of users' needs, - Implementation, acquiring and processing the data and integrating the data records, - evaluation and dissemination of the results. Each of tree cycles, have been carried out for each step and allowed the testing and upgrading of specific implemented technical solutions, quality appraisals of results. The final results of each TIS Pilot project have been published in Atlas booklets, on interactive DVDs, containing the geo-database accessible for consultations trough interactive maps and specific query investigations and some of then on the web which. (Galassi, Lalovic, 2008)

4.3 TIS Pilot projects – short rewiew

4.3.1 TIS for municipal land management in Valjevo

The Pilot Project was identified in order to address a series of problems the Public Administration of Valjevo was facing in managing municipal land properties and initiating the process of development of its territory. The development of an integrated information system was identified as a vehicle to upgrade the municipality's capacities to attract new investments and thus increase employment opportunities, especially for the poor and vulnerable groups of citizens.

Main problem to be addresses was the inefficiency and ineffectiveness in responding to the demands of potential investors since the Municipality could not provide public access, prompt and adequate information about possibilities of activating construction land. It happened that the same transaction over a real estate took place twice because of the lack of available and integrated information on performed procedures. Different administrative disintegrated systems of identification of lots in the land cadastre and ownership books make it hard to determine lots. Decision-making based on small number of correct data can be more reliable than decision making based on wrong data. In this context, the purpose of Pilot Project was mainly rising awareness of managers and other stakeholders in the local community about advantages and importance of using TIS.

The main goals of the Pilot Project are thus to support decision-making processes for management of municipal land at different levels and for different stakeholders; to integrate data from the cadastre and municipal land records in one integrated system oriented towards different users' needs; to provide access to diverse information on municipal land (current and planned conditions and land use, and infrastructure equipment) through the production of different interactive thematic maps and textual reports, and possibilities of multi-criteria search; to monitor effectively and efficiently the changes in the territory.

The TIS Pilot project in Valjevo has been realized by integrating different types and sources of data. In order to improve the quality of information to stakeholders in the area of management and development of municipal land, spatial data (digital orto-photo and land model, digitalized master plan and spatial plan, street network in digital format, cadastral maps) and alphanumerical data (land records) from various sources have been integrated. Data sources that have been used are: the Municipality of Valjevo, Cadastre–RGZ SKN Valjevo, Republic Statistical Office, Public Enterprise Directorate for town planning, construction land, roads and construction of Valjevo.

„Our vision for the development of TIS in the municipality implies the implementation of a distributed network of databases of municipal institutions integrated in a unique TIS. Therefore, further steps, based on existing TIS pilot project results, would be the following: presentation of TIS pilot project results to the public, local self government and experts with the aim to obtain the support for further development of TIS; expansion of inter-institutional co-operation by enhancement of already existing co-operation between Municipal administration, Public Enterprise Directorate for town planning, roads and construction, as well as by inclusion of other institutions that would have benefit from TIS; upgrading and further integration of the Pilot TIS through mapping of all planning documents, as well as integration of additional data related to public lighting, spatial and alpha-numeric (socio-economic) data.", was stand of Valjevo TIS team at the end of project implementation.

4.3.2 TIS Pilot Project to support tourism development – „The Best of Čačak"

In line with the adopted City of Čačak Development Strategy and the action plans on tourism and ICT, the implemented TIS Pilot Project aims at (1) initiating the development of TIS in the municipality as an instrument to support strategic decisions, implementation and monitoring of different plans in the field of tourism development, (2) raising awareness about the advantages of using TIS in everyday work of the Public Administration, as well as (3) promoting touristic resources and potentials of the territory.

Specific objectives of the project ware to initiate an integrated database of tourism resources and potentialities, and to ensure accessibility, integration and quality of data and information through the use of GIS technology, and the elaboration of different interactive analytic and thematic maps.

The Pilot Project integrated spatial and alpha-numeric data from different sources: Public Enterprise Gradac, Tourist Organization, Autoprevoz Čačak, Hiking Association Kablar, MGI Beograd, Geokarta Beograd. The

data have been collected, archived and integrated in a geo-data base providing integral information about touristic resources in the municipality of Čačak.

Different users of the municipal TIS have been identified: - Citizens and tourists interested mainly in tourist resources and activities in Čačak municipality. The interactive tourist map published, is intended primarily for promoting and informing tourists on Čačak tourist offer. The TIS publications illustrate the diversity of information that an integrated information system can offer to them; - Municipal decision makers, public servants, experts, the private sector, and citizens interested in the analytical part of Čačak tourist TIS. This modern information tool enables territorial analysis, when sectoral resources necessary for tourism development are in question. It is possible to access complex information on Čačak tourist zones, evaluate the degree of their development and identify strategic directions for potential improvements. Decision makers and municipal officers can obtain complete access to information by consulting the interactive TIS geo-database, and which is being permanently updated and kept in the municipal IT department.

The Development of information services and co-ordination of information activities in the Municipality of Čačak have been particularly intensive in the last few years. The municipal administration invested major efforts and significant resources in technological modernization of the IT department and this way it set up the conditions for development of modern tools to support management of territorial development. The activities on integration and harmonization of municipal databases have started. From that point of view, the TIS pilot project ”The best of Čačak” is one of very important projects because it introduces technological and organizational innovations to information services of the municipality – introduction of GIS technologies in the process of integration of municipal data, establishment of new procedures of intensive inter-institutional co-operation and strengthening the capacities of municipal officers.

“We truly hope that this project will contribute to the further development of tourism in our municipality, that the number of tourists, who find in Čačak and its vicinities their oasis of pleasure and leisure, will increase significantly and that the visibility of touristic potentials through the maps of this project will contribute to raising awareness on the significance of investments in tourism. The first next step in further upgrading and integration of our municipal TIS is to initiate the next pilot project in support to the management of economic resources and potentials of the municipality, as well as creating a digital address system on town and municipality level, and integration of additional spatial (first of all planning) and alpha-numeric (socio-economic) data.”, was stand of Čačak TIS team at the end of project implementation.

4.3.3 TIS to support rural development – „The ID card of rural villages„

The City of Nis recognized the need to improve the quality of information about rural areas to inform and support plans and actions for their future development. Therefore, the City decided to develop TIS to support rural development aiming towards information accessibility to various users and integration of data from different sources to achieve quality. The focus of TIS Pilot was the Municipality of Pantelej due to the fact some previous field research was done, through the Project “ID of villages”, and acquired data on different topics relevant to rural development. Furthermore, it was decided to improve database and additional alphanumeric as well as spatial data ware captured.

TIS office was established within the Municipality of Pantelej and equipped with hardware and software. During the period of development of TIS Pilot data from the following sources ware integrated: Municipality of Pantelej, PC Urban planning Agency, Clinical Centre Nis, Institute for cultural heritage and monuments protection, Serbian Orthodox Church, PC for Environment Protection, National Statistical Office.

In the final phase 18 interactive maps and reports ware published that cover four aspects of rural territory: - Ownership structure – maps that give information on the size and type of the ownership of the farms, - Economic structure – different queries on the type, size, income of economic production on the farms. - Social structure – maps and reports with data on number, density, marital status, income, profession of the inhabitants, -Natural and built environment – different integral information with data on areas covered by forests, mountains, agricultural land, built areas with services, agricultural facilities.

A project for further upgrading and unification of the city Information System has been formulated within the City of Nis Development Strategy, adopted in 2008, under the Operative Axis 4 on Governance: strengthening vertical and horizontal governance and participation of citizens and stakeholders, implementing an efficient system for planning, formulation of policies, monitoring and evaluation.

4.3.4 TIS Pilot Project on Touristic Resources in Kraljevo

Main purpose of the TIS we developed is to provide an integrated database on tourism in Kraljevo. The conceptual model of TIS database was oriented to its different potential users: tourists, experts, entrepreneurs, decision makers and we tried to integrate as much data as it was possible in one year period. During the different phases of the project implementation great emphasis was put on collecting relevant data. Most of the data was collected during field visits, although already existing data was used as well. The institutions that provided data are: PC Directorate Kraljevo, VGI Belgrade, Republic Geodetic Institute, Touristic Organization Kraljevo, Museum of Kraljevo, Municipality of Kraljevo, PTT and Telenor, Public Enterprise Serbia Railways, Kayak organization.

As a result of integration of various sources of data, spatial queries and interactive thematic maps on promotion and development of touristic resources and potentialities in Kraljevoware created: - Touristic map of Kraljevo, -Level and type of touristic potentialities in Kraljevo, -Analytical maps on traffic network and transportation, natural resources, services, demography, -Touristic potentialities and planning documentation.

TIS was institutionalized through the establishment of TIS working group as part of the Project Center, established in 2007., within the Municipality. The Project Center is active in raising awareness and motivating different stakeholders in the municipality to provide support and involve them in the overall process of development and improvement of TIS in Kraljevo. On this metter the official collaboration with Technical university of Kraljevo was establised. Next steps for upgrading of the TIS ware in the field of development of industrial zones, support rural development and management of municipal land. Now TIS is used for decision making base for Kraljevo Development Strategy formulation.

4.3.5 TIS to manage the development of industrial zones in Kragujevac

The TIS Pilot Project in the city of Kragujevac is addressing management of the first phase development of working zone along the highway Kragujevac – Batočina. Intention was to explore and identify possibilities of providing quality information to support the process of urban investments and project management for different groups of users such as decision makers, public offices of the city administration, private sector investors and other stakeholders interested in specific site construction.

On order to achieve pilot project goals TIS working group made an effort to integrate as much data and information as possible, necessary for Kragujevac investment zones development, such as: Master Plan of the city of Kragujevac 2015, the city investment guide, cadastral maps, cadastral maps of service infrastructure network, orto-photo, street network, plans of detailed regulation, urban acts, geological map. Very close collaboration on data sharing and integration was developed between key local and national institutions and organizations: Public Enterprise Directorate for town planning, the city assembly, Cadastre Office, Republic institute for statistics, Geokarta Beograd.

Significant results ware reached by provision of different interactive maps, textual and numeric reports, graphs and diagrams which refer to resources and potentials of the working zone giving the data on each construction site (spatial, type, structure, land utilization, geologic characteristics, planned building capacities, infrastructures). The Pilot Project has been expanded with integration in the overall map of all other working and industrial zones on the territory of Kragujevac. In the near future, They we plan to develop TIS on city land management using the experiences and models developed by the City of Valjevo.

TIS to support management of municipal housing stock in Pančevo

The municipality of Pančevo decided to support the development of the TIS tool to support municipal social housing programs implementation defined within the housing strategy of Pančevo with two main goals: raise awareness of local authorities and get necessary political support for further development of Pančevo TIS, and increase efficiency and effectiveness in management of the municipal housing stock.

Two attempts to activate the TIS project and setting up its organizational structure have been carried out during the year 2007, which successfully concluded with the involvement of the municipal administration, the IT Department, the Public Enterprise municipal Housing Agency, and the Public Enterprise Directorate for planning and construction. Significant amount of time was spent for the organizational preparation of the TIS Pilot Project, resulting in a short timeframe to be dedicated to operative work. In spite of the starting

difficulties we succeeded to establish an operative TIS team, which succeeded to reach significant results in a five months.

The geodatabase for social housing apartments records has been modeled and integrated with numerous spatial and alpha-numeric records. The focus of the pilot project has been the social housing building in Strelište, newly constructed with the support of the SIRP Programme. Spatial data and maps (Plan of Detailed Regulation, service network cadastre map, etc.) were collected and processed by the Public enterprise Directorate for planning and construction, and alpha-numeric data were collected from the Public Enterprise Municipal Housing Agency, and then integrated in interactive maps. This experience highlighted the need for development and introduction of standards and protocols for data sharing among institutions, further application and upgrading of TIS to support the implementation of social housing strategy.

5 CONCLUSION

Together with the cities of Cacak, Kraljevo, Kragujevac, Nis and Valjevo, UN-HABITAT has received the First Prize at the 16 Serbian Salon of Urbanism for the realization of Municipal Territorial Information Systems Pilot Projects in the category of "Application of Information Technologies to Planning", which main theme was "Urban Challenges", presented to the wide public the recent achievements in the sphere of urban and spatial planning, as well as innovative approaches to local strategic planning for development.

However, experiences of Municipalities that started TIS development showed that there are many problems that have to face during the implementation.

First of all, there is a problem of insufficient political support especially in the conditions when this activity is not regulated by national regulations or law. Comparing to the EU context, more regulated framework is given by numerous EU and national documents and policies that regulate and foster development of information activities of authority institutions, in spite of the fact that some of the member states still didn't put larger effort in their development. Insufficiency of political support is tightly linked to low level of awareness and knowledge about what the benefits of TIS are, and what is its role in the process of planning and governing the sustainable development, even in the context of development driven by market forces, described before. Still, in cases that we performed this experiment it was possible to acquire necessary support due to numerous activities that included not only the meeting with Authority representatives but also organizing round tables, specific trainings for a wider range of authority employees. In this process it was very important the fact of the presence of international support since there is higher trust in international authority than in national. Later on in the process in the phases of publishing the TIS results in each cycle, we succeeded to initialize to redirect focus on some questions of sustainability and to initialize public discussion on this meters. Thanks to the power of visualization that TIS has, we achieved this.

Secondly, the current institutional and organizational procedures in Serbia are mostly in conflict with the ones brought with concept of TIS. Institutions are very closed in their administrative and business performance and resist to a new forms of collaboration due to their fear that they will lose the share of power in community relations if they give and share the information that they have. Old administrative procedures are made in a way that is often very unclear what data is collected by which institution and they also don't have any protocols that oblige them to exchange the data or to share them. So often, we have the experience that there are many redundant and incorrect administrative data records depending on the fact which administrative body we address. The problem is more complicated in the moment when we face the fact that some of the data is owned by national institutions, since there is no efficient communication between local and national government levels. During the process of TIS pilot project implementation we succeeded trough work in practice to develop the atmosphere of trust between participating organizations and to in some of the municipalities foster institutionalization on a local level of these relations by establishment of protocols of data exchange and publishing. At the end this quality is also recognized on a national level, and now we have TIS recognized as important instrument of development within the National Strategy of Spatial development of Republic of Serbia adopted last year.

Thirdly, not all municipalities have the human and ICT capacities to develop TIS, i.e. the basic resources available in differen municipalities vary a lot. Finally, there is not enough level of e/services available to the public and the level of public e-knowledge is still low. This issue is vary serious and needs very creative strategies to find appropriate financial solutions to support further building capacities processes in

municipalities due to the fact that because of the current economic situation public investment in this field are not the priority.

In order to overcome these constraints it is necessary to organize comprehensive educational activities on raisin the awareness and promoting the importance of TIS, building up the knowledge and disseminating the skills, aiming to: - acquire necessary political support on national and on local levels, - foster collaboration between authority and public institutions, nongovernmental organizations and private sector in sharing the data and information using contemporary ICT solutions, - built up local human capacities for TIS development, - foster regulatory and normative reform necessary for information activities organization and coordination, - building up the capacities of the wider public access to TIS, etc.

Experience of Serbian municipalities is that more efficient and effective way to implement TIS concept is step by step approach, because implementing starting up the idea from the stretch, also acquires consuming participatory and collaborative process followed by slow and time consuming process of attitude and values change of all actors involved. In order to initialize TIS development Pilot project topic must be agreed in participatory and collaborative way and through several criteria: - urgency of a problem that must to be meet, - knowledge and motivation of the people that are to be involved in process, - available technological and financial resources, - amount and quality of already available data which provides base of producing fast firs results. Also experience of applied methodology showed that incremental process of implementation through several cycles builds trust between participating actors and also trust in their own capabilities to perform the task. So during the process when first results are visible after short period of time, also foster necessary political support.

At the end the most important thing that we achieved during the process is the fact that communication and collaboration techniques that we delivered during the pilot TIS implementation created the atmosphere of trust between the institutions involved in certain topic or sector, so their role and importance was redefined and recognized in new way. Now in many municipalities recognized partners from TIS pilot projects are also included in planning activities. Also this experience is also started to be applied in other topics of TIS expansion.

A almost one year after the closure of SIRP project four of the municipalities continued very intensively to develop TIS: Cacak, Karljevo, Kargujevac and Nis, relaying on their own resources. In Valjevo and Pancevo due to unclear political conditions the activities continued but much less intense. Very important are also the activities of the municipalities in mutual collaboration and knowledge and experience exchanged since they worked on different topics. The collaboration is also expanded to other municipalities which started with applying the GIS technologies.

Ours, national team that followed this project, overall impression is very satisfying and a bit surprising. Firs, at the beginning of project we expected one of the municipalities to achieve expected results on mach more modest level, yet we succeeded to implement the whole scope of the project in all municipalities. Second, for us it was surprising that preparatory phase, collaboration in participatory way and education and training, took twice longer time than the practical implementation of the project. From the point of view of the academic education and research that we represent, we gained valuable experience that we already incorporated in our curriculum.

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Die Aktivierende Stadtdiagnose – Vorstellung einer stadtpsychologischen Methode zur Förderung nachhaltiger Stadtentwicklungsprozesse

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1 KURZFASSUNG

Das stadtpsychologische Verfahren [Aktivierende Stadtdiagnose] bildet die Grundlage für nachhaltige Stadtentwicklungsprozesse, die eine repräsentative Beteiligung der Öffentlichkeit vorsehen. Die Menschen werden zur Teilnahme aktiviert, da sie ihre eigenen Themen, Sichtweisen und Anliegen einbringen können. Die besondere Stärke dieses Verfahrens liegt darin, jene zu erreichen, die üblicherweise an solchen Beteiligungsprozessen nicht teilnehmen. Im zweijährigen wissenschaftlichen Forschungsprojekt „Kulturlandschaftsforschung und Agenda 21“ wurde die gemeindepsychologische Methode ‘Community-Diagnosis’ von Prof. Francescato (FRANCESCATO, 2000), Uni Rom, mit einem interdisziplinären Forscherteam und 12 internationalen Experten/-innen wissenschaftlich weiterentwickelt und in sechs österreichischen Gemeinden erprobt. Die Teams haben sich in unterschiedlicher Ausprägung (immer mit einem stark umwelt- und gemeindepsychologischen Schwerpunkt) aus ausgebildeten Wissenschaftlern/-innen und Studierenden folgender Disziplinen zusammengesetzt: Psychologie, Soziologie, Philosophie, Landschaftsplanung, Umweltökonomie, Geografie, Biologie, Kulturtechnik & Wasserwirtschaft.

Zuvor wurde die Methode ‘Community-Diagnosis’ im Pilotprojekt ‘Lokale Agenda 21 Alsergrund’ angewandt. Aktuell kam die Methode im Jahr 2009 in einer burgenländischen Gemeinde zum Einsatz. „Die Stadt aus der Sicht ALLER Bewohnerinnen und Bewohner zu verstehen“ lautet der zentrale Ansatz. Es geht darum zu erfahren, was die Menschen über die Zukunft ihrer Stadt denken, was die Themen sind, die sie bewegen und mit wem sie sich darüber austauschen. Methodisch werden qualitative Einzel- und Gruppeninterviews mit Bewohnern/-innen und Entscheidungsträgern/-innen nach Grounded Theory (GLASER & STRAUSS, 1998; CHARMAZ, 2006) durchgeführt und durch Beobachtungsverfahren ergänzt (FLICK, 2007). Als Ergebnis wird eine repräsentative stadtpsychologische Diagnose erstellt, die besonders auf jene lokalen Besonderheiten hinweist, die für eine zukunftsfähige Stadt- oder Gemeindeentwicklung von Bedeutung sind. Ein wesentliches Element dabei ist die Darstellung all jener Gruppen, die in eine nachhaltige Entwicklung einzubeziehen sind. Diese Darstellung nennt sich ‚Kommunegramm’. Mit der [Aktivierenden Stadtdiagnose] erhalten Gemeinden und Städte eine fundierte Unterlage, auf deren Basis sie nachhaltige Stadtentwicklungsprozesse starten können. Einerseits wird die Bevölkerung durch die Befragung motiviert, an weiteren Gemeindeprozessen mitzuwirken. Zweitens können die Ergebnisse der Diagnose mehrere Jahre als Entscheidungsgrundlage für politische Strategien herangezogen werden. Drittens wird auf lokale Besonderheiten Rücksicht genommen. Diese Methode stellt somit eine Verknüpfung des gesellschaftspolitischen Modells der nachhaltigen Entwicklung mit umwelt- und gemeindepsychologischen Ansätzen, sowie Methoden der Organisationsentwicklung dar.

2 EINLEITUNG

Die [Aktivierende Stadtdiagnose], im folgenden ASD genannt, ist ein qualitativ ausgerichtetes, methodisch vielschichtiges, teilstandardisiertes Verfahren, das disziplinenübergreifend sozialwissenschaftliche und psychologische Elemente enthält. Mit der ASD können zukunftsfähige Potenziale einer Stadt ausfindig gemacht und die Stadt auf einen partizipativen Stadtentwicklungsprozess vorbereitet werden.

Zur Erstellung der ASD werden lokale Akteurinnen und Akteure umfassend in den Erhebungsprozess einbezogen. Entsprechend einem Grundsatz der Stadtpsychologie werden im Besonderen die Bewohnerinnen und Bewohner angeregt und ermutigt, sich zu beteiligen. Das in einer Stadt vorhandene Beteiligungspotenzial wird dadurch von Anfang an auf ein höheres Niveau gehoben und die Beteiligungskultur gestärkt. Nun betrifft der Beteiligungsprozess nicht nur die Bewohner und Bewohnerinnen einer Stadt, sondern natürlich auch die Stadtverantwortlichen. Der Nutzen und der Gewinn für die Entscheidungsträger aus der ASD finden sich nachfolgend angeführt.

2.1 Der Gewinn aus der ASD für die Stadtverantwortlichen

Die Verantwortlichen einer Stadt erhalten eine umfassende und detaillierte Analyse der Stadtwahrnehmung und des Verhältnisses der Bevölkerung zu ihrer Stadt.

Sofern das Vorhaben, einen nachhaltigen Weg einzuschlagen besteht, finden sich in der AS-Diagnose all jene Themen aufbereitet, die es diesbezüglich zu behandeln gilt.

Der Vorteil liegt dabei u. a. auch darin, zu erfahren, wie sich die Bevölkerung zu diesen Themen positioniert.

Neben den Stärken und Schwächen der Stadt werden auch die unbewussten Wahrnehmungs- und Denkmuster, die sich negativ auf die weitere Stadtentwicklung auswirken können, erkennbar.

Erschlossen wird ferner, bei welchen Bewohnerinnen- und Bewohnergruppen eine besonders hohe Bereitschaft zur Beteiligung vorhanden ist.

Die Erfahrung hat gezeigt, dass sich nicht zuletzt durch den von der ASD ausgelösten Stadtentwicklungsprozess die Kommunikation ganz allgemein und im Besonderen zwischen Politik und Bevölkerung verbessert. Die Menschen einer Stadt begrüßen es, wenn sie um ihre Meinung gefragt werden. Der Politik wiederum nützt es, um die Meinung der Bevölkerung fundiert Bescheid zu wissen. Insgesamt erhalten die politischen Verantwortlichen mittels ASD auch eine qualifizierte Grundlage für alle politischen Entscheidungen, bei denen die Haltung der Bevölkerung von besonderem Interesse ist.

Die ASD enthält zudem eine über die angeführten Punkte hinausgehende Vielzahl an Zwischen- und Nebennutzen. So löst bspw. nicht selten die Anwesenheit eines externen Forscher-/Forscherinnen- und Berater-/Beraterinnen-Teams den einen oder anderen Konflikt, der schon längere Zeit in einer Stadt schwelte und nicht gelöst werden konnte. Donata FRANCESCATO (2000) beschrieb den allgemeinen Nutzen einer Stadtdiagnose wie folgt: “The benefit a community has by hiring an outsider team, which does this kind of work is like to go to a doctor for diagnosis what our health is what the community’s health is … so it is a tool to plan your own future …” [Der Gewinn, den eine Gemeinde daraus zieht, dass sie ein Team von außerhalb engagiert, das diese Art von Arbeit verrichtet, ist vergleichbar mit dem Besuch bei einem Arzt. Dieser stellt die Diagnose über unsere Gesundheit, mit der Stadtdiagnose erhalten wir eine Diagnose über die Gesundheit der Gemeinde…sie ist also ein Werkzeug, um unsere Zukunft zu planen…]

2.2 Der Gewinn aus der ASD für die Stadtbevölkerung

Die Stadtbevölkerung erhält mit der Diagnose eine leicht fassbare und gut verständliche Rückmeldung darüber, welche und wie viele verschiedene Bevölkerungsgruppen in der Stadt vorhanden sind und in welchem Verhältnis diese sich zueinander befinden, wer in der Stadt „das Sagen“ hat und welche Stimmen ungehört bleiben - was den Bewohnern/-innen in der Regel nicht völlig unbekannt ist. Durch die ASD findet sich dieses Wissen jedoch in umfassender Form aufbereitet. Erst die Zugänglichmachung dieses Wissens ermöglicht den Bewohnerinnen und Bewohnern sich in der Folge zu positionieren, ihre Stellung in der Stadt aber auch zu hinterfragen. Für Bevölkerungsgruppen, die am Rand einer Stadt agieren, ist diese Form der Rückmeldung oft der erste Schritt, sich aus einer bspw. isolierten Position zu befreien.

Dazu ermutigt die Diagnose ebenfalls: Sich über die eigene Stadt Gedanken zu machen, um sich aktiv an einer Veränderung zu beteiligen. Die ASD birgt viele Potenziale in sich: Sie ist Analyse, Diagnose, Befund und Beratungsansatz in einem. Sie kann sich für eine Stadt und ihre Bewohner über viele Jahre als äußerst nützlich erweisen, sofern sich Bewohner und Verantwortliche ernsthaft und gemeinsam auf einen zukunftsfähigen Weg begeben (wollen).

3 ABLAUF EINER AKTIVIERENDEN STADTDIAGNOSE

Die ASD kann prinzipiell auf alle Gemeindeformen (Katastralgemeinde, Standardgemeinde, Marktgemeinde, Stadtgemeinde…) angewandt werden. Unterhalb einer Einwohnerzahl von 1000 Personen, empfehlen sich aus ökonomischer Perspektive modifizierte Varianten der Diagnose; nach oben hin sind betreffend Größe einer Stadt oder Gemeinde kaum Grenzen gesetzt. Auch Millionenstädte stellen kein Problem dar. Im Gegenteil, die ASD wurde von Anfang an (auch) für große Städte konzipiert.

Abhängig von der Größe der Stadt (nach Einwohnern und Fläche) sind sowohl Größe des Forscher-/-innen-Teams als auch Dauer der ASD. Als Richtwert kann gelten, dass das Forscher-/-innen-Team aus ca. acht

Personen besteht und eine ASD rund vier Monate dauert. Für die Arbeit in der jeweiligen Stadt wird ein interdisziplinäres Erhebungsteam zusammengestellt und eingehend vorbereitet.

ARBEITS-SCHRITT	ABLAUF/INHALT	
Schritt 1	**AUFTRAGSVERGABE**: Beschluss zur Durchführung einer [Aktivierenden Stadtdiagnose] durch die Gemeindevertretung	BEGLEITENDE ÖFFENTLICHKEITSARBEIT
Schritt 2	**ERSTINTERVIEW** mit dem Bürgermeister/der Bürgermeisterin	
Schritt 3	**DATENERHEBUNG** IN DER GEMEINDE: Erhebung von Primär- und Sekundärdaten mittels Triangulation, Komparativer Analyse und Theoretischem Sampling	
Schritt 4	**IST-ANALYSE:** Themenanalyse (Darstellung der zentralen Gemeindethemen) und Erstellung eines Kommunegramms	
Schritt 5	**DIAGNOSE** DER ZUKUNFTSPOTENZIALE: Herausforderungen auf dem Weg zu einer zukunftsfähigen Stadt	
Schritt 6	**REFLEXIONSGESPRÄCH:** Rückmeldung der Ergebnisse an BürgermeisterIn / Gemeindevorstand	
Schritt 7	**DISKUSSION DER ZUKUNFTSPOTENZIALE** mit der interessierten Bevölkerung	
Schritt 8	**BEFUND** (Dokumentation)	
Schritt 9	**ABSCHLUSS**: Übergabe der ASD (Befund) an BürgermeisterIn / Gemeindevorstand	

Abb. 1: Übersicht zu den neun Arbeitsschritten einer Aktivierenden Stadtdiagnose.

3.1.1 Schritt 1: Auftragsvergabe

Eine grundlegende Voraussetzung für die Durchführung der ASD ist eine politische Entscheidung. Dieser vorangestellt ist zunächst ein gemeinsamer politischer Wille, der im Beschluss mündet, eine ASD durchzuführen, um für die Herausforderungen der Zukunft (besser) gerüstet zu sein. Ein konsensualer Beschluss vonseiten der Gemeindevertretung ist dabei unbedingt anzustreben. Geht diesem ein ausführlicher inhaltlicher Diskussionsprozess voraus, erhöht es die Erfolgschancen der Diagnose, da davon ausgegangen werden kann, dass bei den politischen Entscheidungsträgern ein Problembewusstsein hinsichtlich anstehender Veränderungen der Gemeinde und ein damit einhergehender Wunsch nach Veränderung vorhanden ist. Üblicherweise nehmen der Bürgermeister oder die Bürgermeisterin (der Bezirksvorsteher oder die Bezirksvorsteherin) während der ganzen Verfahrensdauer eine zentrale Rolle bei der Durchführung der ASD ein. Sie sind am Beginn (bereits im Vorfeld eines Gemeinderatsbeschlusses) die ersten Ansprechpersonen, die über die Vorgehensweise, das Ziel und den Ablauf der Methode informiert werden und sie treffen die (Vor-) Entscheidungen, ob und wann eine ASD in ihrer Gemeinde durchgeführt wird. Schon bei den ersten Vorgesprächen informiere ich darüber, dass die politische Unterstützung über die gesamte AS-Diagnosephase für den Erfolg wesentlich ist. Die politische Unterstützung muss dabei über die gesamte AS-Diagnosezeit nach außen (für die Bevölkerung) und nach innen (für die Gemeindevertretung) sichtbar und spürbar sein. Dies ist wichtig und notwendig, wenn tragfähige nachhaltige Veränderungen bewirkt werden sollen. Zudem zeichnet die ASD ein sehr ehrliches Bild über die Gemeinde und liefert möglicherweise auch Ergebnisse, die den politischen Entscheidungsträgern nicht zu 100 Prozent gefallen. Gerade dann braucht es die politische Unterstützung von höchster Ebene, da ansonsten die Gefahr besteht, dass der begonnene AS-Diagnoseprozess ins Stocken gerät. Üblicherweise übernehmen der/die BürgermeisterIn oder der/die BezirksvorsteherIn in ihrer integrativen und überparteilichen Funktion die Rolle der Vertrauens- und Ansprechperson für den AS-Diagnoseprozess. (In Ausnahmefällen übernimmt ein Mitglied des Gemeindevorstands diese Aufgabe).

3.1.2 Schritt 2: Erstinterview mit dem Bürgermeister/der Bürgermeisterin und Auswertung

Das Ziel des ersten Interviews mit dem Bürgermeister/der Bürgermeisterin besteht darin, einen ersten Eindruck, ein erstes Bild von der Gemeinde zu gewinnen. Dieses erste Gemeindebild wird durch die darauf folgende Erhebung entweder bestätigt, modifiziert und nicht selten auf den Kopf gestellt.

Beim Erstinterview mit dem Bürgermeister/der Bürgermeisterin bin ich vorrangig an den aktuellen Themen der Gemeinde interessiert. Auch will ich wissen „wo" es der Gemeinde gut geht, „wo" aktuelle Probleme liegen und welche Lösungsansätze diesbezüglich vorhanden sind. Weiter führende Fragen zielen darauf ab, herauszufinden, wer (Einzelpersonen, Gruppen) das Gemeindegeschehen aktiv mitgestaltet und wem bzw. welchen Gruppen eine Außenseiterposition zugesprochen wird. Für die weitere Datenerhebung wichtig ist auch die Nennung sog. „Lokaler Akteure", d. s. Personen, Gruppen, Institutionen, die gemeinderelevante Funktionen innehaben. Auch muss für das weitere Verfahren eruiert werden, wo möglichst viele unterschiedliche Bewohnerinnen und Bewohner anzutreffen sind, um diese befragen zu können. Gegen Ende des Erstinterviews stelle ich (bewusst offen gehalten) stets die Frage nach der Zukunft der Stadt. Den Abschluss des Erstinterviews mit dem Bürgermeister oder der Bürgermeisterin bildet die Frage nach einsehbaren schriftlichen Unterlagen über die Gemeinde, wie beispielsweise der Stadtchronik.

Orientierungspunkte für die Gestaltung eines Interviewleitfadens mit dem/der Bürgermeister/in:

- Welche Themen bewegen Ihre Stadt?
- Wer spielt in der Stadt eine Rolle, wer nicht?
- Wenn ich an einem Tag möglichst alles über Ihre Stadt erfahren wollte, was sollte ich tun (wohin gehen, mit wem reden)?
- Wenn sie an die Zukunft ihrer Stadt denken, was fällt Ihnen dazu ein?
- Wo sind schriftliche Unterlagen über ihre Stadt zu finden?

Nach der Auswertung des ersten Interviews beginnt das Forscher-/-innen-Team mit der Datenerhebung in der Gemeinde.

3.1.3 Schritt 3: Datenerhebung in der Gemeinde

In diesem Verfahrensschritt werden die Wahrnehmungen und Bewertungen über die Gemeinde umfassend erhoben und bewertet - die in den Köpfen der Bewohnern ‚versteckten' Stadtbilder werden sichtbar gemacht. Es sind Bilder, die Hoffnungen, Wünsche, Ängste, Visionen, Vorurteile, Gefühle und Gedanken in Bezug auf die eigene Stadt enthalten. Es wird nicht erwartet, dass sich diese Bilder (Innenperspektiven) zwingend mit den objektiven Daten, die in einem späteren Arbeitsschritt ebenfalls erhoben werden, decken. Die Erhebung wird von einem interdisziplinären Forscher-/-innen-Team durchgeführt, das während der gesamten Erhebung Vorort anwesend ist. Es wird festgehalten, welche Themen zur Sprache gekommen sind, mit welchen Personen oder Gruppen Kontakt aufgenommen wurde, was über die Gemeinde erzählt wird, aber auch was beobachtet werden konnte und wie sich die Stimmung in der Gemeinde darstellt. Der Blickwinkel des Forschungsteams ist immer auf Gleichheit aller Bewohner/-innen und aller Bedürfnisse ausgerichtet.

Abb. 2: Die Fun-Fahre-Agenda: Ein Beispiel für aktivierende Öffentlichkeitsarbeit in Wien-Margareten.

Methodisch gehe ich in der ASD mittels Triangulation und Komparativer Analyse vor (ARBEITSKREIS QUALITATIVER SOZIALFORSCHUNG (Hg.); 1994; BOHNSACK; 1999; BREUER, 1996; CHARMAZ, 2006; FLICK, 2004; FLICK, 2007; GLASER & STRAUSS, 1998). Triangulation bezeichnet den Einsatz mehrer Erhebungsmethoden, deren Ergebnisse zueinander in Beziehung gesetzt werden, um zu qualifizierten Ergebnissen zu kommen. Die Komparative Analyse bezeichnet in Anlehnung an GLASER & STRAUSS (1998) den parallel laufenden Prozess der Datenerhebung, Datenanalyse und Dateninterpretation. Erhoben wird so lange, bis eine Verallgemeinerbarkeit der Ergebnisse mittels theoretischer Sättigung erreicht ist. Die qualitativ-zirkuläre Vorgehensweise endet, wenn keine neuen Informationen vorhanden sind; das Feld gesättigt ist. Die Via Regia der Stadtpsychologie, die ASD besteht aus einer Vielfalt an qualitativen Erhebungsmethoden, die eingesetzt werden, um zu wissenschaftlich abgesicherten Ergebnissen zu kommen. Darin enthalten sind der Empirische Stadtspaziergang, das Problemzentrierte Interview, Brainstorming, Fotodokumentation, Bildanalysen, sowie die speziell für Jugendliche entwickelte Methode - „write a movie script“ . Die ursprünglich auf FRANCESCATO (2000) zurückgehende „movie-script“-Methode macht Gemeindeanliegen sichtbar, die in den Familien thematisiert und in den Jugendlichen unbewusst vorhanden sind. Die movie scripts bilden in der Folge die Gemeindestimmungen ab und dienen dem Bewusstwerdungsprozess.

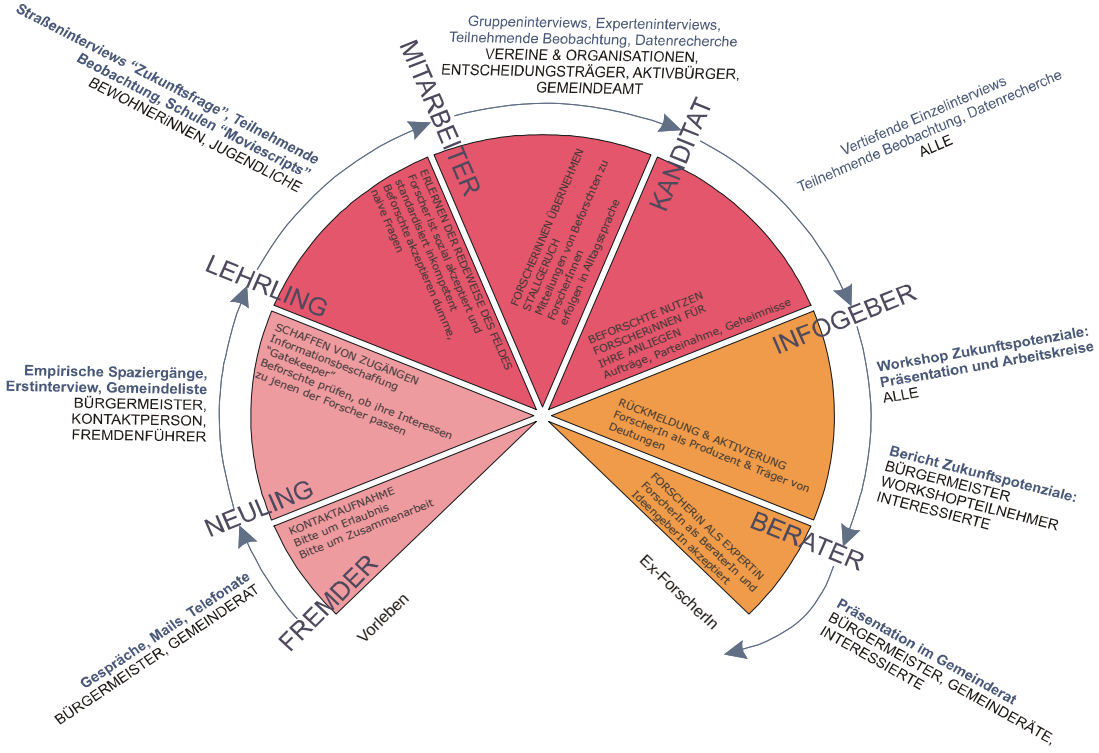

Abb. 3: Darstellung des qualitativen Forscherweges, wie er im Rahmen der ASD angewandt wird (EHMAYER, 2000C; vgl. dazu BREUER, 1996)

Die ASD enthält als zentrales Erhebungsinstrument die persönlich geführten Problemzentrierten Interviews.

Sie werden mit Einzelpersonen und mit Gruppen geführt. Je nach Größe der Stadt und Aufgabenstellung werden zwischen 150 und 350 Personen interviewt.

Zentrale Orientierungspunkte für Interviewfragen bei der Datenerhebung:

- Was ist typisch für Ihre Gemeinde?
- Hat Ihre Gemeinde ein Zentrum? Ein Wahrzeichen?
- Mit welchen fünf Eigenschaften würden Sie Ihre Gemeinde beschreiben?
- Welchen Menschen begegnen Sie in Ihrer Gemeinde? Wer fehlt Ihnen?
- Fühlen Sie sich in Ihrer Gemeinde wohl? Was stört Sie?
- Was zeigen Sie jemandem, der auf Besuch in Ihre Gemeinde kommt?

- Gibt es etwas aus der Gemeindegeschichte, das erzählenswert ist?
- Wenn Sie an die Zukunft ihrer Gemeinde denken, was fällt Ihnen dazu ein?
- Wo können Sie sich vorstellen, selbst etwas zu verändern?

Die Auswahl der Personen und Gruppen erfolgt in festgelegter Reihenfolge. Zunächst werden Personen im öffentlichen Raum, an den zentralen Orten der Gemeinde befragt (Außenrauminterviews). Es wird stets darauf geachtet, alle Bevölkerungsgruppen miteinzubeziehen und die Bedürfnisse unterschiedlicher Akteure/-innen spezifisch wahrzunehmen. Alle Interviewpartner werden im Rahmen der Erhebung gebeten, Personen zu nennen, die eine neue Sichtweise zu den bereits gesammelten Informationen und Themen einbringen können. Die Genannten werden anschließend kontaktiert und um ein Interview gebeten (Innenrauminterviews). Weiters - dies dient vor allem der Überprüfung wissenschaftlicher Vollständigkeit - wird ein sog. „Institutionen-Check“ durchgeführt: Erhobene Gemeindedaten werden mit aktuellen Gemeindedaten verglichen. Wenn das Forscher-/-innen-Team gute Arbeit geleistet hat, sind mindestens 80% der aufgelisteten Initiativen, Organisationen und Institutionen bekannt. Zumeist kennt das Forscher-/-innen-Team mehr Initiativen als durch offizielle Angaben zu finden sind, da sie über die intensive Arbeit Vorort Netzwerke erfassen, die über die klassischen Gemeindedaten nicht verfügbar sind. Oft sind diese auch den politischen Entscheidungsträgern nicht bekannt. Die Erhebung sieht weiters die kontinuierliche Erfassung von sog. Sekundärdaten vor. Dabei handelt es sich um öffentlich zugängliche Daten wie Wirtschaftsdaten, demographische Daten, Daten zur Anthropologie, Informationen aus Zeitungsartikeln, Fotos, Bilder, Chroniken, usw. Die Sekundärdaten werden für den Vergleich zwischen mündlich eingeholten Daten (subjektive Wahrnehmungen) und vorhandenen Fakten (objektive Daten) herangezogen. Dabei ergibt sich zuweilen durchaus Erstaunliches. So empfand bspw. die Bevölkerung ihren eigenen Wiener Bezirk als überaltert. Tatsächlich ist er lt. Bevölkerungsstatistik einer der „jüngsten“ Bezirke in Wien. Dies lag - so ergab die stadtpsychologische Analyse - an den alten Gebäuden, die den gesamten Bezirk „alt aussehen“ ließen. Die [Aktivierende Stadtdiagnose] sieht es als eine ihrer wesentlichen Aufgaben, die unterschiedlichen (unbewussten) Sichtweisen, die innerhalb eines Bezirkes, einer Stadt, einer Gemeinde vorhanden sind ausfindig und sichtbar zu machen. In dem soeben beschriebenen dritten Schritt der ASD ergänzen Phasen der Datenerhebung, Datenanalyse und Dateninterpretation einander. Nach der ersten Erhebungswoche kristallisiert sich stets ein spezielles Thema als Ausgangspunkt für weitere Erhebungen in einer Stadt heraus. Es wird dem Ursprung dieses Bildes nachgegangen, Fragen gestellt und Antworten gesucht. Woche für Woche wird dann das Bild über eine Gemeinde klarer. Wenn das Forscher-/-innen-Team keine neuen Inhalte über die Gemeinde mehr in Erfahrung bringen kann und das soziale Gefüge der Gemeinde ausreichend erfasst ist, endet die Erhebungszeit. Erfahrungsgemäß beginnt diese Phase nach rund drei Wochen intensiver Forschungsarbeit. Anzumerken ist, dass dem in der Gemeinde tätigen Forscher-/-innen-Team zunehmend mehr zugetraut und damit auch sukzessive mehr anvertraut wird. Voraussetzung dafür sind die positiven Erfahrungen der Bewohner, die diese mit einem professionell agierenden Forscher-/-innen-Team machen. Für die Datengewinnung ist das entstehende Vertrauensverhältnis so lange positiv zu bewerten, bis der Punkt der Einflussnahme erreicht ist: Zuerst werden Geheimnisse erzählt, dann wird versucht, das Forscher-/-innen-Team für spezielle Interessen zu gewinnen oder zu Anwälten für eine bestimmte Sache zu machen und zu guter Letzt werden ausdrückliche Erwartungen an das Forscher-/-innen-Team zur Verbesserung der Situation in der Gemeinde ausgesprochen. Dann ist der Zeitpunkt gekommen, an dem sich das Forscher-/-innen-Team aus der Gemeinde zurückzuziehen hat. Dieser Rückzug ist für beide Seiten zuweilen nicht ganz einfach aber unumgänglich.

3.1.4 Schritt 4: Analyse des Ist-Zustandes

Die Analyse des Ist-Zustandes wird vom Forscher-/-innen-Team durchgeführt, dauert rund ein Monat und findet in der stadtpsychologischen Praxis statt. Bei der Ist-Analyse werden die aus der Stadt mitgebrachten Ergebnisse (wie beim Problemzentrierten Stadtpsychologischen Interview bereits beschrieben) nach einem dreistufigen Verfahren kodiert. Zentrale Stadtaussagen (im Fachjargon „Kodes“ oder „Eigenschaften“ genannt) werden herausgearbeitet, nach Gruppen zusammengefasst, und nach inhaltlich-thematischen Schwerpunkten in Kategorien gegliedert. Bei der ASD ist die Analyserichtung von Beginn an bereits vorgegeben: In Richtung ‚Themen’: ‚Was’ ist Thema in der Stadt?“ und in Richtung ‚soziale Struktur’: „Wer prägt die soziale Struktur der Stadt?“.

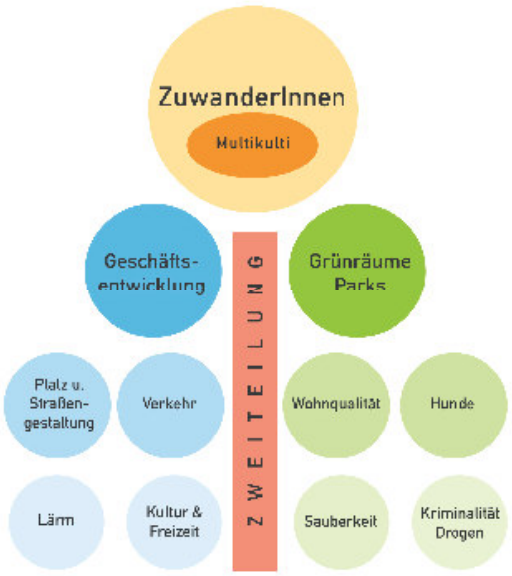

Abb. 4: Darstellung der Themenanalyse in Wien-Margareten.

Die Ergebnisse der Analyse erhalten in der grafischen Darstellung eine räumliche Position und gehen in die ‚Themenanalyse' und das ‚Kommunegramm' ein. Bei der Themenanalyse werden die inhaltlichen Kategorien anhand eines Stadtplans in eine räumliche Beziehung zueinander gebracht. In einer Stadt gibt es sowohl Themen, die die ganze Stadt betreffen, als auch ausschließlich stadtteilbezogene Themen. Einmal positioniert, können die Stadtthemen auf einen Blick erfasst werden, wie im folgenden ein Beispiel aus Wien Margareten verdeutlicht. Das Kommunegramm macht das soziale Gefüge einer Gemeinde sichtbar. Es bildet die Gemeinde als Ansammlung von Gruppen und Einzelpersonen ab, gibt deren Position, die Stärke und die Qualität der Beziehungen zueinander wieder. Voraussetzung für die Erstellung eines Kommunegramms ist die – im qualitativen Sinn – vollständige Erfassung der für die Stadt prägenden Personen, Gruppen, Organisationen und Institutionen. Stadtpsychologische Untersuchungen haben gezeigt, dass sich die stadtspezifischen Themen (Themenanalyse) in einem wesentlich kürzeren Zeitraum erfassen lassen als das soziale Gefüge. Dafür braucht es wesentlich mehr an Vorort-Kenntnissen und der zeitliche Aufwand ist größer. Auch die grafische Darstellung des Kommunegramms erfordert viel stadtpsychologisches Know-how. Es bedarf mehrere Anläufe, bis das endgültige Kommunegramm vorliegt. Das Kommunegramm ist eines der Kernstücke der ASD und eine wesentliche Grundlage für zukunftsfähige Beteiligungsprozesse.

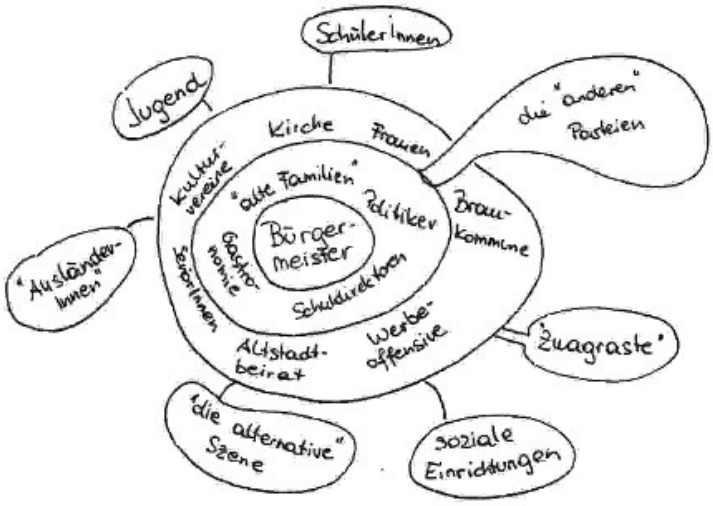

Abb. 5: Das Kommunegramm von Freistadt (Skizze)

Auszug aus dem Bericht ‚Zukunftspotenziale von Freistadt': Das Kommunegramm zeigt einen schalenartigen Aufbau, der sich um den Bürgermeister gruppiert. Nicht direkt verbunden sind: die Jugendlichen, die „Zuagrasten", die Migranten, sowie die „alternative Szene". Mit „Zuagrasten" sind diejenigen gemeint, die noch nicht lange in Freistadt leben. Es dauert einige Jahre bis man in Freistadt „dazugehört". Migranten kommen vorwiegend aus der Türkei und arbeiten im Straßenbau und in Steinbrüchen. Die alternative Szene umfasst hauptsächlich die Aktivitäten rund um den Verein Localbühne. Spannend erscheinen zwei Fragen: Inwieweit entspricht die soziale Struktur den örtlichen Gegebenheiten, also dem Stadtkern, der Stadtmauer und der Vorstadt? Und: Lassen sich die nicht direkt verbunden Gruppen als Potenzial für die Stadtentwicklung von Freistadt? Aus einem Kommunegramm, kann viel Information hinsichtlich des inneren Zusammenhalts einer Stadt abgelesen werden. Für weiterführende partizipative Stadtentwicklungsprozesse ist es insofern hilfreich, da es aufzeigt, welche Personen/Gruppen zu involvieren sind.

3.1.5 Schritt 5: Diagnose der Zukunftspotenziale

Die Diagnose der Zukunftspotenziale filtert die Themen aus, die in einer Stadt zu behandeln sind, um einen zukunftsfähigen Entwicklungsprozess zu starten. Zunächst gilt es herausfinden, welche Themen aus der Sicht der Bewohner für die zukünftige Entwicklung der Stadt von Bedeutung sind und welche Personen und Gruppen innerhalb der Gemeinde geeignet sind, diese Themen aufzugreifen und weiter zu tragen. Erst danach setzt die Expertise über die zukunftsbeständige Entwicklung der Gemeinde an. Die Stadtpsychologie entwickelt die Zukunftsperspektiven in einem gemeinsamen Prozess mit der Gemeinde.

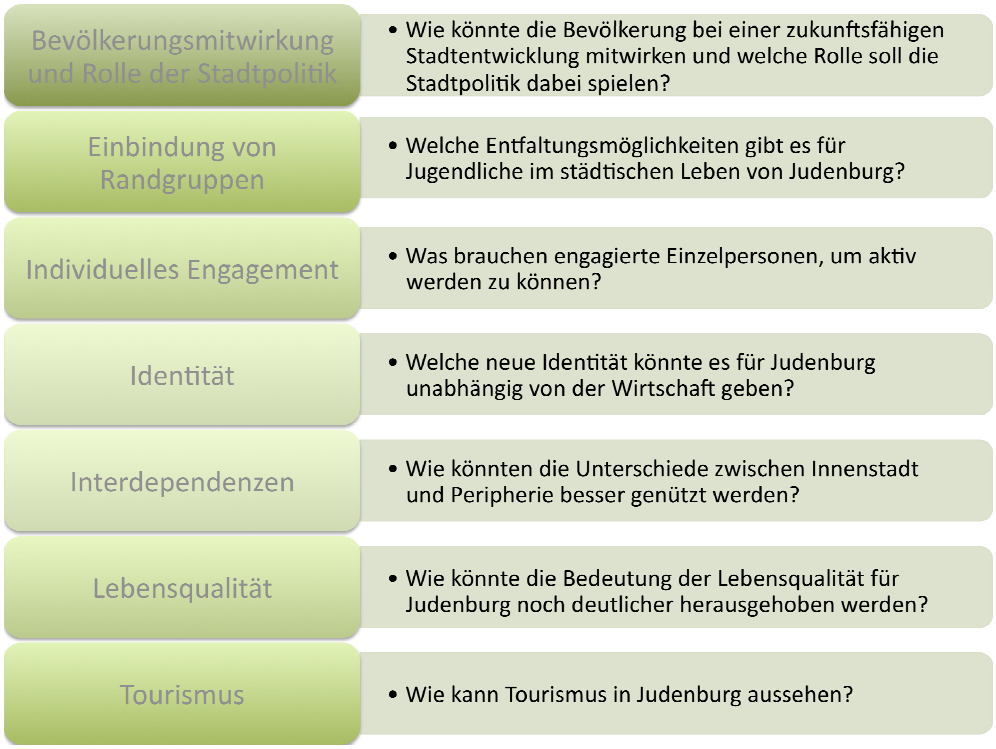

Abb. 6: Beispielhaft die Zukunftsfragen von Judenburg, die sich aus der ASD ergaben (EHMAYER et al, 2000a).

Ausgehend von den Kernfragen: „Welche nächsten Schritte sind für eine zukunftsfähige Entwicklung der jeweiligen Stadt notwendig und auf welchen Potenzialen kann sie dabei aufbauen?" werden im Laufe des Diagnoseprozesses Antworten gefunden. Diese ergeben sich gleichwohl anhand der in der Gemeinde erhobenen Analysedaten und der Expertise. Diese beiden Wissensfundi werden kombiniert, in Beziehung gesetzt und stadtpsychologisch interpretiert. Wichtig ist, dass hierbei nochmals genau auf Stärken und Schwächen der Gemeinde geachtet wird. Schließlich kann aufgezeigt werden, in welche Richtung es die Stadt ‚ziehen' muss, d. h. auf welche Entwicklung sich eine Stadt einlassen muss, so sie sich auf dem Weg in eine aussichtsreiche Zukunft machen will. Die Zukunftspotenziale einer Stadt sind jedoch zunächst keine Antworten, die in die Richtung weisen, wohin es gehen soll, sondern ganz im Gegenteil, sie werden zuallererst als Fragen formuliert. Denn der stadtpsychologische Ansatz geht davon aus, dass der Weg in

Richtung Zukunft nur auf Basis eines gemeinsamen Diskurses begangen werden kann. Als zentrales Element der Diagnose der Zukunftspotentiale fungieren die (drei bis sieben) Zukunftsfragen, die innerhalb der Stadt, ähnlich einem Leitbildprozess, zu thematisieren und zu bearbeiten sind.

Die Zukunftspotenziale sind als Wegweiser in die Zukunft zu verstehen. Und dies umso besser, je mehr Personen einer Gemeinde sich damit auseinandersetzen. Von stadtpsychologischer Seite wird jedoch nicht der Anspruch gestellt, dass sie die einzige Möglichkeit für eine aussichtsreiche Gemeindezukunft darstellen. Sie sind aber eine sehr gute Option, die einen lohnenden Prozess in einer Stadt auslösen können. Um einen ganzheitlichen Zugang zu einer Stadt – im Sinne von der Stadt als Wesen – zu erhalten, hat es sich bewährt, die jeweilige Stadt als Speise zu kreieren. War es bei der ersten Teildiagnose noch ausschließlich eine Hauptspeise (Tafelspitz mit Pommes in Wien-Alsergrund), so kreierten das Forscher-/-innen-Team und ich in Wien-Margareten zuletzt ein ganzes Gericht, mit Vor-, Haupt- und Nachspeise, das den jeweiligen Bezirk quasi kulinarisch wiedergibt. Jede Stadt verfügt über ihren ganz eigenen Charakter, zeichnet sich durch ihr unverwechselbares Wesen aus, und so gleicht auch keine Stadtdiagnose der anderen. Die Stadtpsychologie und das Forscher-/-innen-Team haben demnach die Aufgabe, individuelle Schwerpunkte zu setzen. Manchmal sind es dann die „besonderen“ Geschichten, die über die jeweilige Stadt erzählt werden und die in die ASD einfließen. Es kann sich aber auch um eine inhaltliche Vertiefung in bestimmte Stadtthemen handeln, die als literarischer Beitrag, von Stadtbewohnern verfasst, in die ASD eingehen. Es können auch weitere ‚Bilder' sein, die deshalb angefertigt werden, um der Stadtbevölkerung zu einem besseren Verständnis über ihre aktuelle oder zukünftige Stadtsituation zu verhelfen.

3.1.6 Schritt 6: Reflexionsgespräch mit dem/der Bürgermeister/in

Ausgestattet mit der Themenanalyse, der Analyse der sozialen Struktur und den Zukunftspotenzialen führt der Weg zum/zur Bürgermeister/in, um die Ergebnisse gemeinsam zu reflektieren, zu diskutieren und gegebenenfalls zu ergänzen. Es ist dies eine qualitätssichernde Maßnahme, eine reflexive Schleife, um die Ergebnisse an die Stadt noch besser anzupassen und damit eine maximale Gültigkeit (Validität) der AS-Diagnose zu erreichen. Bei diesem Gespräch wird der Zeitpunkt für die öffentliche Diskussion der Zukunftspotenziale (Präsentation) festgelegt und deren Ablauf strukturiert. Üblicherweise stellt die Stadt den Diskussionsort zur Verfügung und informiert in den lokalen Medien über Inhalt, Zeit und Ort der Veranstaltung. Das Ablaufdesign inklusive der Moderation Vorort sind Aufgabe der Stadtpsychologie.

3.1.7 Schritt 7: Öffentliche Diskussion der Zukunftspotenziale

Die öffentliche Diskussion der Zukunftspotenziale ist eine Informationsveranstaltung mit Workshopcharakter. Sie dient dazu, die Ergebnisse der ASD einer breiten Öffentlichkeit zur Kenntnis zu bringen. Außerdem ist das Interesse bei all jenen, die bei einer ASD mitgewirkt haben stets groß. Sie möchten gerne wissen, was dabei herausgekommen ist. Daher wird darauf geachtet, dass möglichst allen Menschen, die in der Stadt leben und arbeiten die Ergebnisse der ASD zugänglich gemacht werden. In der Stadt werden deshalb - gut sichtbar - Ankündigung und Einladung affichiert, es werden persönliche Schreiben verschickt und die Bewerbung der Veranstaltung über die lokalen Medien durchgeführt. Bei der Veranstaltung erfahren die anwesenden Personen schließlich die Ergebnisse der Diagnose und werden gleichzeitig dazu aufgerufen ihre Ideen und ihr lokales Know-how aktiv einzubringen und die dargestellten Zukunftsfragen noch einmal zu diskutieren und zu ergänzen.

Abb. 7: Diskussion der Zukunftspotenziale in Baumgarten.

Abb. 8: Der Bürgermeister von Baumgarten im Gespräch mit den Bewohnerinnen und Bewohnern.

3.1.8 Schritt 8: Befund erstellen

Am Ende jeder ASD steht der Befund. Kein Befund ist zwar wie der andere, da keine Gemeinde wie eine andere ist, aber es gibt Themen, die sich in jedem Befund finden. Wesentlich ist zunächst, dass der Befund in gut verständlicher Sprache geschrieben ist. Denn dieser wurde zwar mittels wissenschaftlicher Methoden erstellt, die werte Leserschaft ist aber nicht die Scientific Community, vielmehr soll er von den politischen Vertretern/-innen als Arbeitsgrundlage verwendet werden können und der Bevölkerung Einblick in Geschichte, Themen und Perspektiven ihrer Stadt geben. Der Befund ist ein ehrliches Bild über die jeweilige Gemeinde und ermöglicht seinen Leserinnen und Lesern, sich mit der eigenen Stadt in Beziehung zu setzen. Bemerkenswert an einem ASD-Befund ist, dass er im Unterschied zu quantitativen Analysen über mehrere Jahre Gültigkeit besitzt. Wahlen können dann zwar einiges in der Politlandschaft einer/m Stadt/Gemeinde/Bezirk verändern, an den Themenstellungen einer Stadt ändert erfahrungsgemäß auch ein politischer Wechsel nichts. Insofern kann die durchschnittliche Lebensdauer eines ASD-Befundes mit ca. 7 Jahren angesetzt werden.

3.1.9 Schritt 9: ABSCHLUSS: Übergabe des Befundes an den/die BürgermeisterIn & Präsentation im Gemeinderat

Der Befund wird dem Auftraggeber übergeben. Meist leitet der Bürgermeister/die Bürgermeisterin den Befund an den Gemeinderat weiter. Manchmal wird mir ermöglicht, die Ergebnisse des Befundes direkt bei einer Sitzung des Gemeindrates zu präsentieren.

4 RÉSUMÉ

Mit der Durchführung einer Stadtdiagnose können sich Städte und ihre Bewohner optimal auf einen partizipativen Stadtentwicklungs- bzw. Leitbildprozess vorbereiten. Mit den diagnostizierten zukunftsfähigen Potenzialen können Städte aus eigener Kraft jene Veränderungsmaßnahmen setzen, die es braucht, um eine hohe Stadt- und Lebensqualität dauerhaft abzusichern. Zur Erstellung der Stadtdiagnose werden lokale Akteurinenn und Akteure umfassend in den Erhebungsprozess einbezogen. Eine fundierte Stadtdiagnose kann nicht erstellt werden, ohne die Meinung jener zu kennen, die in der Stadt wohnen, arbeiten und Entscheidungen treffen. Die Erfahung hat gezeigt, dass sich – ausgelöst durch den stadtpsychologischen Befragungsprozess - die Kommunikation zwischen Politik und Bevölkerung zu verbessern beginnt. Die Menschen einer Stadt begrüßen es, wenn sie um ihre Meinung gefragt werden. Der Politik wiederum nützt es, um die Meinung der Bevölkerung fundiert bescheid zu wissen.

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🏆 *reviewed paper*

Emergence of suburban employment centres in German metropolitan regions: Impacts on commuter traffic, 1987-2007

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1 ABSTRACT

Over the past decades metropolitan areas became increasingly decentralised. The relocation of workplaces to suburban places has given rise to the emergence of 'new' employment centres, which generally reflect the multicentric nature of an urban landscape. The literature frequently claims that the formation of such centres shortens average commuting distances as people tend to relocate near or even within subcentres. Our results suggest that the majority of people did not come closer to their jobs, as the average journey-to-work distances significantly lengthened over time. Moreover, we can not find decreasing shares of suburb-to-core-city commutes, making us argue that factors other than intrametropolitan jobs-housing-proximities strongly influence where employees reside.

2 INTRODUCTION

During the last couple of decades metropolitan areas have experienced a rapid deconcentration of economic activities to suburban places. A review of empirical studies shows that the emergence of multicentric urban configurations occurred in many metropolitan regions throughout Europe, Asia and the USA. The results indicate that increasingly higher shares of metropolitan employment are concentrated in suburban clusters, nodes or edge cities outside the traditional urban cores (Anas/Arnott/Small 1998). Spatially, these 'new' centres are frequently located in the periphery along or in close vicinity to motorways. Functionally, they mostly do not include all functions of traditional urban centres. They rather may be specialised as office or retail locations (Einig/Guth 2005; Garreau 1991; Giuliano/Small 1991).

One of the recurring topics of this discourse is the interrelation between decentralised employment growth and the development of commuting patterns over time. The impact of subcentring on the journey-to-work has already been addressed in numerous papers (e.g. Alpkokin et al. 2005; Cervero/Wu 1998; Giuliano/Small 1991; Muller 1976; Parolin 2006). However, the evidence is disputed and far from being conclusive:

- Given the existence of a decentralised population within metropolitan regions makes some researchers argue that the suburbanisation of the labour force brings jobs and workers closer together. The spatial convergence of employment and housing locations goes hand in hand with higher shares of intrasuburban commuter flows which are usually associated to be shorter both in terms of times and distances (e.g. Lee/Seo/Webster 2006), thereby leading to more sustainable trip patterns within urban areas (e.g. Crane/Chatman 2003).
- Another strang of papers observed an increase in commuting in terms of distances, durations and/or volumes. These studies have shown that workers living within or close to subcentres do not necessarily have shorter commutes (e.g. Aguilera 2005); partly a reason of a growing number of dual-earner couples who usually fail to both relocate close to their working place (e.g. Cervero 1989). Moreover, some authors argue that restrictive urban land use regulations may prevent people from relocating closer to their workplace (exclusionary zoning hypothesis). As suburban municipalities often do not pursue a coherent policy with regard to jobs and housing aspects, urban spatial structures that minimise commuting may hardly emerge (e.g. Muller 1976).

While recent empirical research on the interrelation of employment suburbanisation and commuter traffic mostly focuses on US (e.g. Yang 2005), French (e.g. Aguilera 2005) and Dutch (e.g. Schwanen et al. 2004) metropolitan regions, there is a striking research gap regarding German literature (exceptions are: Guth et al. 2010; Siedentop 2007). The DFG/SNF-funded research project 'Spatial accessibility and the dynamics of commuting in Germany and Switzerland, 1970-2005' aims to contribute to this topic. The paper presents findings from our research. It examines the following hypotheses with a focus on German metropolitan regions:

- The deconcentration of workplaces to suburbia goes along with a 'decoupling' of the periphery from the traditional urban cores and leads to stronger internal linkages within suburban areas.

- The emergence of suburban employment centres is an outcome of the 'infill' of workplaces in the periphery of metropolitan areas. These centres are – besides the historic urban cores – privileged areas of attraction for commuters and might increase the probability of finding a job near or even within the place of residence. Multicentric urban configurations may therefore generate more travel-efficient commuting trip patterns across metropolitan regions ('co-location' hypothesis).

3 DATA

To examine the hypotheses described above, we use data on commuter flows provided by the Federal Statistical Office (German Census 1987) and the Federal Employment Agency (German Social Security Statistics 2007). The data contain information about in-, out- and internal commuting trips at the spatial scale of municipalities. In both data sets a commuter can be identified by the spatial separation of jobs and housing locations. All persons who do not work and live within the same municipality are considered to be crossmunicipality commuters. There is only in- and out-commuting if an employee crosses at least one municipal boundary on his/her way to work. If no boundary crossing occurs, the person is classified as local (internal) commuter. Both commuting matrices have been validated extensively during our prior work and a weighting factor for daily and periodically (non-daily) commuting activities has been introduced. The share of daily commuting trips by distance (km) has been deducted from the Census 1987. In the following sections we only consider daily commuting activities to avoid the distorting effect of long-distance commuting trips. Furthermore, we only consider employees subject to social insurance contribution due to missing information about self-employed and public servants in the commuter matrix of 2007.

4 DELINEATION OF METROPOLITAN REGIONS

Our study requires the identification of metropolitan areas as a framework for analyses. In the German spatial science literature the assignment of metropolitan boundaries frequently relies on the use of a-priori circular shapes (e.g. 60 km) using GIS-applications to buffer the administrative boundaries of the urban cores (e.g. Siedentop 2007). Several other studies use threshold values of in- and out-commuting intensities for describing the spatial expansion of commuter catchment areas of urban centres[1] (e.g. Herrmann/Schulz 2005). Our approach is similar to the functional definition of commuting regions proposed by the German Federal Office for Building and Regional Planning (BBR 2005). The delineation refers to the year 2007 and works as follows:

- *Identification of metropolitan cores*: First, metropolitan cores have been defined as municipalities having more than 500.000 inhabitants.
- *Identification of second order core cities*: All cities which have above 100.000 inhabitants have been defined as second order core cities. The metropolitan cores and the second order core cities constitute the set of large cities. All other municipalities have been classified as 'potential' suburban municipalities.
- *Identification of large cities' catchment areas*: The out-commuting intensity[2] values of all 'potential' suburban communities to large cities have been calculated using the commuter flow matrix of the year 2007. We checked for different cut-off values ranging from 5% to 10% of all workers within a municipality. The choice of the cut-off point generally determines size and expansion of an urban area (Killer/Axhausen 2009). After a systematic comparison of the different boundaries we finally decided to use the 7,5% threshold value as cut-off level for further analyses.
- *Creation of functional commuting regions*: All communities exceeding the 7,5% threshold value have been classified as suburban municipalities; all other municipalities have been classified as peripheral (non-metropolitan) communities, which had to be excluded from further delineation. In a last step, we finally allocated all suburban municipalities to their respective commuting regions by (i) selecting all commuting flows to large cities and (ii) comparing their values with regard to their out-commuting intensities. After having identified the prevailing flow to a respective large city (highest intensity) we finally were able to define a suburban municipality as being part of a specific commuting region.

[1] This method has also been carried out for US metropolitan regions (e.g. Berry/Gillard 1977).
[2] The out-commuting intensity is the share of out-commuters among all workers (employed residents) within a specific municipality.

Following this approach, we identified eight metropolitan regions with the core cities of Bremen, Hamburg, Hanover, Frankfurt a.M., Munich, Nuremberg, Rhine-Ruhr (= Cologne, Dortmund, Düsseldorf, Essen) and Stuttgart. Moreover, we identified 15 secondary urban areas. As metropolitan regions generally have enlarged over time (expanding commuter sheds), we decided to take a fixed boundary-delineation, as is often the case in this type of studies (e.g. Aguilera 2005).

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Table 1 provides some key statistics highlighting structural differences among the metropolitan regions. The spatial expansion of the catchment areas and the location of large cities are shown in figure 1. Because of missing data (1987) with regard to workplaces, workers and commuter flows we were not able to delineate the metropolitan areas of the former German Democratic Republic. In the remainder of this paper, we only consider the municipalities of the West German 'Bundesländer'.

Region	Number of municipalities	Overall area [km²]	WP 1987	WP 2007	ER 1987	ER 2007
Bremen	154	8.977	565.612	605.072	577.350	593.170
Frankfurt a.M.	428	9.244	1.599.571	1.634.727	1.548.888	1.520.332
Hamburg	525	10.677	1.185.710	1.259.426	1.178.400	1.210.022
Hanover	192	8.063	820.442	800.642	813.259	778.614
Munich	379	11.401	1.301.749	1.443.504	1.264.563	1.353.870
Nuremberg	186	6.389	609.920	636.806	594.986	611.804
Rhine-Ruhr	287	19.027	4.255.851	4.129.819	4.227.938	4.063.783
Stuttgart	281	7.133	1.420.016	1.424.284	1.370.246	1.350.223
Other urban areas	1.714	45.106	3.919.750	4.191.808	3.901.571	4.062.801

WP: workplaces; ER: employed residents

Tab. 1: Structural data of the German metropolitan regions (Source: Own computations. Data taken from the German Census 1987 and the German Social Security Statistics 2007)

5 IDENTIFICATION OF SUBURBAN EMPLOYMENT CENTRES

Our study requires the identification of suburban municipalities which have above-average employment stockings. Prior studies have defined suburban centres in several different ways. Some papers use threshold values of employment densities and total employment, considering a subcentre to be a zone or municipality above a given minimum cut-off (e.g. Anderson/Bogart 2001; Giuliano/Small 1991; Giuliano et al. 2005; McDonald 1987). Others suggest more sophisticated approaches to avoid pre-defined (arbitrary) cut-off points. For instance, McMillen (2001) uses non-parametric estimation techniques to identify suburban centres as local peaks in employment density functions. A similar approach has been discussed in Craig/Ng (2001) showing the application of non-parametric specifications for the metropolitan area of Houston (Texas). Other studies refer to the use of spatial autocorrelation techniques to explore regional employment concentrations higher than the mean. The empirical application of such statistics has recently been shown for a selection of four Belgian cities (Riguelle/Thomas/Verhetsel 2007).

This paper follows the approach described in Parolin/Kamara (2003) and Parolin (2006). The methodology has been carried out twice for the metropolitan area of Sydney and works as described subsequently:

- In a first step we need to identify 'potential' subcentres for use in further analyses. A 'potential' subcentre can be defined as (suburban) municipality which has an employment stocking that is significantly higher than the national mean. The identification of above-average employment concentrations is based on the calculation of standardised employment values (z-scores). For each municipality employment data were thus standardised by subtracting the mean of all municipalities from its employment value and dividing the difference by the standard deviation. The body of municipalities which have values higher than 0 were then considered as 'potential' subcentres. In doing so, we identified 1.183 'potential' centres in 1987 and 1.313 in 2007.

- In a second step we confined the set of 'potential' centres by selecting only those municipalities which have a ratio of workplaces to workers (employed residents) greater than 1 resulting in 610 centres in 1987 and 680 in 2007. That means we only considered a municipality to be a subcentre if the respective community exhibits a surplus of in-commuters, indicating a superior attraction for employees. Furthermore, we only included those municipalities which have their location within the boundaries of the metropolitan regions as defined in section 4. After further having reduced the set of subcentres we finally identified 202 subcentres in 1987 and 265 in 2007. All other municipalities within the catchment areas' boundaries (except for the large cities) were assumed to be non-(sub)centres.

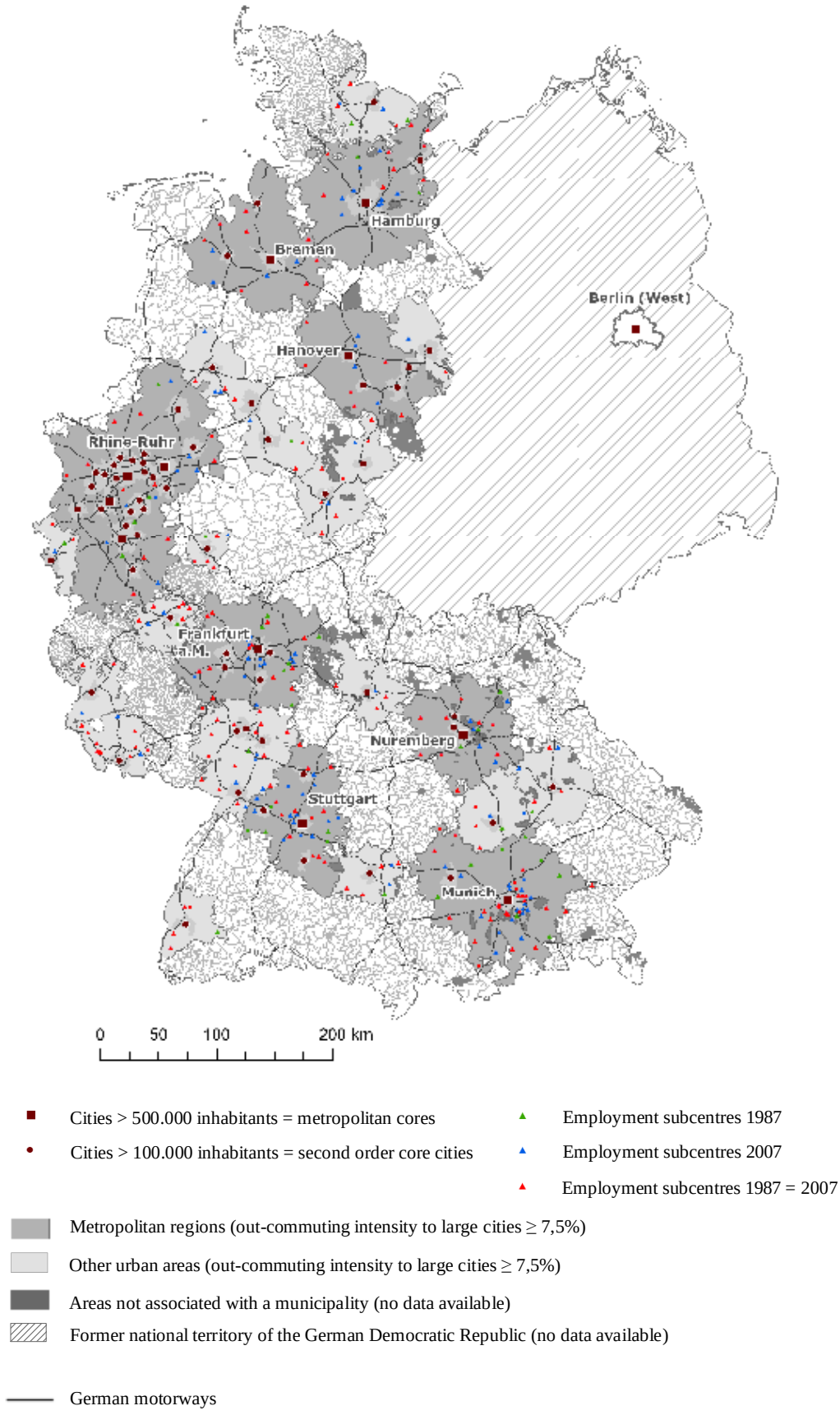

Fig. 1: German metropolitan regions (functional commuting areas) (Source: Own illustration. Data taken from the Federal Agency for Cartography and Geodesy)

Figure 1 shows the location of subcentres within the predefined boundaries of our study regions. Like in many European and US agglomerations, the majority of suburban centres has clearly sprawled along or in

close vicinity to motorways (e.g. Aguilera 2005; Anderson/Bogart 2001; Garreau 1991). Table 2 provides some key statistics with regard to the number of large cities and suburban centres. The table also contains information about the absolute and relative variation in the number of subcentres over time, highlighting a general increase in the number of suburban employment locations across all metropolitan regions. The results further indicate that many centres that have been identified in 1987 still exist 20 years later (1987 = 2007). While some of the 1987 employment subcentres drop out of the table in 2007 and some 2007 centres were below the national mean in 1987, several centres exist both in 1987 and 2007. The 'stability' of clustered employment through recent decades may generally reflect the relevance of strong agglomeration forces over time (Parolin 2006) and might as well support the argument of long-term persistence in metropolitan spatial structures.

Our further analyses proceed by generating statistics on workplaces, workers and commuter flows for the entire set of geographical subdivisions (large cities, non-(sub)centres and subcentres). Some caution is warranted in the cross-interpretation of the results (percentage changes) as some subcentres and non-(sub)centres are not identical in 1987 and 2007. However, the method applied in this paper allows us to check for the 'decoupling' and 'co-location' hypotheses, as we explicitly aim to examine commuting patterns for both 1987 and 2007. Given that subcentres represent the multicentric nature of an urban landscape we (i) expect higher levels of self-sufficiency within suburban municipalities (more internal commuting trips within subcentres and/or increasing shares of suburb-to-suburb commutes) and (ii) a shortening of commutes as firms may favour to move closer to their workforce.

In the following sections we first describe the changing geography of working and housing locations over time. We ask as to whether there is a significantly higher share of workplaces located within suburban municipalities in 2007 (section 6). In a second step we examine whether or not a significant proportion of residents came closer to their jobs, thereby leading to a 'decoupling' of the periphery and to decreasing amounts of commuter traffic over time (section 7).

Region	Number of …							
	… mc	… socc	… lc	… sc				
				1987	2007	1987 = 2007	Δ 1987-2007	
							[abs.]	[%]
Bremen	1	2	3	8	12	8	+4	+50,0%
Frankfurt a.M.	1	4	5	19	26	13	+7	+36,8%
Hamburg	1	1	2	11	18	9	+7	+63,6%
Hanover	1	3	4	6	10	6	+4	+66,7%
Munich	1	1	2	33	42	25	+9	+27,3%
Nuremberg	1	2	3	12	14	9	+2	+16,7%
Rhine-Ruhr	4	22	26	15	19	11	+4	+26,7%
Stuttgart	1	3	4	17	26	12	+9	+52,9%
Other urban areas	(-)	21	21	81	98	70	+17	+21,0%

mc: metropolitan cores: socc: second order core cities; lc: large cities; sc: subcentres

Tab. 2: Number of large cities and employment subcentres in German metropolitan regions, 1987-2007 (Source: Own computations. Data taken from the German Census 1987 and the German Social Security Statistics 2007)

6 CHANGING GEOGRAPHY OF WORKING AND HOUSING LOCATIONS

In this section we describe some major trends of metropolitan evolution since 1987. The focus is on morphological shifts such as the spatial development of employment and housing locations. In doing so, we are able to quantify the degree of spatial deconcentration for both economical and residential activities and can better assess the relevance of centred employment growth in German metropolitan regions. In this chapter we raise two specific questions:

- Is there evidence for employment suburbanisation between 1987 and 2007?
- If so, did jobs tend to cluster in centres or spread out across the urban landscape?

To answer these questions we calculated aggregate workplace statistics for the entire set of German agglomerations (table 3). The results indicate several striking features. First, it becomes clear that suburban municipalities gained importance as locations of employment across all metropolitan regions. The shares of large cities in the regional overall sum of workplaces declined in every single case, whilst the shares of

suburban municipalities increased without any exception. In all agglomerations the growth rates of suburban municipalities exceed the values for the large cities, i.e. a decentralisation of the workforce generally took place throughout German metropolitan areas.

A second key finding is that large cities still remain important locations of employment, despite declining shares of total employment. The percentages in the regional overall sum of workplaces (2007) are ranging from 33,5% in Stuttgart (lowest) to 63,6% in Rhine-Ruhr (highest), whilst the shares of jobs within subcentres accounts for 4,9% in Rhine-Ruhr (lowest) and 23,2% in Munich (highest). Comparing our data with the work of Parolin (2006) shows somewhat lower proportions of employment within German subcentres[3] . However, the addition of 63 centres across the entity of metropolitan areas has supposably affected the spatial economies of the study regions. As more and more workplaces tend to cluster within a small number of suburban municipalities, we agree with prior studies, assuming a general rise of multicentric urban growth throughout Europe over time (e.g. Gilli 2009).

	WP 1987				WP 2007				Δ 1987-2007	
	within …				within …				within …	
Region	… lc	… sc	… nc	… sub	… lc	… sc	… nc	… sub	… lc	… sub
Bremen	344.979	59.455	161.178	220.633	334.325	96.191	174.556	270.747	-10.654	+50.114
	61,0%	*10,5%*	*28,5%*	*39,0%*	*55,3%*	*15,9%*	*28,8%*	*44,7%*	-3,1%	+22,7%
nom	3	8	143	151	3	12	139	151	3	151
Frankfurt a.M.	803.057	128.921	667.593	796.514	763.754	255.715	615.258	870.973	-39.303	+74.459
	50,2%	*8,1%*	*41,7%*	*49,8%*	*46,7%*	*15,6%*	*37,6%*	*53,3%*	-4,9%	+9,3%
nom	5	19	404	423	5	26	397	423	5	423
Hamburg	788.876	90.868	305.966	396.834	789.828	145.478	324.120	469.598	+952	+72.764
	66,5%	*7,7%*	*25,8%*	*33,5%*	*62,7%*	*11,6%*	*25,7%*	*37,3%*	+0,1%	+18,3%
nom	2	11	512	523	2	18	505	523	2	523
Hanover	492.652	71.701	256.089	327.790	444.207	98.956	257.479	356.435	-48.445	+28.645
	60,0%	*8,7%*	*31,2%*	*40,0%*	*55,5%*	*12,4%*	*32,2%*	*44,5%*	-9,8%	+8,7%
nom	4	6	182	188	4	10	178	188	4	188
Munich	779.127	192.123	330.499	522.622	735.879	335.220	372.405	707.625	-43.248	+185.003
	59,9%	*14,8%*	*25,4%*	*40,1%*	*51,0%*	*23,2%*	*25,8%*	*49,0%*	-5,6%	+35,4%
nom	2	33	344	377	2	42	335	377	2	377
Nuremberg	373.225	111.875	124.820	236.695	362.577	115.767	158.462	274.229	-10.648	+37.534
	61,2%	*18,3%*	*20,5%*	*38,8%*	*56,9%*	*18,2%*	*24,9%*	*43,1%*	-2,9%	+15,9%
nom	3	12	171	183	3	14	169	183	3	183
Rhine-Ruhr	2.817.037	164.831	1.273.983	1.438.814	2.626.647	200.584	1.302.588	1.503.172	-190.390	+64.358
	66,2%	*3,9%*	*29,9%*	*33,8%*	*63,6%*	*4,9%*	*31,5%*	*36,4%*	-6,8%	+4,5%
nom	26	15	246	261	26	19	242	261	26	261
Stuttgart	530.976	167.756	721.284	889.040	477.026	233.088	714.170	947.258	-53.950	+58.218
	37,4%	*11,8%*	*50,8%*	*62,6%*	*33,5%*	*16,4%*	*50,1%*	*66,5%*	-10,2%	+6,5%
nom	4	17	260	277	4	26	251	277	4	277
Other urban areas	1.820.433	658.056	1.441.261	2.099.317	1.830.085	801.793	1.559.930	2.361.723	+9.652	+262.406
	46,4%	*16,8%*	*36,8%*	*53,6%*	*43,7%*	*19,1%*	*37,2%*	*56,3%*	+0,5%	+12,5%
nom	21	81	1612	1693	21	98	1595	1693	21	1693

WP: workplaces
nom: number of municipalities
lc: large cities; sc: subcentres; nc: non-(sub)centres; sub: suburbia = sc + nc
italics: Share in the regional overall sum of workplaces

Tab. 3: Aggregate workplace statistics, 1987-2007 (Source: Own computations. Data taken from the German Census 1987 and the German Social Security Statistics 2007)

Closer examination further indicates the significance of centred employment within German metropolitan areas. In order to study the spatial (de-)concentration of jobs within urban areas a simple measure of the morphological distribution has been calculated. We use Gini coefficients to investigate the degree of spatial dispersion in metropolitan employment. The index can take values from 0 to 1, and the higher the value, the more concentrated the workforce within each metropolitan region. The Gini coefficient (GC) is calculated as follows (municipalities have to be ranked ascending with regard to their share of employment within the respective region) [4]:

$$GC = 1 - \sum_{i=1}^{n} (u_i - u_{i-1}) \cdot (v_i + v_{i-1})$$

[3] The share of workplaces within identified subcentres accounts for about 38% in the Sydney metropolitan area (Parolin 2006).
[4] In the same way, we calculated Gini coefficients for the distribution of the workers (employed residents).

u_i: accumulated share of municipality i in the overall sum of all municipalities of a region
v_i: accumulated share of a municipality's i employment in the overall sum of all municipalities of a region
n: number of municipalities of a region

Table 4 reveals that all WP-GCs exceed a minimum of 0,75 (2007), indicating that a high proportion of the metropolitan workforce still remains concentrated within a small number of municipalities (see also table 3). Comparing the coefficients for 1987 and 2007 makes clear that the deconcentration of jobs has led to a more equal distribution of employment occasions across metropolitan areas (declining WP-GCs). However, the spatial diffusion of workplaces seems to be rather selective in the sense of that employment tends to cluster within a small number of centres (indicating the unbroken relevance of strong agglomeration forces). In no case there is any scattered (i.e. spatially extensive or sprawl-style) decentralisation pathway as reported for US metropolitan regions (e.g. Burchell et al. 1998). The dynamics in the pattern of employed residents show similar trends. As has been shown for workplaces, the results indicate deconcentration tendencies of residential activities (finding their expression in declining ER-GCs). However, as shown in prior studies, the overall distribution of residents tends to follow a more even distribution across space (e.g. Gilli 2009; Lee 2007; Siedentop et al. 2003). We confirm these prior findings by comparing WP- and ER-GCs for both points in time, showing somewhat lower values of ER-GCs throughout all metropolitan areas.

Region	Gini WP			Gini ER		
	1987	2007	Δ [%]	1987	2007	Δ [%]
Bremen	0,881	0,856	-2,8%	0,790	0,746	-5,6%
Frankfurt a.M.	0,868	0,859	-1,0%	0,742	0,711	-4,2%
Hamburg	0,944	0,935	-1,0%	0,870	0,844	-3,0%
Hanover	0,890	0,876	-1,6%	0,778	0,749	-3,7%
Munich	0,872	0,846	-3,0%	0,747	0,704	-5,8%
Nuremberg	0,862	0,843	-2,2%	0,701	0,666	-5,0%
Rhine-Ruhr	0,780	0,758	-2,8%	0,705	0,668	-5,2%
Stuttgart	0,780	0,754	-3,3%	0,620	0,587	-5,3%
Other urban areas	0,866	0,856	-1,2%	0,738	0,715	-3,1%

WP: workplaces; ER: employed residents

Tab. 4: Gini coefficients, 1987-2007 (Source: Own computations. Data taken from the German Census 1987 and the German Social Security Statistics 2007)

7 DYNAMICS OF COMMUTING

The spatio-temporal development of commuter traffic will be analysed in two steps: First, the dynamics of commuting linkages over time will be examined. By comparing the shares of in-, out- and local commuting trips we can assess whether or not a 'decoupling' of the periphery from the traditional urban cores did in fact take place between 1987 and 2007. In a second step we focus on the changes in average distances covered by commuters. In doing so, we are able to test the 'co-location' hypothesis, which claims that the emergence of multicentric urban configurations leads to a shortening of commutes over time.

7.1 Commuting linkages – 'decoupling' of suburbia from large cities?

After having shown the relevance of suburban growth patterns across German metropolitan regions we raise some more specific questions. As the arrival of 'new' jobs within suburban areas generally may have increased the probability for workers to find a job within suburban locations, we (i) could expect decreasing percentages of traditional (long-distance) suburb-to-large-city trips and/or increasing shares of (somewhat shorter) suburb-to-subcentre commutes. Moreover, the emergence of suburban employment centres may (ii) explain higher degrees of self-containment within these municipalities. We thus ask for two questions:

- Do the residents of suburban municipalities orientate towards subcentres?
- Can we observe increasing levels of internal linkages within suburban centres over time?

Table 5 highlights several important findings. One of the most striking features is that the proportion of crossmunicipal commuting trips (in- and out-commuting) has significantly increased across the entire set of metropolitan areas during the past two decades. Compared with the situation in 1987 we can find increasing shares of employees living in a subcentre and working in a large city. Moreover, we can identify higher

shares of people living in a subcentre and working in another subcentre, as well as higher shares of people living in a subcentre and working in a non-(sub)centre and even higher shares of people living in a subcentre and working outside the boundaries of their respective metropolitan area (external commuters). At the same time the proportion of internal commuting trips (people who both live and work in the same subcentre) declined markedly over time, which makes us reject the second question raised above. As for suburban centres, similar dynamics can be found for large cities and non-(sub)centres[5] . Our results thus confirm a trend widely noticed among European transport researchers, that workers expand their activity spaces and do not overwhelmingly tend to live and work within the same municipality[6] (e.g. Aguilera 2005; Bontje 2007; Moser 2007). This makes us assume that the distances covered by commuters may not have declined during recent decades, as claimed by the 'co-location' hypothesis. We provide some deeper insights in the next section.

		Commuters 1987 [%]					Commuters 2007 [%]				
Region		… lc	… sc	… nc	…int	… ext	… lc	… sc	… nc	…int	… ext
Bremen	From lc to …	1,5%	0,4%	5,2%	91,7%	1,2%	3,2%	3,3%	8,8%	82,6%	2,2%
	From sc to …	8,3%	2,1%	8,7%	76,3%	4,7%	22,6%	5,8%	13,1%	50,3%	8,2%
	From nc to …	34,8%	5,5%	14,1%	42,2%	3,4%	39,1%	11,1%	16,9%	27,7%	5,2%
Frankfurt a.M.	From lc to …	7,5%	1,3%	7,5%	83,6%	0,2%	14,1%	6,9%	11,9%	66,0%	1,1%
	From sc to …	22,6%	6,8%	16,8%	51,0%	2,7%	33,8%	11,0%	20,2%	30,9%	4,0%
	From nc to …	33,1%	5,6%	22,8%	36,0%	2,5%	36,3%	12,0%	25,7%	21,9%	4,1%
Hamburg	From lc to …	0,4%	0,7%	4,6%	93,9%	0,4%	0,7%	3,1%	6,7%	88,7%	0,8%
	From sc to …	16,7%	2,7%	10,3%	67,6%	2,7%	35,5%	6,2%	15,1%	39,8%	3,4%
	From nc to …	37,7%	6,9%	18,5%	34,7%	2,3%	41,5%	11,1%	21,5%	22,1%	3,8%
Hanover	From lc to …	3,6%	0,4%	6,4%	88,0%	1,6%	5,9%	3,9%	11,0%	75,3%	3,9%
	From sc to …	12,4%	0,5%	9,5%	74,4%	3,2%	29,5%	3,0%	16,2%	46,4%	4,9%
	From nc to …	39,9%	5,4%	14,3%	37,1%	3,3%	41,4%	9,1%	18,7%	25,8%	5,0%
Munich	From lc to …	0,6%	4,4%	4,9%	89,9%	0,2%	1,2%	13,5%	6,4%	78,1%	0,7%
	From sc to …	28,4%	5,5%	10,5%	52,4%	3,2%	37,4%	15,5%	10,9%	32,6%	3,6%
	From nc to …	39,1%	10,9%	15,0%	31,9%	3,0%	36,6%	17,5%	19,6%	21,1%	5,1%
Nuremberg	From lc to …	11,6%	1,5%	2,5%	84,2%	0,3%	18,9%	4,0%	7,1%	69,0%	1,0%
	From sc to …	22,3%	3,0%	7,0%	65,0%	2,6%	26,9%	4,9%	13,0%	49,0%	6,2%
	From nc to …	41,4%	13,6%	11,4%	29,9%	3,9%	42,3%	14,1%	17,4%	20,5%	5,6%
Rhine-Ruhr	From lc to …	13,8%	0,6%	5,5%	79,9%	0,2%	24,0%	1,5%	10,5%	63,2%	0,8%
	From sc to …	17,4%	0,3%	15,6%	63,2%	3,4%	26,3%	1,2%	23,6%	41,5%	7,3%
	From nc to …	30,1%	2,8%	17,0%	47,6%	2,4%	37,1%	4,1%	22,8%	31,6%	4,5%
Stuttgart	From lc to …	0,8%	3,4%	10,3%	85,1%	0,4%	1,7%	10,4%	18,1%	67,8%	2,1%
	From sc to …	18,2%	3,8%	19,8%	56,2%	2,1%	28,5%	9,0%	26,1%	33,0%	3,4%
	From nc to …	22,4%	7,2%	26,9%	41,8%	1,7%	23,0%	12,3%	33,9%	27,1%	3,7%
Other urban areas	From lc to …	1,8%	2,4%	6,0%	88,4%	1,5%	3,0%	5,7%	12,4%	73,9%	5,0%
	From sc to …	16,0%	5,4%	10,7%	63,0%	4,9%	21,7%	9,1%	16,4%	43,9%	8,9%
	From nc to …	30,2%	10,7%	15,7%	37,7%	5,7%	32,4%	13,5%	19,5%	25,5%	9,1%

lc: large cities; sc: subcentres; nc: non-(sub)centres; int: internal commuting trips (= local commuters); ext: external commutes (= workplace destination not within same metropolitan region)

Tab. 5: Dynamics of commuting linkages, 1987-2007 (Source: Own computations. Data taken from the German Census 1987 and the German Social Security Statistics 2007)

As already has been pointed out for French metropolitan areas (Aguilera 2005), table 5 also shows that the majority of people living in a subcentre work outside their places of residence, giving us some more indication to reject the questions raised above. It further becomes apparent that the main out-commuter flows are still directed towards the higher level cities in the urban hierarchy (large cities). This is true for both categories of suburban municipalities; i.e. subcentres and non-(sub)centres. Comparing 1987 with 2007 indicates that the situation was even more distinct in 2007 than 20 years before. We thus find increasing rather than decreasing shares of traditional suburb-to-large-city commuting trips over time.

[5] There is only one exception in the case of Munich: The share of employees living in non-(sub)centres and working in large cities declined from 1987 to 2007.

[6] More generally we can speak of intensifying commuting patterns over time as already have been observed by Bontje (2007) for the region of Amsterdam. His main findings are a constantly high level of in-commuters into Amsterdam and a steady increase in reverse commuters with jobs in the newly developed suburban employment centres. This pattern, which he describes as 'exchange commuting', clearly suggests a qualitative mismatch between job supply and job demand.

At the same time as large cities became more attractive as destinations for suburban employees, the peripheral type of suburb-to-suburb trips gained importance, too. We thus agree with Killer/Axhausen (2009) who suggest that commuting linkages are becoming more and more complex over time. We further support the argument of Moser (2007) claiming that the commuters' destination choice became increasingly arbitrary through recent decades. All these findings make us reject the 'decoupling' hypothesis. Neither, can we identify more or less self-reliant 'villages' in the urban fringes nor can we find declining linkages between the traditional cores and suburban municipalities as reported for several US agglomerations (Lee/Seo/Webster 2006). However, we find evidence for a marked increase in disperse commuting patterns, which one may interpret as a general outcome of the infill of 'new' job opportunities within suburban locations ('urbanisation of suburbia'). In the following section we study as to whether these trends led to more sustainable short distance trip patterns over time.

7.2 Commuting distances – shortening of the journey-to-work?

In this chapter the distances covered by commuters will be analysed. Information about the real distances travelled by crossmunicipal commuters are missing in the data sets. As often is the case in this type of studies we hence calculated straight line distances between the centroids of the working and housing municipalities (e.g. Siedentop 2007). The distances covered by local commuters are estimated as well. A complete description of this approach can be found in Guth et al. (2010).

Table 6 shows the average distances covered by in- and out-commuters both for 1987 and 2007. We additionally calculated the mean distances for the sum of all commutes, i.e. in- and out-commuting trips including internal commutes. This chapter particularly aims at testing the 'co-location' hypothesis. As firms may have relocated where employees reside or, vice versa, as people might have relocated closer to their workplaces, we could expect somewhat shorter commutes within metropolitan areas. Again, we raise some specific questions:

- Can we observe significantly lower in-commuting distances to suburban employment centres over time?
- Did the emergence of suburban centres lead to shorter trips in the study regions?

We start by comparing average in-commuting distances of large cities with those of subcentres and non-(sub)centres. There has already been a broad discussion on whether or not working in central cities is associated with above the mean distances. Our findings clearly suggest that in-commuters of traditional urban cores have longer work trips than people working in subcentres or non-(sub)centres. This is true both for 1987 and 2007, and for the entire set of metropolitan areas. Our results are consistent with Cervero/Wu (1998) and the recent work of Siedentop (2007) for a selection of five German metropolitan regions. Moreover, we confirm that commuting trips to employment subcentres are somewhat longer than commutes to jobs within noncentred employment locations. This again is true for both points in time; but not for the region of Hanover[7].

To finally answer the questions raised above we need to analyse the shifts in commutes over time. Table 6 indicates that journey-to-work trips lengthened among all types of municipalities from 1987 to 2007. To return to 'co-location': As more and more people live and work within suburban places, we expected to find somewhat shorter commutes on average. But people obviously do not live closer to their jobs than 20 years before. On the contrary there is an increasing spatial separation of homes and workplaces in all municipality classes[8]; moreover, the regions' total average distances increased significantly over time. Some caution is needed as the tc-values are highly dependent on the share of internal commuters, who cover distinctly lower distances than in- or out-commuters on average. As shown in section 7.1 the share of local-commuters declined markedly over time, providing some explanation why the average distances rose as vast as shown in table 6. However, our results are in line with prior studies from Germany and abroad (e.g. Aguilera 2005;

[7] Referring to Giuliano/Small (1991) we can provide a possible explanation: As large cities and subcentres generally have high concentrations of jobs, they do not only draw workers from their adjacent municipalities but from a wider geographical space. Hence, a significant proportion of people working in a major centre requires longer average commutes and, thus, contributes to the existence of large-scale commuter sheds.

[8] Parolin (2006) visually determines the spatial spread of trips to suburban centres using GIS-flowmap applications. His results show a general increase in trip lengths and an expansion of overlapping commuting areas since 1981. His findings make him argue that the idea of self-containing suburban municipalities is *"indeed a long way off as a planning goal"* (Parolin 2006, p. 11)

Cervero/Wu 1998; Guth et al. 2010; Parolin 2006; Siedentop 2007). All the findings presented here lend weight to the argument that the 'co-location' hypothesis does not hold for German metropolitan regions and makes us come to the conclusion that the emergence of multicentric urban configurations has not given rise to shorter commutes on average.

		Average distances 1987 [km]			Average distances 2007 [km]		
		ic*	oc*	tc*	ic*	oc*	tc*
Region							
Bremen	lc	22,4	32,8	11,3	24,6	30,5	14,6
	sc	14,1	24,4	10,0	17,1	20,7	13,9
	nc	13,3	16,6	11,6	15,4	17,9	14,5
	total	18,5	19,0	9,9	20,4	20,2	13,2
Frankfurt a.M.	lc	20,4	16,0	12,3	23,4	19,5	16,4
	sc	11,0	16,4	10,0	14,5	15,6	13,1
	nc	10,8	14,1	10,2	13,4	16,5	13,8
	total	15,7	14,4	9,5	18,3	16,9	13,5
Hamburg	lc	27,0	26,4	13,0	29,5	27,8	15,3
	sc	13,9	23,7	11,0	16,6	20,9	14,7
	nc	12,1	17,8	12,9	14,6	19,9	16,5
	total	20,3	19,1	11,0	22,3	21,2	13,7
Hanover	lc	21,6	20,6	12,0	22,4	23,4	14,5
	sc	11,5	23,8	9,6	15,4	19,3	13,2
	nc	13,4	15,9	11,5	15,8	17,5	14,4
	total	18,3	16,8	10,2	19,3	18,8	13,0
Munich	lc	25,8	18,1	12,2	28,5	20,9	15,2
	sc	12,5	18,6	11,0	16,2	17,2	14,4
	nc	10,8	16,9	12,3	12,9	18,7	15,4
	total	18,9	17,3	10,1	20,4	18,8	13,2
Nuremberg	lc	19,4	14,0	10,8	20,6	16,4	13,7
	sc	12,6	17,5	9,5	14,6	18,8	12,6
	nc	9,4	14,9	11,3	11,7	15,8	13,3
	total	16,3	15,1	9,1	17,3	16,3	11,9
Rhine-Ruhr	lc	18,9	17,6	9,5	22,1	21,3	13,7
	sc	12,3	15,0	9,0	15,2	17,3	12,9
	nc	12,2	15,0	9,8	15,2	17,6	13,8
	total	16,3	15,9	8,4	19,3	19,0	12,4
Stuttgart	lc	17,8	14,4	10,6	20,5	17,4	13,9
	sc	10,2	11,5	7,8	12,5	12,2	10,7
	nc	10,1	11,6	8,2	11,7	13,1	10,8
	total	12,9	11,8	7,8	14,6	13,5	10,9
Other urban areas	lc	16,0	18,7	10,1	18,9	22,4	13,7
	sc	10,9	14,9	8,6	13,5	16,2	11,8
	nc	10,0	12,7	9,2	12,2	14,4	11,9
	total	13,0	13,4	8,4	15,4	15,6	11,9

** ANOVA (F-Test): p < 0,05*
lc: large cities; sc: subcentres; nc: non-(sub)centres; total: region total
ic: in-commuting, oc: out-commuting; tc: total-commuting
(= in-, out- and local commuting)

Table 6: Dynamics of average commuting distances (one way), 1987-2007 (Source: Own computations. Data taken from the German Census 1987 and the German Social Security Statistics 2007)

8 SUMMARY AND OUTLOOK

This study has examined the role of suburban employment growth on the evolution of metropolitan commuting patterns over the past two decades. The paper focused on three specific topics: First, the identification of major employment subcentres across German metropolitan areas. Second, the question of whether or not the deconcentration of workplaces goes along with a 'decoupling' of the periphery from traditional urban centres and, third, the validity of the 'co-location' hypothesis for German agglomerations.

The interrelations between decentralised employment growth and the journey-to-work have already been addressed in numerous papers (especially USA, France, Netherlands). However, the evidence is disputed and far from being conclusive. Our empirical findings suggest that the decentralisation of employment has not led to a 'decoupling' of suburban municipalities from their respective urban cores. Neither found we higher numbers of self-reliant subcentres in the periphery of agglomerations, nor were we able to detect a decline of commuting linkages between cores and suburban centres over time. Moreover, our results suggest that the decentralisation of the workforce did not favour to bring more people closer to their jobs, as the average journey-to-work distances lengthened over time. All these findings made us reject the 'co-location' hypothesis[9]. We agree with Parolin (2006) and come to the conclusion "that factors other than proximity to

[9] As we focused on the investigation of average commuting distances exclusively, we have to amend that the empirical verification of the 'co-location' hypothesis frequently bases on the examination of commuting times, too. E.g. Gordon/Richardson/Jun (1991)

workplace have influenced and will continue to influence where workers reside. It is of paramount importance for metropolitan and transport planners to better understand what these other factors are likely to be if we are to move towards achieving sustainability" (Parolin 2006, p. 14).

The results presented in this paper shed a first glance on the dynamics of commuter traffic in German metropolitan regions since 1987. In order to broaden the empirical basis and to allow more general conclusions, additional analyses on the correlation between spatial development of employment, jobs-housing-proximity and commuter traffic will be necessary. Future work will extend on other urban regions and on an additional point in time (Census 1970). Moreover, it is intended to use road network distances instead of straight line distances to estimate the distances covered by commuters more precisely.

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studied trends in US agglomerations between 1980 and 1985 and found a significant decrease in mean commuting times, despite considerable metropolitan urbanisation processes during the same period. The finding that the traffic increase associated with these urbanisation processes did not involve increasing commuting time burdens is interpreted as a 'commuting paradox'. They explain their results by a shift from radial commute trips, which are likely to take place on congested roads, towards more peripheral flows within suburbia. We currently prepare road travel time matrices for use in further analyses. These data allow us to examine the question whether or not the suburbanisation of workplaces has given rise to constant or even lower intrametropolitan commuting times during past decades.

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EURO 2012 in Poland as a catalyst for change and testing ground for new urban management tools

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1 ABSTRACT

UEFA decision from April 2007 to grant the hosting of EURO 2012 to Poland and Ukraine came not only as a significant benefit but also as a considerable challenge for Polish Authorities. The enormous organisational task including construction of new stadiums in four major cities as well as modernisation of transportation and urban infrastructure has to be accomplished in a relatively short time span. Not surprisingly the authorities branded EURO 2012 as a "civilizational project" considering the championship as a stimulus for the development of the country. A series of special legal, organisational and fiscal mechanisms have been implemented in order to facilitate provision of the required development. Municipal governments of the participating cities are also trying to take maximum advantage of the given chance by managing complex infrastructural projects and promoting designated areas in close proximity to the stadiums. Yet the key question of long-term economic and social effects after EURO2012 remains open for debate.

The presentation focuses on the overview of special legislation, organization and financing of EURO 2012 development agencies. The key development projects in major cities of Warsaw, Gdansk, Wroclaw and Poznan will also be discussed in the context of management, implementation and problems concerning large-scale complex urban projects as well as their relationship with their regional and local context.

2 INTRODUCTION

2.1 Euro 2012 as a catalyst of the procedural change

The UEFA European Football Championships EURO 2012 to be hosted by Poland and Ukraine allow to critically examine how the new, extraordinary implementation mechanisms introduced to enable the organization of a mega sport event (Preuss, 2005) affect urban policy in post-socialist countries. Specific context of this event is reflected by the rethorics of Polish authorities describing EURO 2012 as 'civilizational boost' or 'civilizational chance'. In such context a sport event becomes accelerating power for development of infrastructure and reduction of the existing civilizational underdevelopment (in comparison to the Western countries). Similar processes occurred as part of preparations to the Olympic Games in Athens in 2004 or football championships in Portugal 2004.

Examination of this point of view leads to special development mechanisms which were created for the purpose of enabling the development of the large scale urban projects. To understand fully the degree of change it will also be necessary to study how private capital was involved in the process and how the large-scale projects, which are often autonomous urban islands of rapid development, affected the urban development policy. Subsequently, this article focuses on issues closely related to the development and investment policy: the operational, legal or physical dimension of the urban change motivated by Euro 2012 championships. It is noteworthy that in Poland this event is not only considered as a challenge but academic, political and business observers also think of it as of a testing ground for new practices.

Preparations for Euro 2012 are one of the best examples of effects of globalization on the development practice – transfer of Western practice in terms of financing, organization and management of large-scale projects. The mobilization of the skills and resources was justified by relatively short deadlines, scale and extent of the projects. Former Polish governments had bad experiences of failures and lengthy development of the past projects, such as national motorways. The pressure on the government to meet the challenge had justified introduction of extraordinary mechanisms designed to speed up delivery of the projects. This decision is similar to global practice of finding the 'procedural shortcuts' that were used during the organization of other mega events (Preuss, 2005).

2.2 The mega event and participating cities – the stadiums as local flagship projects

The mega event considered from the local perpective requires additional examination of how the participating cities (Warsaw, Gdansk, Poznan and Wroclaw) could benefit from the chances granted by Euro 2012. The issue of the sport grounds development is often discussed in Polish debates as important in the

context of long-term urban sustainability and vitality of these areas. In majority of the cities the stadiums are considered as ‚flagship projects' and the attendant grounds as future development areas of the cities. Almost all of the Polish projects are judged against urban strategy pursued by London's ODA (Olympic Development Authority) embodied in its 2012 Olympic Park Masterplan. The overall strategic aim to ensure that 'life after mega event' of the urban districts in which the championships are to be held is often quoted as a reference in this regard.

Critcal assessment of all Polish projects indicates that in contrast to British practice, their future is more likely to be determined after the games. Some of the municipalities have been struggling to establish a long-term viable strategy for the development of these lands considering them as a long-term development potential. The weakness of local and national authorites in establishing a strong long-term urban strategy is illustrated by "The Stadium City" project in Warsaw. The overall masterplan designed in 2008 has never progressed into any viable implementation strategy and its concept is still debated by the participating parties. Equally Gdansk authorities consider development of the grounds in the vicinity of Baltic Arena but this potential is still dormant. Both case studies are discussed below.

3 'SPECIAL ACTS' AND PUBLIC 'SPECIAL PURPOSE VEHICLES' AS NEW LEGAL AND ORGANIZATIONAL STRUCTURES ESTABLISHED FOR EURO 2012

3.1 UEFA EURO 2012 Football Championships Tournament Preparation Act of the 7th of September 2009

One of the most important steps in the implementation of the projects for Euro 2012 was introduction of the UEFA EURO 2012 Football Championships Tournament Preparation Act on the 7th of September 2009. This bill enabled creating new development mechanisms, which supported the work of the highly politicised Organizational Committee established by the PM Jaroslaw Kaczynski and chaired by the high ranking governmental and sports officials. New structures created on foot of the Act were focused on business-oriented and managerial aspects of the preparations.

The Act had been colloquially called as 'A Special Act' (Polish: 'specustawa') reflecting its exceptional and interventionist character in the Polish legal system. It was not the first time that the government called for the special legislative measures. One year earlier a Special Roads Act had been passed, enabling a speeded-up delivery of the roads infrastructure[1]. The uniqueness of Euro 2012 Act was that it had established a legal basis for the organization and functioning of the designated Special Purpose Vehicles (SPVs). These publicly owned companies were tasked to develop key infrastructure and act as a local organizer of the local Euro 2012 events.

Establishment of these companies is in many apects similar to the British concept of Urban Regeneration Companies (URC). Polish companies are business-like entities, staffed by professional managers and controlled by the management boards. The SPVs were created to perform specific urban development duties. They are allowed by law to purchase and develop the land, procure tenders and act as a substitutionary investor. They are accountable to the local authorities or the State. Similarly to a private market SPVs their Polish counterparts can offer increased financial flexibility. The other unique aspect of the Polish SPVs is that they are allowed to by-pass the statutory planning and Compulsory Purchase Order (CPO) procedures due to their special legal status.

The Act specified that the SPVs should be established as a publicly owned company under the supervision of the Department of Sport or in some exceptions by the municipal government of the cities organizing the event. The entities created on the foot of the Act were established to:

- coordinate the event on the national scale - PL 2012,
- design and build the stadiums and the attendant grounds - National Sports Centre in Warsaw or Bureau of Euro 2012 Development Gdansk (Polish: BIEG 2012) in Gdansk,
- develop the communal infrastructure – for example Communal Developments Euro 2012 Gdańsk (Polish: GIKE 2012);

[1] Dz. U. Nr 154 z 2000, poz. 958

One of the most important benefits of the organizational model of the Euro 2012 Act was that it granted the public bodies a possiblity to engage the mechanisms of financial engineering available to the SPVs. Initially the legal status of the SPVs limited the access to the sources of financing other than public budgets. According to the initial version of the Act[2] the developments for Euro 2012 were to be financed primarily by the national budget, participating municipalities and EU structural funds in accordance with Long-Term Investment Plans (Wieloletnie Plany Inwestycyjne). Polish Public Finance Act of the 27th of August 2009[3] limited the amount of debt that can be taken by the public authority. This particular issue created a difficulty for the municipal government of Gdansk, whose budget could not provide covering the cost of Baltic Arena stadium. The attempts to attract private investment have been unsuccesful leaving the deficit of approx. 378 billion Zlotys.

Subsequently the Euro 2012 Act was changed after successful lobbying by Gdansk authorities, enabling some substantial changes to the legal status of the SPVs. The new Act allowed the companies to change the status of their developments from the delegated public investments to their own statutory tasks. In accordance to the new Act the lifespan of the SPVs could be extended. This new status enables them to operate the stadiums that they will have built after the 31st of December 2012. These changes lended a greater financial freedom to the companies allowing them to pursue other sources of financing such as credits or emission of development bonds. Gdansk selected this route and in 2009 arranged the emission of the municipal bonds. It was the only municipal government that decided to gather the funds for completion of the stadium using this route.

It is worth mentioning that not all of the infrastructure is delivered by the SPVs. Some of the large national level projects such as motorways, national roads, railroad improvements or the airports are built by the offical state-owned or quasi-public agencies such as Polish National Railways (PKP SA) or Polish National Roads and Motorways Authority (GDDKiA).

3.2 New delivery mechanisms created by the Euro 2012 Act and the changes to the legal system

The succesful organization of the UEFA EURO Championships in Poland depends on the timely delivery of significant amount of infrastructure. The projects supporting the event comprise inter alia roads network, railroads, IT networks, hotels and security networks. These infrastructural improvements are often considered as one of the long-term, ‘physical‘ benefits of the mega events (Oldenbloom, 2006). In this context the improvements to the legal mechanisms, responsible for delivery of these projects was of particular importance in Polish context.

All of the 136 key infrastructural projects have been designated and specified in the Regulations to the principal Act. The designated projects could benefit from special planning and CPO procedures, guaranteed by the Act.

The Euro 2012 Act covers four main areas of intervention, including:

- Accelerating tendering procedures
- Simplification of the planning procedures for the designated EURO 2012 projects
- Simplification of the Compulsory Purchase Order procedures
- Enabling the Public Private Partnerships and inclusion of the private projects (IT networks or Sports accomodation facilities) as Euro 2012 designated developments

Increased focus on these aspects of the investment process reflected the potential areas of contention, which could cause significant delays in the projects. The inclusion of private projects was one of the disputed topics since all of the designated project enjoyed a „public work“ status and simplified planning procedures.

Not all of the proposed improvements were introduced. One of the unsucessful changes was an attempt to grant the SPVs the right to use simplified tender or single-source procurement procedures without having regard to the premises required for a particular type of services such as construction works. Proposed solutions were not compliant with the EU directives of fair competition. Moreover, according to the EU

[2] Section no. 2 of the Euro 2012 Act.
[3] Dz. U. Nr 157 poz. 1240 and Dz. U. Nr 157 poz. 1241

directives the public owned SPVs were required to use tendering procedures. Finally the proposal was omitted. Review of the Public Tenders Law in 2008 resolved some of the issues. In the context of Euro 2012, one of the main risks associated with the old tendering procedures were appeal procedures. According to the 2004 Act the appeals were to be decided by the District Courts. New procedures for construction works allowed much quicker resolution of the contested matters by the National Appeal Boards. Addtionally, Ministerial Regulations on Appeal Procedures of the 2nd of October 2007 specified that all the projects of the significant national importance were eligible for the quicker route.

One of the most significant improvements was the introduction of special planning decision for the designated Euro 2012 projects. The Euro 2012 Act established administrative procedures which were to act independently of the Polish planning system. Poland as other European Union member states run a ‚plan-led' system requiring preparation of a valid Local Area Plan prior to development of the land. One of the main benefits of this system was that it allows to by-pass the standard planning controls. This procedure is similar to the other procedure – location decission for the public works development, allowed by the Planning and Development Act of the 27th of March 2003. The main difference between these two models is that in case of Euro 2012, the decission is granted by the Voivodship and not by the local authority. The Voivod is a regional representative of the central government and his duties include coordination and supervision of the local authorities' performance of their duties. The chances for the public participation are also greatly reduced in these new procedures.

The other equally important change included the unification of new location decision with the Compulsory Purchase Order procedures. This mechanism allowed not only to shorten the time required for purchase but also to gain the freehold of the building sites by the SPVs. In case of the land for designated Euro 2012 project a new law specifies the time required to reach the agreement with the landowner as two months. If this agreement is not reached the company can enter disputed property to commence the works.

4 FINANCING THE DESIGNATED EURO 2012 PROJECTS AND INVOLVEMENT OF PRIVATE CAPITAL

According to the initial version of the Euro 2012 Act all of the designated projects would be financed by the central and municipal budgets as well as non-refundable EU help, mainly the structural funds. Changes to the Act in 2009 created opportunity to use other sources of financing including private capital. These changes were dictated by the decision to include some of the private market developments on the designated projects list.

The way in which financing of Euro 2012 was organized enabled to involve the governmental budget in development of the large projects of the national importance – roads, railroads and airports. Significant number of these projects had been planned independently of the Football Championships. According to „The National Roads Investment Programme 2007 – 2012" prepared in 2007 the Department of Infrastructure assigned 165 billion Zloty to the new roads projects, of which 22 billion were diverted to the designated Euro 2012 projects. Majority of the infrastructural projects could be financially supported by the EU structural funds – particularly from the operational programme ‚Infrastructure and Environment" - as well as the Regional Operational Funds. The analysis of the Department of the Regional Development indicated both national and municipal projects as eligible for EU help.

Financing of the stadiums in four major cities – Warsaw, Gdansk, Poznan and Wroclaw - could not be achieved with EU funds. On the basis of inital agreements between Department of Sports and local governments, majority of the funds had to be collected by the municipalities. The National Stadium in Warsaw was the only stadium funded entirely by the central budget. Central government assigned a designated subsidy of 364 billion Zloty to support the development of the municipal stadiums. For example a total estimated cost of the Baltic Arena in Gdansk reached 645 billion Zloty, while the government assigned the subsidy of 144 billion Zloty. On averge the subsidies covered approximately 20% of the total cost of the projects. The remaining amount had to be covered by the municipalities[4].

So far the preparations to Euro 2012 proved the weakness of the procedures involving the private investment in the larger elements of the key infrastructure. This problem became apparent when none of the stadium projects did not manage to attract any private funds. One of the main reasons of this situation was general

[4] Stańczyk J."After the Meeting with UEFA We Have to Pay More", www.trojmiasto.com.pl, 4th of April 2008

lack of trust to PPP procedures amongst local governments and private investors. This distrust was caused by the character of the delivery mechanism specified by the Public Private Partnerships Act of the 28th of July 2005, which was generally considered as overly complicated and prone to the charges of corruption by the public authorities. The situation improved greatly with the review of the Act of the 5th of December 2008. Nevertheless, the new act was introduced too late to have any effect on the delievry of the stadiums. The act can still help of the delivery of other public infrastructural projects as the indebted municipal governemnts will seek for alternative sources of funding.

The aforementioned situation required the majority of the municpal authorities to search for other methods of gaining the funds for the development of their projects, as the emission of bonds or sale of naming rights. The high estimades of the management costs of the built stadiums, which will be a burden of the future municipal budgets, also forces the local governments to pursue more active strategies for funding.

One of the examples of such attempts is illustrated by Gdansk, which sold the naming rights to the Polish Energy Group for 35 million Zlotys and considers other options including using the stadium for mass concerts. In February 2010 local Councillors invited members of Commerzbank Arena management team, responsible for a number succesful large scale events for consultations. In this context the amendment of Euro 2012 Act enables some new opportunities for the management of the stadium. The analysis prepared by the Gdansk authorities highlighted at least two potential models. One of them considered the maintaining of the public character of the company owning the stadium and appointment of the private partner to manage the stadium. It is the same model as the one used by Frankfurt's Commerzbank Arena. Other option quoted by the offcials was full privatization of the SPV in a similar manner to Veltins Arena in Gelsenkirchen, which is owned and managed by a sports club - FC Shalke.

It is worth mentioning that in European context local stadiums function as the sports arenas for local football clubs (Oldenbloom, 200x). Gdańsk is no different and 44,000 seater PGE Arena will be a home stadium of Polish Premier League club - Lechia Gdańsk. The question of the long term viability of this arrangement is open for debate. On average Premier Leaue match in Poland attracts approximately 7,500 supporters.

UEFA Euro 2012 Championships will remain as a mega event, which preparation will largely be financed by the public budgets. Lack of the private investment can be explained by the absence of positive experiences of Public Private Partnerships and faulty legal mechanisms. Lack of trust in PPP, flaws in Polish legal environment of large scale investment with private funding and short deadlines led one of the prominent manager to state that „Stadium in Gdańsk is too serious matter, to experiment".

One of the main consequences of Euro 2012 apart from improvements to the law may be the increasing cooperation between the public and private sector after the 2012 championships., given the increasing level of the public debt incurred as the effect of preparations to the tournament. Unsuccesful attempts to create a PPP mechanism was one of the reasons to improve the legislations. Some of the arguments quoted during the discussions were the foreign examplesof succesful PPPs including Portugal during preparaion to Euro 2006.

5 SPORTS GROUNDS AND STADIUMS AS THE CATALYSTS FOR IMPROVEMENT OF BUILT ENVIRONMENT

On of the interesting aspects of the relationships between the Euro 2012 and urban policy are the proposals for the development of stadium immediate environments. The overall positive effects of the development of the sports infrastructure on the city are well documented. Some of the often cited cases include Barcelona, where Olympic Games were integrated into the city wide urban regeneration programme. (Preuss, 2005).

Analysis of the Polish examples indictates that in the case majority of the infrastructural projects supported the long term development strategies for the cities and Euro 2012 chapmionships simply accelerated the process. Development of the stadium and the sites adjacent to it were not so obvious. Comparative look at the Polish examples of Gdansk and Warsaw illustrates that issue of long term, development strategy for these lands is still not resolved. In Warsaw case study one of the main difficulties is caused by the sharing of the competences and responsibilities, especially in relation to developments that are not directly supporting the preparation of Euro 2012. Gdank represents a case study where location of the stadium resulted in increasing support to the adjoining disadvantaged community.

5.1 Warsaw- Stadion City

The debates about the location of the National Stadium took place during the late nineties but they were largely inconclusive. The decision to grant Euro 2012 to Poland and Ukraine gave this discussion a new impetus. Finally, in 2007 the final site selection was made. New site is located on the right bank of Vistula River on the 30 ha site of the former "Stadion Dziesięciolecia". Parallel to the discussion about the National Stadium, other development concepts for the adjoining lands had been discussed.

As a result one of the earliest proposals included a large National Sports Centre with new stadium, sports and exhibition hall, swimming polls, sports accommodation centres as well as small number of commercial uses. Delivery of the initial concepts was delayed due to lack of agreement on funding. National government could not support the development of that magnitude alone. The local government considered he sports centre as a national project.

Situation changed when Poland became a host of UEFA Euro 2012. In September 2007 a governmental, public company – Narodowe Centrum Sportu has been estanblished. One of the main tasks of the company, apart from coordination of the stadium development, was preparation of plans for the environs of the sports arena. Architectural competition for the development of the stadium's environs was held in 2008. Winning team - JEMS Architects and Dawos proposed location of the new commercial development with diversified character with total floorspace of approximately 40,000 sq. m. called "Stadion City". The overall idea of the projects was to locate three large scale venues – stadium, congress centre and modern sports hall in order to create a positive synergy. Concept was enthusiastically received by the consultants from global entertainment company AEG (Anschutz Entertainment Group). Supplementary uses included Polish Football Federation headquarters as well as private offices, administration, residential uses and restaurants. The commercialization of the sports grounds could help to balance the expenditures for the construction of the stadium.

One of the main difficulties of this project was changing political context (new Minister of Sport had been appointed), lack of decisions and lack of coordnation and cooperation on the financing of the project. New Minister of Sport – Jakub Drzewiecki, nominated in November 2007 opposed the idea of provision of the commercial development on the lands owned by the State. In his opinion the lands should have flexible strategy with huge degree of "investment flexibility" rather than detailed masterplan. He also recommended omission of the sports hall from the project. Dismissal of Mr. Drzewiecki in October 2009 did not help the project. Department of Sports refused to fianance any commercial project within the environs grounds of the stadium and for the local government current involvement would create a significant liability. It is more likely that the new development of this area will continue after Euro 2012.

6 GDANSK – ENVIRONS OF THE PGE ARENA AND LETNICA DISTRICT

The site for the stadium was selected in May 2005. In making the final decision some of the important conditions and issues were taken into account such as good access to the public transport, large proportion of the communal land. New site for the stadium had been located on the lands adjacent to Letnica – neglected neighbourhood in the need of regeneration. Plans to build a large stadium casued the increase interested in this neighbourhood. The city officals considered different scenarios for the development.

According to the High Buildings Location Study (SLOW) environs of Letnica caoul accommodate some larger scale developments. The Local Area Development Plan prepared in may 2007 for the stadium and its environs were designated as commercial services with supporting residential uses with permission to byild high rise structures. The concepts about what to do with Letnica evolved into the proposed extensive development – with proposed uses such as outdoor events and concerts. Declaration casued some reaction and started a debate about the future of Letnica. Local architects such as P. Wład-Kowalski and ADS architects from Poznana tried to lobby for the idea of new, modern district. The most probable scenario the land will wait to be developed after 2012.

As mentioned above the decision to locate the development in Letnica was a pretext to start a regenration programme of this once neglected neighbourhood. Local government assigned 75 million Zlotych for the regenration of the neighbourhood which included renovation of the streets and tenement houses, support for the social activites, local neighbourhood scial facilties and open spaces.

7 CONCLUSION

Overall in summary or the long term consequences of UEFA Euro 2012 Championships on legal and organizatinal context of investment it is worth highlighting that the mega event gave reason for a number of significant improvement s to the system. Changes included improvments to the PPP and public tender procedures. These legal acts, improved recently, will have a positive effect on the pro-development urban policy in the city.

The other important change is the debut of the SPVs as the new tool in urban development. It is the first time that such a mechanism is deployed by the public sector. Due to change in legislation, some of these agencies may still function after 31 of December 2010, opening the opportunities for privatization of some of the resources or introduction of new forms of private or quasi-public mechanisms of management.

Euro finally accelerated the delivery of the technical infrastructure too. The side effect of theis intensive development strategiy is that local governments are increasingly limited by their liabilities, caused by the investment. Situation of Poland is more difficult than its Western counterparts since not a single major Polish stadium was built with a help of private sector. It means that the local governments may be forced to seek for other sources fiannacing to meet their liabilities.

Finally Euro 2012 indicates quite diversified level of involvement in management of the urban growth in conjunction with local urban policy. Development of the stadiums is seen as a technical exercise whilst the lands in close vicinity to the stadion are considered as a long term development potential. No operational plans are made to harness this opportunity. What Polish cities are lacking is the long term strategy for the development of the new disticts on the basis of new facilites. Sometimes the program to improve the district can be stalled due to problems with communication between public partners or crisis in leadership as it was illustrated in Warsaw case study.

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European Reference Indicators for Public Facilities and Services. Approach to an Integrated Production in Reference Values for the Basic Social Services Infrastructure

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1 ABSTRACT

Public services should 'live' in public facilities allocations. According to this, one must fit into the other; in the same way as citizens should find an answer in the residential park offer or production activities seek their location in the industrial areas.

This high level of engagement needed is not produced. Services and facilities coexist in an historical isolation.

In addition to this, while services are provided by administration, facilities are at proposal of the town plans. In this context, how can they keep a good relationship? How planning guarantees enough land to allocate public services?

Of the great range and variety of public services, some of them are recognized in the countries constitutional texts as essential or universal citizen's rights. All State Main Texts of different European Nations protect the right of their citizens to enjoy -at least- a good public education, quality in provision of health services and enough offer in assistance to persons. These services, which could be labeled as 'public basics', are widespread respected and unquestioned, thus an acceptable level must be provided by administrations. This minimum threshold in basic public services should be understood as a common European level, in order to give a reference point to governments for the provision of public services.

Basic public services are strictly connected to people because of their essential and universal nature. Services, whose necessity remains unmodified although race, culture, education, nationality, etc. of users' changes. Their universal nature allows the possibility to express them in values per capita, so indicators are possible and needed.

Same thing with facilities; there is a minimum amount of basic public facilities that must be preserved and protected, according to the constitutional texts of European Countries.

The aim of the ongoing research is to obtain indicators for basic public services and basic public facilities, all expressed in values per capita, which will enable both subjects to be viewed in relation to each other in order to discover if they work together.

A methodology for the equivalence of service and facility indicators will be also obtained. The final step would be the production of 'basic recommended values' as European Reference Indicators for Public Facilities and Services which gives the name to the research.

2 SCIENTIFIC CONCEPTS OF THE RESEARCH

Today's Europe must deal with important and structural challenges: the rapid globalization, the climate change or the progressive ageing of its population, to stat just a few significant ones. In addition, the present economic crisis has added even more pressure to these already complex issues.
The "Lisbon Strategy for Growth and Job, towards a green and innovative economy" addresses these challenges with goals such as stimulating growth and creating more and better jobs, while making the economy greener and innovative.
The economic downturn has stopped labour market growing and turned the Agenda measures into more fiscal actions, believing on stimulation of private parties as the most effective way to keep people at work. Parallel to these 'emergency' economic solutions, big investment efforts have been made to maintain Lisbon Strategy's goals concerning infrastructures, research and innovation.
An updated strategy for Europe is needed, a new agenda capable of performing a complete recovery from the crisis. Promptly, the EU 2020 strategy is under construction. First available agenda drafts emphasize the idea of learning and profiting from the current crisis in a way that leads us to a reinvent economy with high

standards of sustainability for both social and natural resources. Innovation and knowledge are the basis to build this new economy, hand in hand with an EU renewed society.

To the construction of this new European scenario, we, as investigators, must contribute fully conscious of the extreme efficiency required, from now on, to manage social and economic resources.

The current research develops a complete methodology on how to make European public social infrastructure more efficient –which means, investing less with better results- thanks to a new integrated vision of public services in such public facilities.

Innovations in economic aspects must not forget public investment. Enhancing the administration's level of investment in general infrastructure it's mandatory -despite of the crisis itself- in order to face the negative social effects brought about by the economic downturn.

Recent exercises and efforts, on behalf of the administration, to re-launch private economy, introducing innovative mechanisms in the stagnant –even recessive– markets, must be matched with there on public version.

Research and innovation policies, concerning the service sector, must be introduced not only fully aware of the market's real dimension, but also conscious of the real social needs. So far, service's provision has been designed form the supplier's –public or private- point of view, not from the receiver's –citizens- needs.

The current European 'hands-on' managing economic and social efficiency implies taking notice of citizens updated needs when providing social goods (mainly services) in social infrastructures (facilities as service's 'containers').

As private actors do with their business, administration must rethink its products and public realm management, as a private company at the edge of its economic sustainability, would do.

The needed efficiency in public goods delivery and social infrastructures will come from a new vision which integrates both, in a way that service's market dimension matches facility's built stock.

This completely new vision is the key target of the ongoing research. Focusing on the Lisbon strategy measure of social sustainability, it will seek for efficiency on the public side, for both services and facilities. This implies a previous understanding that a minimum common EU level of welfare is the basis for a European social sustainability.

With this aim, standards (planning indicators) are proposed as the most efficient way to illustrate levels of social and economical sustainability as well as to put into practice monitoring processes.

The research will demonstrate, with indicators and from different countries, the importance of public facilities and service's joint program and planning. This is the way to ensure a real and efficient administration contribution to the economic and social sustainability goals of the Lisbon 2020 strategies.

3 TECHNICAL CONCEPTS OF THE RESEARCH

Public services should 'live' in public facilities allocations. According to this, one must fit into the other, the same way as citizens should find an answer in the residential stock offer or productive activities seek their location in the industrial areas. If the described necessary matching don not exist, problems arise. For instance, taking residential as example, homeless people or, conversely, over-occupied homes are evident socioeconomic problems of weak social groups, while, in other urban areas, residential stock is empty.

In the industrial world, company's needs sometimes can't find a location in the initially intended area. As a difference with residential stock, other causes exist, apart from the economic ones, which promote companies delocalization: legal possibilities of countries, bonuses or extra conditions offered by governments, etc.

As for services, something similar happens but with the difference that public offer exists in this segment of activity. The coexistence of public and private offer is something exclusive to the tertiary or services sector. The sole exception, found in the residential sector, being the public housing experiences started in the 30s in some European countries, as a social answer to post World Wars destruction scenarios. Although the promotion of social housing increases day by day, it has turned into a public/private co-payment, far away from the quoted figures fully financed by governments.

The service sector includes the public services offer -necessarily located in public sites- and the private one (which corresponds strictly to the tertiary sector), exclusively allocated in private plots and buildings. As a primary explanation of the public-private dual offer we can say that, in general, where the public offer doesn't arrive, the private one does, understanding the lack of the public sector as a business opportunity for the private one. Also true is that, apart from covering this public services 'gaps' (normally concerned with 'new services' related to 'new social needs'), there are -in some services- a duplicity of offers explained by some improvements introduced by the private sector. If the coverage of 'gaps' is related to quantity, the dual

offer is related mainly to quality and innovation. Here, the private offer an alternative to the obsolete, poor, or badly maintained services, public provided, which do not satisfy some or all citizens.
This strong relation between public-private services hides important dangers. In public services provision, administration (normally local governments), develops a social function, guaranteeing -at least- the essential services, the basis of the welfare state. Starting from the most basic ones -related to nets- such as electricity, water, gas, etc. to others -nodal-, such as schools, sport fields, hospitals and so on.
Of the wide range and variety of public services, some are recognized in the different country's constitutional texts as essential or universal citizen's rights. All State Main Texts of different European Nations protect the right of their citizens to enjoy, at least, a good public education, quality in provision of health services and enough provision of assistance to persons. These services, which could be tagged as 'public basics', are widespread, respected and unquestioned, thus an acceptable level must be provided by administrations. This minimum threshold in basic public services should be understood as a common European level, in order to give governments a reference point for the provision of public services.

Basic public services are closely related to people, due to their essential and universal nature, witch remains unmodified despite race, culture, education, nationality, etc of there users. Their universal nature allows the possibility to express them in values per capita, so indicators are possible and needed.

As previously stated, public services are necessarily located in public plots and buildings, which are commonly called public facilities. Thus, production of public social infrastructure (facilities) must fit/match the public services provision, especially for the described basic ones. For example, educational services need to find a location solution in public plots classified as educational, otherwise administration will need to spend additional money to obtain the necessary plots, an extra cost that sometimes is not possible and will impede its construction. When governments don't have such extra money, private promoters appear with the aim of building it, on sites designated as private facilities. It must be said that private offer is necessary and healthy, as citizens want to choose, especially the ones that can pay more.

But there is a minimum amount of basic public services that must be preserved and protected, according to the constitutional texts of European countries. If services must fit in basic public facilities previously obtained, thus facility indicators are also needed.

The aim of the research is to obtain indicators for basic public services and correspondent public facilities, all expressed in values per capita, which will enable both subjects to be viewed in relation to each other,

thus discovering if, together, they work out correctly. A methodology for the equivalence of service and facility indicators, to compare results in different consortium countries, will also be obtained. The final step of the research would be the production of basic recommended values, as European reference indicators for public facilities' planning and services' programming.

4 RESEARCH BEYOND THE STATE-OF-THE-ART

As it will de showed public facilities and public services can both be found as research objects but with limited or inexistent relation between them. The research will break down this unnecessary separation. Public services take place at public facilities gaining this desirable fitting even more importance when referring to the basic service categories, health, education and assistance to persons.

Results of research projects, indicators production and scientific publications on similar works –at national and international levels– are here described in order to better understand and situate de relevance of the present research.

4.1 Research Projects

To begin with, we refer to the projects of the Seventh Framework Programme[1], under EUROSTAT host, and also to the ones subject to the SERVPPIN[2] project of the 'European Association for research on services.

European Projects, presently in progress, focusing on different aspects related to services have been found. For instance, the project Contribution of public and private services to European growth and welfare, and the

[1] http://epp.eurostat.ec.europa.eu/portal/page/portal/research_methodology/research/seventh_framework/projects_and_links
[2] http://www.reser.net/The-SERVPPIN-project_a389.html

role of public-private innovation networks[3] which analyzes the segregation between public and private services. The project focus on public-private innovation networks as an important organizational model to develop, produce and deliver new and improved services, with positive impacts on growth and contributions to welfare. The research consists in an in-depth analysis of case studies covering major services such as health, transport and knowledge intensive services.

Another project concerned with the preservation and improvement of welfare is Globalization, investment, and services trade[4]. It also aims to generate tools for policy-makers and businesses in Europe; instruments that will be produced by a team of European researchers addressing international trade and Foreign Direct Investment (FDI) in the service sectors. There main objective is to integrate this network in the communitarian policies, in such a way that makes it possible to change the old management of the service sector with non-tradable outputs.

On the other hand, on the subject of social infrastructures (or facilities) interesting projects could also be found, but still not related to services contained in them. Here, the Preparatory phase project for a major upgrade of the Council of European Social Science data archives (CESSDA) [5] must be highlighted.

As a central issue, the project aims to establish a European Research Observatory for the Humanities and Social Sciences (EROHS), to be built upon the existing data and resources which, systematically organized, will promote synergy and coherence. Thus, access to the existing European and national data will be more efficient and effective, structuring and linking data resources already available. In addition to this, existing data -indicators and standards- will be improved and their documentation exhaustively developed, to enhance scientific quality and interoperability potential.

This interesting project, though concerned with the development of new indicators (especially in less developed countries) and with improved access to the existing ones (mainly for Northern European countries, already data provided), focuses only on the strict sense of ‘demographic and cultural’ data,

provided by the administrative census of museums, collections, libraries, linguistic corpora and citation indexes. Therefore, information and data regarding health, education and assistance to persons is excluded from the project.

The project is framed in the call for the ESFRI Roadmap, which identifies new Research Infrastructure (RI) of pan-European interest, corresponding to the long term needs of the European research communities, covering all scientific areas, regardless of possible location. The ESFRI roadmap is an interesting on-going process; it will be periodically updated and its subsequent revisions will be considered by the different Member states, as well as by the European Commission, to better define priority projects to be supported at national and community level.

Another project found was Research infrastructures and their structural dimension within the European research area[6], based on the Lisbon Strategy, whose initial aim was to make the EU “the most dynamic and competitive knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010" (Lisbon, 2000). The project (a conference) aims to clarify the challenges and opportunities, at regional, national, or international levels, which could be related to the development of research infrastructures (understood as ‘tools of research’) of pan-European character (including the e-infrastructure).

It also takes into account the 2004 review of Lisbon's objectives that enforce the initial strategy, giving more impetus to growth and employment, in hand with the promotion of social/ environmental objectives and highlighting the contribution of such Infrastructures (e.g. impacts on industry, sustainable development, employment, etc.). The main goal is to produce recommendations to improve the financial engineering of research infrastructures, for their construction and sustainable operation. As opposed to the previously discussed projects, this one establishes a relationship between data services and the supporter facility, but

[3] *ServPPIN* (SSH-2007-1.2-02: The implications of developments in the *service* economy for the European economy. Project start date: 2008-02-01)
[4] *GIST* (PEOPLE-2007-1-1-ITN Marie Curie Action:"Networks for Initial Training".Project start date: 2008-09-01)
[5] *CESSDA-PPP* (INFRA-2007-2.2-01 Preparatory phase for the projects in the 2006 ESFRI Roadmap. Project start date: 2008-01-01)
[6] *INFRASTRUCTURE-ERA* (7th FWP- INFRA Research Infrastructures. Project Start date: 2007-12-01)

from the specific perspective of construction and sustainable building work. This approach, although interesting, is far from the viewpoint sought in the ongoing research.

Another project, European social survey infrastructure preparatory phase[7], which participates in the same call, also addresses the production of social infrastructure (facilities) indicators but, like the others, without regarding the connection to the services located within. The project translates the results of the European Social Survey into updated data and a sustainable research infrastructure. As all projects included in the call INFRA-2007, research infrastructures should be understood as the so called 'research tools', like statistics, indicators, standards, etc.

The European Social Survey (ESS), together with the European Value Study, the International Social Survey Program, the Luxembourg Income, the Employment Study, the European Advisory Group on Language Engineering Standards and the European Social Science Data Archives (CESSDA), conform European programmes and institutions producers of research infrastructure, focused on cultural and population aspects, thus there is a gap in indicators related to health, educational and assistance facilities available to people.

The current research will cover this lack of joint indicators for both facilities and services, focused on the basic categories (health, education and assistance to persons). As previously explained this is the main goal, as well as evaluating their degree of correspondence with each planning system. Unique reference indicators for facility and services matching will be provided, which could be used by EU members as recommendations, attending to some adjustments according to each country's planning system and power structure. The international nature of the project permits the extension of the resulting indicators to non-EU countries.

Examining European research projects illustrates the non-integrated work with services and facilities and the greater distance between indicators. The existence of data standards for some facilities, mainly the ones related to culture, has also been shown. As for services, the listed projects do not show the existence of such indicators (the main concern being the possibilities that could be offered by public and private networks). But indicators for services exist; as for facilities, they appear only for demographic and cultural fields and never connected with the supporter facility. To find them we have to move to institutions depending on the European Council, UNESCO, OCDE or the UN.

Furthermore, as for facilities, service indicators are not produced for basic categories (health, education and assistance to persons). For these basic services, few indicators, and not fully representative, are listed in the EUROSTAT data service, corresponding to the annual welfare reports that members submit to the EU Commission.

4.2 Data and Entities producing, revising and maintaining it

In reference to services and related to demographic and cultural fields, in particular services such as archives, libraries or museums, different organizations produce reference values for the service design. The International Council on Archives, and specifically the Committee on Descriptive Standards, offers such indicators. The International Federation of Library Associations and Institutions plays the same role for the library service. For museums, the International Council of Museums provides reference service values.

All these values are presented, in an integrated way, at the Council of Europe web page -http://www.coe.int/[8] and some indexes extracted from countries reports are presented at EUROSTAT site - http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/-.

Social references can be widely consulted at MISSOC the EU's Mutual Information System on Social Protection witch provides detailed, comparable and regularly updated information about national social protection systems -http://ec.europa.eu/social/main.jsp?catId=815&langId=en-.

The International Council on Social Welfare, dedicated to social development and depending on UNESCO, also provides indicators and standards for some social services - http://www.icsw.org/-.

[7] *ESSPREP*. (INFRA-2007-2.2-01, Preparatory phase for the 2006 ESFRI Roadmap projects. Project start date: 2008-02-18)

[8] International Council on Archives -http://www.ica.org/; Committee on Descriptive Standards - http://www.icacds.org.uk/eng/home.htm; International Federation of Library Associations and Institutions -http://www.ifla.org/; International Council of Museums -http://icom.museum/

Similar information can be found for sport services, as the International Council of Sports Science and Physical Education and the Council of Europe, both founded on the principles described in the Letter of Sport, produce indicators that can be used by administrations for sport services plan and provision - http://www.icsspe.org/-.

But once again, for basic services such as education, health and assistance to persons, specific organizations that produce indicators cannot be found, we must to refer to indexes appearing at EUROSTAT.

4.3 Evidence of Data indicators and common actions need

4.3.1 About Education

The need for more education data, indicators and common actions is shown by the European Commission when launching Council resolutions working on actions such as:

- Creating White Papers like the 'Teaching and learning towards the learning society`.
- Promoting works on quality like the Centre for Educational Research and Innovation (CERI).
- Taking indicator's initiatives such as the 'International Indicators of Educational Systems (INES)' or the 'Evaluation of Educational Achievement (IEA)'.
- Promoting European cooperation in matters as the 'Into the new millennium', developing new working procedures in the education and training field.
- Supporting associations working on transparent quality assurance systems, like the 'European Association for Quality Assurance in Higher Education (ENQA)', the 'European University Association (EUA)', the 'European Association for Institutions of Higher Education (EURASHE)' or the 'National Unions of Students in Europe (ESIB)'
- Supporting the European Centre for the Development of Vocational Training
- Developing European programmes such as: 'Action programme on education'[9];; 'Programme of pilot projects for the improvement of the transition from school to working life'; 'Erasmus'; 'Comett'; or 'Youth for Europe (YES)'
- Also supporting European Networks such as the (EURIDYCE): Education Information Network in the European Community.

These initiatives can be viewed in their original context of Council Conclusions or Council Resolutions in the following extracts:

Council Conclusions of 22 September 1997[10] on the communication concerning the White Paper 'Teaching and learning towards the learning society[11].

Council Conclusions of 16 December 1997[12], on the evaluation of quality in school education, having regard to Article 126 of the Treaty establishing the European Community.

Council Resolution of 17 December 1999[13] concerning 'Into the new millennium', developing new working procedures for European cooperation in the field of education and training

Notices that that the development of a Europe of knowledge and the promotion of lifelong learning both have become shared overall objectives, as an outcome of the Treaty of Amsterdam as well as the EU's Agenda 2000 document. Both resulted in an increase in the importance placed on education in skill and information-related policies, including those which contribute to economic competitiveness and employment in the European Union.

Recommendation of the European Parliament and of the Council of 15 February 2006[14] on further European cooperation on quality assurance in higher education.

[9] 9 February 1976
[10] 31997Y1004
[11] 97/C 303/04
[12] 31998Y0103
[13] 32000Y0112
[14] 32006H0143

Recommends that member states encourage representatives of national authorities, the higher education sector and quality assurance and accreditation agencies, together with social partners, to set up a "European Register of Quality Assurance Agencies" based on national review and to define the conditions for registration as well as the rules for management of the register.

4.3.2 About Education health and assistance to persons

Data pertaining to health and assistance to persons on EUROSTAT is less extensive. The need for more information (statistics, indicators, etc.) for European countries is also present at the European Council Resolutions and Conclusions, trough initiatives similar to the ones for education services:

- European Cooperation on health and nutrition, adopting the 'Programme of Community action in the field of public health (2003-2008).
- Cooperation with WHO (programmes and projects administered by the United Nations), OECD ('System of Health Accounts and collection of data not covered by the Community Statistical Programme'), ECDC ('European Centre for Disease Prevention and Control'), promoting patient safety and health services quality by helping to develop 'European cooperation and collaboration between competent authorities and relevant stakeholders'; national statistical authorities cooperation in the implementation and further expansion of the 'System of Health Accounts in the EU' (in cooperation with the OECD and the WHO).
- European common requirements for the integration of health protection requirements in Community policies
- European common terminology, ensuring health protection in all Community policies and activities
- European promotion of Studies for mental health
- Indicators development through documents such as: 'First phase set of EU health indicators', 'Health Indicators (ECHI)', 'Healthy Life Years Indicator by socioeconomic categories using the standard EU methodology' or 'Healthy Life Years Indicator'
- White papers like'White Paper on nutrition and physical activity' and the 'Report on Contributions to the Green Paper´.

These initiatives can be viewed in their original context in the following extracts:

Council Resolution of 20 December 1995[15], on the integration of health protection requirements in Community policies.

Council resolution of 18 November 1999[16], on the promotion of mental health.

Council Resolution of 2 June 1994[17], on the framework for Community action in the field of public health.

Recalls that emphasis should be done on the encouragement of enhanced cooperation between Member States and coordination of their activities in liaison with the Commission. Previously on 1 December 1993 the Commission forwarded to the Council a communication on the framework for action in the field of public health in the light of the entry into force of the Treaty on European Union.

Council resolution of 18 November 1999[18], on ensuring health protection in all Community policies and activities.

Council Resolution of 14 December 2000[19], on health and nutrition.

Invites the Commission to continue to cooperate with the relevant international organisations, in particular the WHO, to ensure effective coordination of activities and avoid any duplication.

Decision 1786/2002/EC of the European Parliament and of the Council of 23 September 2002[20], adopting a programme of Community action in the field of public health (2003-2008).

[15] 31995Y1230
[16] 32000Y0324
[17] 31994Y0617
[18] 32000Y0324
[19] 32001Y0123
[20] 32002D1786

Stats that cooperation with third countries and the competent international organisations in the sphere of health, such as the WHO, the Council of Europe and the OECD, should be fostered, not only in the field of collecting and analysing data (including indicators) but also in the field of cross-sector health promotion, in order to ensure cost effectiveness, avoid overlapping of activities and programmes and enforce synergy and interaction.

Commission Decision of 25 February 2004[21], adopting the work plan for 2004 for the implementation of the programme of Community action in the field of public health (2003 to 2008).

Commission Decision of 10 February 2006[22], adopting the work plan for 2006 for the implementation of the programme of Community action in the field of public health (2003-2008).

Commission Decision of 12 February 2007[23], adopting the work plan for 2007 for implementation of the programme of Community action in the field of public health (2003-2008).

4.4 An overview from scientific publications

Regarding scientific publication, almost the same absence of relation between public facilities and public services working within is revelled[24], with the exception of a single work with quite similar approaches.

Nevertheless all articles, once again, remark that issues related with public facilities and public services governance are currently on the political agenda.

Concerning 'public service' provision, in the article "Municipal Service Provision Choices within a Metropolitan Area"[25] the authors investigate the decision of municipal governments to out source the provision of public services during the 1980s and 1990s. It extends previous empirical work on outsourcing by distinguishing the type of outsourcing used (e.g., public, private, or other types of providers). Institutional characteristics and fiscal stress are found to play an important role in explaining service choices. It indicates that outsourcing was more common for poor cities than for wealthier ones (as it had already been said in other research works quoted earlier) with the former often relying on government agencies and the latter opting for privatization. Still no reference to the facilities that support these services is made.

Another reference on the subject of public services provision, either by public or private ownership is "Building and managing facilities for public services"[26] which adds "the desirability of bundling the building and management operations, (…) whether it is optimal to allocate ownership to the public or the private sector". Modelling alternative institutional arrangements for building and managing facilities for provision of public services, including the use of the Private Finance Initiative (PFI), explores the effects on innovative investment activity by providers. It also examines how the case for PFI is affected by the (voluntary or automatic) transfer of ownership from the private to the public sector when the contract expires. Asset specificity and service-demand risk play critical roles.

Research on 'public facilities' has been more plentiful, but still with a rather different approach, more concerned with size and the optimal location. As the article "Welfare analysis of the number and locations of local public facilities"[27] witch develops a model with a finite number of households and congestible local public goods where the level of provision, the number of facilities and their locations are all endogenously determined. Proving that an equal-treatment identical-provision second-best optimum exists, where all

[21] 32004D0192
[22] 32006D0089
[23] 32007D0102
[24] In an overview of the major research publications for the last 5 years:
Urban Studies, at http://www.sagepub.com/journalsProdDesc.nav?prodId=Journal201866; Urban Affairs Review at http://www.sagepub.com/journalsProdDesc.nav?prodId=Journal200784;
Journal of Urban Economics at http://www.elsevier.com/wps/find/journaldescription.cws_home/622905/description#description;
Regional Science and Urban Economics at
http://www.elsevier.com/wps/find/journaldescription.cws_home/505570/description#description;
and Public Management Review at
http://www.informaworld.com/smpp/title~mode=abstracting_a_indexing~tab=summary?content=t713926128;
As well as Google Scholar's first 100 results for the same key words entry.
[25] Joassart-Marcelli, Pascale (University of Massachusetts-Boston); Musso, Julie (University of Southern California); Urban Affairs Review, Vol. 40, No. 4, 492-519 (2005)
[26] Bennet, John and Iossa, Elisabetta; Department of Economics and Finance, Brunel University, UK, 2005
[27] Berliant, Marcus; Peng, Shin-Kun; Ping, Wang; Regional Science and Urban Economics, Volume 36, March 2006, Pages 207-226.

households are required to reach the same utility level, the provision of local public good is required to be the same at all facilities, and all facilities must serve the same number of consumers. Such an optimal public facility configuration may be concentrated (single site) or dispersed (multiple sites), depending on congestability, commuting cost and household preference parameters.

Still on this subject, the "Public Facilities Planning"[28] book it's a reference with a different angle, also taken into account by the research, addressed from the planning field. It brings together a careful selection of the major works in planning relate to the provision of public facilities - such as recreation grounds, parks and sports arenas. The opening sections present classic, theoretic papers that lay both the general and the specific foundations for why some facilities are treated outside of the market. Key topics such as institutional issues, the role of the private sector, and the assessment and evaluation of public facilities planning and financing are then examined. Finally, the volume looks at some of the more novel approaches that are emerging in the provision of public facilities, and concludes with a selection of case-studies that demonstrate the application of a set of planning approaches.

As for indicator issues on local government[29], "Identifying barriers to the application of standardized performance indicators in local government" exposes the experience of local governments in many countries who are implementing administrative reforms within the framework of New Public Management (NPM) in order to improve the quality and productivity of public services. The use of performance indicators and benchmarking facilitates evaluation of efficiency regarding the provision of

such services and favours the acquisition of better practices. The problems that may arise in the introduction of performance indicators in local government mainly concern the consensual design and standardization of indicators for various entities, the method to be used for calculations and the selection of analytical criteria to be applied to the values obtained. In this article, we identify obstacles that may be encountered in achieving a standardized definition of performance indicators within local government and, on the basis of learning from the practical experience of several large city councils in Spain, formulate strategies to resolve these problems, taking note of the viability and real efficacy of the solutions adopted.

Finally, it must be pointed out similarities between the research and the "Examination of floor area ratio in residential district in terms of the service level of public facilities – An example of Hu-Wei-Liao readjustment area in Tainan City"[30] research, for it's approach to the need for standards, or ratio, and it's relation with planning development

As it also remarks "A lot of articles have discussed the related factors in developing floor area ratio, but there is no model that includes the service level of public facilities and floor area ratio at once". The starting point for this research was the consciousness that the population and various economic activities in Taiwan have concentrated in cities and that in the past, the uses of land and buildings were primarily controlled by limiting the building coverage ratio and building height. Therefore, there were some problems in the areas with high-degree urbanization, including the overuse of lands, the excessive concentration of population, the significant lack of public facilities, etc. In 1992, the government enforced a law, which provided counties/cities with two options: accepting the standard floor area ratio, or developing detail plan on their own. The control of floor area ratio in Taiwan has existed for about seven years, and the problems above have been partially solved in some places. But the control took into consideration only the largest area of buildings, not the base's impact on the environment, the sufficiency of public facilities around the base, the mixture of land use, and so on. And the plan was not based on local requirements, so it has led to new challenges, such as the space development and urban development. First of all, this study will apply gravity model to evaluate the probability of public facilities service usage. And its result can be used to calculate the occupant load and influenced range of the public facilities. At the same time, the result can be applied to analyze the maximum of land development and to set up the most suitable scale of the floor area ratio. This study will explore the questions of floor area ratio control and urban planning development. Through these items, such as the probability, influenced range and occupant load of the public facilities service, it will set

[28] Edited by Kiminami, Lily; Button, Kenneth and Nijkamp, Peter; Cheltenham, UK, Edqard Elgar Publishing, 2006.
[29] Navarro Galera, Andrés; Ortiz Rodríguez, David; López Hernández, Antonio M.; Public Management Review, Volume 10, 2008 , pages 241 – 262.
[30] Cho, Ming-ying; Master's Thesis 2009.

up a model for the service level of public facilities. The result of the model can be a reference to the draft of floor area ratio.

5 EVIDENCE

To sum it all up, it can be said that theoretical indicators in services and facilities exist, but in a non-integrated way. These standards/indicators mainly appear in cultural and demographical fields. For basic services we must refer to indicators coming from specific Council initiatives that partially cover the areas of education, health and assistance to persons. Basic facilities have a less promising scenario: no indicators exist, other than those for facilities relating to cultural aspects.

The integrated production of indicators for services and facilities launched by the research will help to cover the gaps described. Production that will add new value since information will be obtained from the analysis of existing urban areas, not from theoretical or ideal values. The contrast between the announced theoretical values with those coming from the 'city calculation' will provide extremely interesting information.

Another relevant step of the research will be a second contrast between the existing facilities and services and the ones planned - plan vs real city - revealing inadequacies at both levels: plan/services and plan/facilities.

Ongoing research aims to obtain common European references in the provision of services in facilities, independently of the social model of each country, contributing, at the same time, for the vital undertaking witch represents the extension of the EU to new members.

The research converges in what is intended by the Club of Rome, in their ongoing project Identifying strategic research directions on network and service infrastructures under the hypothesis of a disruptive paradigm concerning global societal developments (PARADISO) . This aims to identify strategic research directions on network and service infrastructures in the hypothesis of a disruptive paradigm concerning global social developments. This possible paradigm shift, which more and more analysts are evoking worldwide, is based on the vision that, in order to avoid major worldwide crises, all countries (developed, emerging, and developing ones) will need to agree, sooner or later, on an alternative way forward, and make their social development models converge.

The EU is, undoubtedly, the world's best placed power to proactively promote this new concept of progress, based on revised social, environmental and economic objectives: true sustainable development, more sustainable economic growth, more equally shared resources, and, as the final goal, the well-being of people around the world.

To this we will add the research on facilities and services needed to support these new objectives, and more precisely the service's infrastructure network to be developed.

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Evaluation von Regionalplänen – ein theoriebasierter Ansatz zur Analyse von Instrumenten zur Steuerung der Siedlungsentwicklung

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1 ABSTRACT

Plan evaluation is generally considered as a problematic field of research. There is no systematic evaluation of regional plans in Germany. With regard to settlement development regulation this paper presents an ex-post-evaluation approach for regional plans. Based on this methodical approach, results of an evaluation of two regional plans are shown.

2 EINLEITUNG

Zwar gilt die Evaluation eines Plans schon immer als integraler Bestandteil komplexer Planungsprozesse (Alexander 2006; Eggers 2006), in Deutschland werden aber in der Regel Regionalpläne keiner Evaluation unterzogen (Kühn 2005, S. 40; Hübler 2002, S. 12). Als Planevaluation wird in diesem Beitrag eine auf empirische Methoden gestützte Abschätzung der Wirksamkeit bzw. des Erfolgs eines Regionalplans sowie einzelner regionalplanerischer Instrumente bezeichnet. Soll nur der Zielerreichungsgrad ermittelt werden, spricht man von einer Erfolgskontrolle. Wird die Evaluation durchgeführt, um intendierte und nicht-intendierte Wirkungen zu erfassen, handelt es sich um eine Wirkungsanalyse. Abhängig von der gewählten zeitlichen Perspektive können eine vergangenheitsorientierte sowie zukunftsorientierte Grundrichtung unterschieden werden. Während bei der Ex-Post-Evaluation bereits eingetretene Wirkungen und Effekte schon länger in Kraft befindlicher Regionalpläne untersucht werden, zielt die Ex-Ante-Evaluation auf eine Abschätzung wahrscheinlich eintretender Wirkungen eines Regionalplanentwurfs ab.

Der seltene Einsatz von Evaluationen in der Regionalplanungspraxis kann insbesondere auf die erheblichen Schwierigkeiten praktischer Planevaluation zurückgeführt werden (Fürst 2000), da Regionalpläne nicht direkt die Flächennutzung steuern, sondern über den Umweg anderer Planungen und Zulassungsentscheidungen wirken. Weitere Hemmnisse sind der Mangel geeigneter Datengrundlagen zur Messung von Ursache-Wirkungsbeziehungen, unpräzise definierte Ziele oder Festlegungen, die keinen evaluierbaren Charakter aufweisen, die geringe Motivation der Regionalplaner zu einer Wirkungs- und Erfolgskontrolle ihrer Pläne und der Mangel an Vorbildern für Planevaluationen und Erkenntnisdefizite bei Methoden.

In einer Planevaluation müssen beobachtete oder erwartete Veränderungen in der sozialen, ökologischen, wirtschaftlichen, politischen, verkehrlichen und siedlungsräumlichen Umwelt kausal auf einen Regionalplan oder einzelne seiner Instrumente zurückgeführt werden. Es gilt die Evidenz solcher Ursache-Wirkungs-Beziehungen empirisch zu beweisen. Hierzu ist ein kontrollierter Einsatz wissenschaftlicher Evaluationsmethoden notwendig. Ein standardisiertes Methodendesign für die Evaluation von Regionalplänen ist allerdings noch nicht entwickelt und in Frage kommende Methoden und Möglichkeiten ihrer Kombination sind erst in Ansätzen diskutiert (Shefer/Kaess 1990; Talen 1996, S. 80 f.). Dieser Beitrag demonstriert am Beispiel der Steuerung der Siedlungsflächenentwicklung, mit welchen Methoden eine Ex-post-Evaluation der Instrumente von Regionalplänen durchgeführt werden kann. Dargestellt werden die Forschungsergebnisse aus dem Refina-Vorhaben „Entwicklung eines fernerkundungsgestützten Flächenbarometers als Grundlage für ein nachhaltiges Flächenmanagement – Teilvorhaben Evaluation“, das durch das Bundesministerium für Bildung und Forschung (BMBF) gefördert und von 2006 bis 2009 durchgeführt wurde. In Fallstudien für zwei Planungsregionen der Regionalplanung (München und Westsachsen) wurde die Wirksamkeit von Instrumenten der Regionalplanung im Bereich der Siedlungsentwicklung für bereits in Kraft befindliche Regionalpläne gemessen und die Leistungsfähigkeit des eingesetzten Methodenmix systematisch geprüft (Einig et al. 2009).

Der Beitrag konzentriert sich auf die Evaluation regionalplanerischer Instrumente zur Steuerung der Siedlungsentwicklung (Kapitel 3), entwickelt die theoretischen Grundlagen eine Evaluation von Regionalplänen (Kapitel 4), stellt den angewandten Evaluationsansatz vor (Kapitel 5) und präsentiert ausgewählte Ergebnisse der Planevaluation (Kapitel 6).

3 REGIONALPLANERISCHE INSTRUMENTE ZUR STEUERUNG DER SIEDLUNGSFLÄCHENENTWICKLUNG

Im Kontext der Regionalplanung werden Instrumente vorrangig als gestaltende Mittel zur direkten Beeinflussung raumbedeutsamer Vorhaben und Planungen anderer öffentlicher Stellen und zur indirekten Einflussnahme auf die Raumentwicklung verstanden. Regionalpläne definieren zukünftig zu erreichende Ziele und verknüpfen diese mit Instrumenten, um Rechtsfolgen für die Adressaten der Ziele zu setzen, ohne allerdings die Art und Weise der Zielverwirklichung detailliert vorzuschreiben. Dabei ist der Gesamtzusammenhang aller instrumentellen Komponenten eines Regionalplans von Relevanz (Kment 2002a, S. 37). Die Wirkung regionalplanerischer Festlegungen für die Siedlungsentwicklung in einer Region ist zum einen von ihrem rechtlichen Status – ihrer Rechtsnormqualität – abhängig und zum anderen von ihrem Steuerungsmechanismus, d. h. vom Inhalt der Verhaltensvorschrift, die durch eine Festlegung normiert wird.

Pauschal kann man sagen, dass die Steuerungswirkung einer Festlegung zunimmt, je verbindlicher eine Festlegung Verhaltensvorgaben für ihre Adressaten vorgibt. Raumordnungsrechtlich verbindliche Festlegungen der Regionalplanung sind gemäß § 3 Nr. 1 ROG prinzipiell nur Ziele, Grundsätze und sonstige Erfordernisse der Raumordnung. Diese drei Festlegungstypen ziehen unterschiedliche Rechtsfolgen für ihre Adressaten nach sich (Heemeyer 2006; Kment 2002). Ziele der Raumordnung lösen bei ihren Adressaten eine strikte Beachtenspflicht aus, die diese nicht durch Abwägung oder Ermessensausübung überwinden können. Sie stellen die strikteste Form der Verhaltensbindung durch raumordnungsrechtliche Normierung dar. Grundsätze der Raumordnung sind Vorgaben für nachfolgende Abwägungs- oder Ermessensentscheidungen. Sie begründen eine Berücksichtigungspflicht für ihre Adressaten und können daher durch eine gerechte Abwägung durch diese überwunden werden. Ebenfalls eine Berücksichtigungspflicht wird durch sonstige Erfordernisse der Raumordnung (in Aufstellung befindliche Ziele der Raumordnung, Ergebnisse förmlicher landesplanerischer Verfahren, landesplanerische Stellungnahmen) ausgelöst. Die Adressaten werden durch Ziele der Raumordnung aufgrund der zwingenden Beachtenspflicht stärker gebunden, als durch Grundsätze der Raumordnung, die wie ein Optimierungsgebot wirken und von den Adressaten, im Sinne eines „soviel wie möglich“ zu berücksichtigen sind.

Neben der Rechtsnormqualität der Festlegungen eines Regionalplans ist ihre Wirkung vor allem von ihrem endogenen Steuerungsmechanismus abhängig. Ausgehend von ihrem Wirkprinzip werden unterschiedliche Instrumente unterschieden. In der Summe bilden die Instrumente eines Regionalplans einen Instrumentenverbund.

Einige Klassifikationsansätze von Instrumenten, die in Regionalplänen eingesetzt werden, orientieren sich an ihrem inhaltlichen Bezug, d. h. ob sie die Steuerung der Siedlungs-, Freiraum- oder Infrastruktur einer Region bezwecken (Kistenmacher 1991, S. 28):

- Instrumente zur räumlichen Koordination der Siedlungsentwicklung (Zentrale Orte, Achsen, gemeindescharfe Funktionszuweisungen, Vorranggebiete für Siedlungsentwicklung),
- Instrumente zum Freiraum- und Ressourcenschutz und zur Koordination konkurrierender Nutzungen im Freiraum (Grünzüge, Vorrang- und Vorbehaltsgebiete für Natur- und Landschaft, Hochwasserschutz, Windkraftnutzung, Rohstoffabbau, Erholung),
- Instrumente zur räumlichen Steuerung technischer und sozialer Infrastrukturen (Ausstattungskataloge Zentraler Orte, Vorrangstandorte für Einrichtungen und technische Bauten, Vorrang- und Vorbehaltsgebiete für Infrastrukturkorridore).

Neben inhaltlich orientierten Unterscheidungsansätzen hat die Planungsforschung aber auch Instrumenteneinteilungen entsprechend der basalen Wirkungsmechanismen vorgenommen. Die bekannteste Klassifikation unterscheidet positiv- und negativplanerische Instrumente (Einig 2005; Istel 1991; Lendi 1997; Siedentop 2008, S. 115 f.). Negativplanerische Instrumente normieren einen Bestandsschutz für bestehende Flächennutzungen und verbieten Adressaten bestimmte Formen der Flächennutzung und

schließen raumbedeutsame Vorhaben aus, die im Konflikt zu den geschützten Bestandsnutzungen stehen (Lendi 1997, S. 127). Entscheidend ist ihre Negativwirkung (Schulte 1996, S. 71). Negativplanerische Festlegungen weisen eine ummittelbar nutzungssteuernde Wirkung auf (Spannowsky 1997, S. 765). Ein positivplanerisches Instrument hingegen ermöglicht Adressaten eine bestimmte Form der Flächennutzung bzw. legitimiert zu einer Planung eines raumbedeutsamen Vorhabens, das nur durch einen Wandel der Flächennutzung umzusetzen ist (Lendi 1997, S. 127). Die Positivwirkung einer Festlegung im Regionalplan fördert die Durchsetzung der Zielnutzung, führt allerdings nicht automatisch zu einem Anspruch auf bauplanungsrechtliche Zulassung eines entsprechenden Vorhabens (Schulte 1996, S. 72).

In Bezug auf ihr Steuerungsprinzip sind nicht alle positiv- und negativplanerischen Instrumente gleich. Eine mengen- und standortsteuernde Grundwirkung sind zu unterscheiden (Einig 2005, S. 51). Mengensteuernde Instrumente dienen beispielsweise einer Begrenzung des Umfangs der gemeindlichen Neuausweisung von Bauland oder auch der Erhaltung eines Mindestbestandes von Freiraum. Standortsteuernden Instrumenten obliegt die räumliche Lenkung bestimmter Vorhaben und Nutzungen. Im Falle der Baulandentwicklung haben sie entweder die präzise Ausrichtung der kommunalen Bauleitplanung auf raumordnerisch geeignete Standorte oder deren standortgenaue Abwehr zum Ziel.

Zur Steuerung der Siedlungsentwicklung können positiv- wie negativplanerische Instrumente mit einer mengen- oder standortsteuernden Lenkungsform kombiniert werden (vgl. Abb. 1).

	Positivplanerischer Ansatz	**Negativplanerischer Ansatz**
Standortsteuernde Instrumente	Vorranggebiete für Siedlungsentwicklung	Grünzäsuren
Mengensteuernde Instrumente	Gemeindescharfe Kontingente maximal zulässiger Brutto-Neubaulandausweisung	Mindestflächenanteil des Biotopverbundes an Planungsregion

Abb. 1: Regulierungsprinzipien in Raumordnungsplänen, Quelle: Einig 2005, S. 287

Mittels positivplanerischer Instrumente können Raumordnungspläne auf direktem Wege (aktivplanerisch) die Baulandausweisungen der Gemeinden räumlich lenken und in Grenzen auch mengenbezogen steuern. Der Einsatz negativplanerischer raumordnungsrechtlich verbindlicher Festlegungen in Regionalplänen erhöht den Schutzstatus von Freiräumen gegenüber einer baulichen Inanspruchnahme. Eine Ausrichtung baulicher Vorhaben auf jene Standorte, die eine besondere Eignung für bauliche Nutzungen aufweisen, vermögen treffsicher nur positivplanerische Raumordnungsgebiete zu leisten.

	München	**Westsachsen**
Steuerung der Siedlungsentwicklung		
Ausrichtung auf Zentrale Orte	x	x
Bereiche, die für die Siedlungsentwicklung besonders in Betracht kommen (M) / Siedlungsbereiche (WS)	x	x
organische Entwicklung (M)/ Eigenentwicklung (WS)	x	x
Konzentration der Siedlungsentwicklung auf Standorte mit SPNV-Anschluss	x	
Schutz des Freiraumes		
Regionale Grünzüge	x	x
Trenngrün (M)/ Grünzäsuren (WS)	x	x
Vorranggebiete Freiraumschutz		x
Vorbehaltsgebiete Freiraumschutz	x	x

Abb. 2: Instrumentenverbund der Fallstudienregionen, Quelle: eigene Darstellung

Obwohl alle Regionalpläne in Form von Zielen oder Grundsätzen der Raumordnung verbindliche negativplanerische Instrumente des Freiraumschutzes ebenso wie positivplanerische Instrumente zur Koordination der Baulandentwicklung der Gemeinden und zur Entwicklung der Siedlungsstruktur einer Region einsetzen, bestehen erhebliche länderspezifische Unterschiede. Die hier untersuchten Instrumentenverbünde der Fallstudienregionen München und Westsachsen sind verhältnismäßig ähnlich ausgebildet. Die Regionalplanung in beiden Ländern zeichnet sich durch einen weitgehenden Verzicht auf positivplanerische Instrumente zur Mengensteuerung der kommunalen Baulandentwicklung aus. In begrenztem Umfang ist eine Mengensteuerung mit Hilfe des Instruments Eigenentwicklung bzw. organische Entwicklung möglich. Es werden vor allem standortsteuernde Instrumente genutzt. Für die kleinräumige

Steuerung der Siedlungsentwicklung sind in beiden Regionen negativplanerische Instrumente von zentraler Bedeutung (Abb. 2).

4 THEORETISCHE GRUNDLAGE DER PLANEVALUATION

Seit den 1990er Jahren gewinnt der Ansatz einer theoriegeleiteten Evaluation an Bedeutung (Weiss 1998; Chen 1990). Die Grundidee theoriebasierter Evaluation besteht darin, von den Wirkungen eines Instruments ein „theoretisches“ bzw. „logisches“ Modell mit Hilfe der wichtigsten Stakeholder zu entwickeln. Ein solches Modell beschreibt die Wirkungszusammenhänge eines Instruments in Bezug auf zentrale Input-, Prozess- und Outcome-Variablen. Eine Wirkungstheorie enthält Annahmen darüber, auf welchem Implementationsweg ein Instrument zu möglichen Effekten führt (Weiss 1998, 55). Das Ziel der Modellbildung ist die Rekonstruktion, warum ein Instrument intendierte Ziele erreicht oder verfehlt und welche Aspekte diese Wirkung erklären können. Eine theoriegeleitete Evaluation folgt den rekonstruierten Wirkungsketten (Brickmayer/Weiss 2000, 408). Zentrales Element einer theoriegestützten Evaluation ist die Integration von Wirkungstheorien in den Evaluationsprozess (Chen 1990, 39). Häufig werden konkurrierende Wirkungstheorien gebildet. Durch intensive Meinungsforschung wird beispielsweise rekonstruiert, wie die Autoren von Regionalplänen die Wirksamkeit ihrer Pläne einschätzen oder es wird die Wirkungswahrnehmung auf Seiten der Adressaten abgebildet. Ergänzt werden die pluralen Sichten der zentralen Stakeholder durch die Einschätzung der Evaluatoren, die ebenfalls Theorien über Wirkungen der untersuchten Instrumente entwickeln.

Die theoriegeleitete Evaluation ist nicht methodengebunden. So können verschiedene qualitative oder quantitative Methoden genutzt werden, solange dies den theoretischen Zwecken dient (Chen 1990, 84).

Bei der Evaluation von Regionalplänen sind das gesetzlich normierte Verhältnis von Regional- zu Kommunalplanung sowie das Anpassungsverhalten der Planadressaten zu beachten. Bestandteile der Wirkungskette sind zunächst der Regionalplan bzw. dessen Instrumente als Programminput sowie die siedlungsräumliche Entwicklung als Effekt. Regionalpläne steuern die Flächennutzung über den Umweg anderer Planungen und Zulassungsentscheidungen. Insofern handelt es sich bei den Regionalplänen um eine "Planung der Planung" (Einig 2003, 2008, S. 25). Direkte Effekte der Flächennutzung bewirken Regionalpläne erst nachdem sie in Bauleit- und Fachplänen weiter konkretisiert wurden und in Entscheidungen von Genehmigungsbehörden über die Zulässigkeit raumbedeutsamer Planungen und Maßnahmen eingeflossen sind (Heemeyer 2006). Voraussetzung für eine Steuerung der Siedlungsentwicklung durch regionalplanerische Festsetzungen ist deren tatsächliche Umsetzung auf Ebene der Kommunalplanung. Auf Grund dieser Mehrebenensteuerung müssen in einer Planevaluation neben indirekten Wirkungen auf die Flächennutzung auch direkte Wirkungen auf Seiten der Planadressaten gemessen werden. In beiden Fällen müssen die Wirkungen kausal auf einen Regionalplan oder einzelne seiner Instrumente zurückgeführt werden können. Im empirischen Beweis der Evidenz solcher Ursache-Wirkungs-Beziehungen besteht die wissenschaftlich schwierigste Herausforderung von Planevaluationen. Gelingt es mittels Indikatoren, auf der Basis qualitativer und quantitativer Daten, einzelne Instrumente als Ursache beobachtbarer Effekte zu identifizieren, kann die Wirksamkeit der unterschiedlichen Instrumentenverbünde ermittelt und vergleichend bewertet werden.

Sehr unterschiedliche Daten sind erforderlich, um den Wirkungspfad eines Regionalplans vollständig zu beobachten. Zuerst werden Planungsdaten für die unterschiedlichen Ebenen des Raumplanungssystems benötigt. Liegen Daten über die Anpassungsreaktionen der Kommunen in Form von Flächennutzungs- und Bebauungsplänen vor, sind die vielfältigen Fachplanungen und die vorhabenbezogenen Genehmigungs- und Zulassungsentscheidungen von Behörden bekannt, lässt sich verhältnismäßig genau beurteilen, ob die Festlegungen eines Regionalplans ausreichend von den direkten Adressaten des Plans berücksichtigt und eingehalten wurden. Ergänzend werden präzise Daten zur Entwicklung von Art und Intensität der Flächennutzung benötigt. Erst die Verfügbarkeit eines verhältnismäßig komplexen Datenkatalogs gestattet es, das Wirkungsspektrum von Regionalplänen in Ansätzen zu beobachten und den Grad des Erfolges eines Plans zu bewerten.

5 METHODE DER INSTRUMENTENBEZOGENEN PLANEVALUATION

Die Forschungsergebnisse belegen, dass geeignete Daten sehr häufig weder in der sachlichen, zeitlichen, noch in der räumlichen Differenziertheit existieren. Beispielsweise liegen nicht für alle Planungsregionen

Raumordnungskataster mit Informationen über alle relevanten raumbedeutsamen Vorhaben vor. Oft sind diese Planungsdaten auch noch nicht in einer digitalen Fassung verfügbar, so dass Verschneidungen des Regionalplans mit den Plänen der Kommunen und der Fachplanungen mittels eines Geographischen Informationssystems nur mit sehr großem Aufwand realisierbar sind. Aufgrund der Datenrestriktionen ist ergänzend eine Thematisierung der Wirkungswahrnehmungen und Erfolgsbewertungen zentraler Akteursgruppen notwendig. In der theoriebasierten Evaluationsforschung ist deshalb eine intensive Einbeziehung relevanter Stakeholder vorgesehen (Donaldson 2007; Leeuw 2003; Vaessen 2006). Um den Verhaltenseffekt von Instrumenten und Plänen besser beurteilen zu können, müssen Meinungen unterschiedlicher Akteure über die Wirkungsweise und den Erfolg von Plänen und Instrumenten rekonstruiert werden. Diese komplexen Untersuchungsschritte verlangen nach dem Einsatz sehr unterschiedlicher sowohl qualitativer als auch quantitativer Methoden der empirischen Sozialforschung. Im Resultat ergab sich ein Evaluationsansatz mit sechs Untersuchungsphasen (Abb. 3).

Abb. 3: Evaluationsansatz, Quelle: eigene Darstellung

Die Basis der Planevaluation bildet die Identifikation verbindlicher Instrumente zur Steuerung der Siedlungsentwicklung in den Fallstudienregionen. Unter Berücksichtigung raumordnungsrechtlicher Vorschriften kann auf Grundlage der textlichen und zeichnerischen Festlegungen der Regionalpläne eine Bewertung der Restriktivität der Instrumente vorgenommen werden (Teilbewertung Plananalyse). Zentrales Element der Ex-Post-Evaluation ist der sogenannte Soll-Ist-Vergleich. In dieser Phase werden die verbindlichen Vorgaben der Regionalpläne mit der realen Raumentwicklungen sowie den Inhalten der kommunalen Bauleitpläne, die als Adressaten der Regionalpläne dessen Festlegungen beachten bzw. berücksichtigen müssen, verglichen. Die Gegenüberstellung basiert auf einer Auswertung amtlicher Statistiken sowie einer quantitativen Analyen von Geodaten der zeichnerischen Festlegungen der Regionalpläne sowie der geplanten (FNP) und bestehenden (ATKIS) baulichen Flächennutzung. Mittels dieser Daten lassen sich Abweichungen von regionalplanerischen Festlegungen identifizieren (Teilbewertung Soll-Ist-Vergleich). Parallel zu den genannten Phasen werden Experteninterviews mit Planungsakteuren auf Landes-, Regional-, Kreis- und Gemeindeebene geführt. Vor dem Hintergrund langjähriger Erfahrungen mit regionalplanerischen Festlegungen erfolgt durch diese Akteure eine Einschätzung der Steuerungswirksamkeit der Planinstrumente. Das über die Gespräche generierte Expertenwissen dient insbesondere als Fundament der Stakeholder-Befragung. Als primäre Adressaten der Regionalpläne nehmen die Kommunen auf Grundlage eines standardisierten Fragebongens eine Bewertung der Steuerungswirkung vor und beziehen insbesondere zur Akzeptanz und zum Reformbedarf der Instrumente Stellung (Teilbewertung Befragung). Die Implementation der Regionalpläne wird in der fünften Phase über eine Auswertung von Stellungnahmen der Regionalplanung zu kommunalen Bauleitplanungen überprüft. In den Stellungnahmen können Konflikte zwischen verbindlichen Festlegungen der Regionalpläne und kommunalen Planungsvorhaben erfasst werden (Teilbewertung Planvollzug). Auf der Grundlage der Ergebnisse dieser Meinungsforschung können Theorien über die Wirkungsweise der untersuchten Instrumente abgeleitet werden. Diese Theorien werden dann mit den Ergebnissen der anderen Methodenblöcke verglichen. Erst aus der Gegenüberstellung von quantitativen Analysen auf der Basis von

amtlicher Statistik und Geodaten, der Vollzugsanalyse sowie den Einschätzungen der Wirkungen und des Steuerungserfolges der Instrumente durch die Stakeholder, kann eine angemessene Abbildung der Wirkungskette von Instrumenten sowie eine Bewertung der Steuerungseffektivität gelingen. Für die abschließende Gesamtbewertung der Steuerungseffektivität der einzelnen Instrumente werden die qualitativen und quantitativen Ergebnisse der Teilbewertungen zusammengefasst. Auch hier hat sich ein qualitativer Bewertungsansatz gegenüber einer quantitativen Vorgehensweise als vorteilhaft erwiesen. Auf Grund vielfältiger Erklärungsansätze für die Begründung der ermittelten Werte muss die Interpretation der Resultate sehr kontextsensibel vorgenommen werden. Nachdem für jedes Instrument eine Gesamtbewertung erfolgt ist, kann der Steuerungsansatz des gesamten Verbundes beurteilt werden. Auch hier kommt ein qualitativer Ansatz zum Einsatz.

6 AUSGEWÄHLTE EVALUATIONSERGEBNISSE

Die Ex-Post-Evaluation der Raumordnungspläne bzw. -instrumente wurde in beiden Fallstudienregionen auf Basis des vorgestellten Evaluationsansatzes durchgeführt. Die Teilbewertung sowie die Gesamtbewertung erfolgte jeweils über fünf Bewertungskategorien: gering, mittel und hoch sowie gering/mittel und mittel/hoch. Da hier nicht für alle untersuchten Instrumente die einzelnen Phasen der Evaluation durchlaufen werden können, werden zunächst die Bewertungsgrundlagen und Teilbewertungen der Evaluation für das Instrument "Regionale Grünzüge" exemplarisch vorgestellt. Im Anschluss erfolgt eine kurze Darstellung der Gesamtbewertung der regionalen Instrumentenverbünde.

6.1 Instrumentenbewertung Regionale Grünzüge

Regionale Grünzüge zählen zu den klassischen multifunktionalen Instrumenten des Freiraumschutzes. Sie sind für die Steuerung der Siedlungsentwicklung unverzichtbar (Domhardt 2005, S. 239). Das Instrument zielt in erster Linie auf den Schutz vor Bebauung und eine Vernetzung schutzwürdiger Freiraumflächen. Bevorzugtes Einsatzgebiet sind Regionen mit hohem Siedlungsdruck.

6.1.1 Plananalyse

In beiden Planungsregionen werden Regionale Grünzüge als standortsteuernde Instrumente genutzt. Sie weisen jeweils die Rechtsqualität eines Ziels der Raumordnung auf und müssen demzufolge von den Kommunen und Fachplanungsträgern strikt beachtet werden. Allerdings wird die Bindungswirkung durch Ausnahmeregelungen eingeschränkt, so dass die Festlegungen durch ihre Regel-Ausnahme-Struktur in keiner der beiden Regionen eine hohe Restriktivität aufweisen. Ausschlaggebend für die Bewertung ist die konkrete Formulierung der Ziele bzw. der Ausnahmen. Während in Westsachsen der Freiraumschutz einen strikten Vorrang besitzt und Ausnahmen auf Investitionen mit Landesbedeutung beschränkt sind, weist der Regionalplan der Region München eine deutlich geringere Regelungsintensität auf. Der Kreis zulässiger Bauten wird durch die Ausnahmeregelung nicht restriktiv eingeschränkt. Aus diesem Grund ist die Restriktivität der Regionalen Grünzüge in Westsachsen höher als in München einzuschätzen. Von der Ausweisung Regionaler Grünzüge ist in beiden Regionen nur ein Teil der Kommunen betroffen.

	Planaussagen		**Bewertung**	
	Rechtsqualität	**Ausnahmeregelung**	**Restriktivität**	**Betroffenheit der Kommunen**
München	Ziel	Ja	Mittel	Mittel
Westsachsen	Ziel	Ja	Mittel/Hoch	Mittel

Abb. 4: Plananalyse, Quelle: eigene Darstellung

6.1.2 Soll-Ist-Vergleich

Unter Nutzung gebietsscharfer Geodaten ist eine quantitative Erfolgskontrolle der Regionalen Grünzüge möglich. Diese bilden neben den Regionalen Grünzügen die geplante (Flächennutzungsplanung) und tatsächliche Flächennutzung (Amtliches topographisch-kartographisches Informationssystem (ATKIS)) ab. Bei der Analyse sind Besonderheiten der regionalplanerischen Ausweisungen zu berücksichtigen. So überlagert die Darstellung der Regionalen Grünzüge im Regionalplan der Region München bewusst Bereiche, die in bestehenden Flächennutzungsplänen bereits als Siedlungsfläche dargestellt werden. Diese Siedlungsgebiete werden im Regionalplan eindeutig aus der Zielfestlegung ausgeklammert und müssen deshalb nicht an die Vorgaben des Regionalplans angepasst werden. Aus diesem Grund ist für die Region München der Anteil der baulich geprägten Flächen ausschlaggebend, der in Regionalen Grünzügen und

gleichzeitig außerhalb der in FNP ausgewiesenen Siedlungsgebiete liegt. Im Ergebnis zeigt sich für die Region Westsachsen eine höhere Anpassung der Realnutzung an die ausgewiesenen Regionalen Grünzüge. Der Anteil baulich geprägter Flächen in den Regionalen Grünzügen fällt in der Region München deutlich größer aus (vgl. Abb. 5). Das Ergebnis ist nicht nur auf den höheren Siedlungsdruck in dieser Region, sondern auch auf die geringere Restriktivität der regionalplanerischen Festlegung zurückzuführen. Offensichtlich werden hier wiederholt Zulassungen von Siedlungsentwicklungen in Grünzügen auf Basis der Ausnahmeregelung erteilt.

Im Hinblick auf den Soll-Ist-Vergleich der Flächennutzungsplanung kann mit den vorliegen Daten für die Region München keine Bewertung vorgenommen werden, da eine Entwicklung der in FNP ausgewiesenen Siedlungsbereiche in den Regionalen Grünzügen nicht abgebildet werden kann. Die vorliegenden Daten spiegeln nur den aktuellen Stand der Flächennutzungsplanung wider. Ob ein Plan bereits vor In-Kraft-Treten des Regionalplans aufgestellt wurde und dementsprechend keine Verletzung der ausgewiesenen Regionalen Grünzüge darstellt kann nicht überprüft werden.

	München	**Westsachsen**
Soll-Ist-Vergleich Realnutzung		
Anteil baulich geprägter Flächen , der in Regionalen Grünzügen liegt	5,2 %	2,1 %

Abb. 5: Ergebnisse des Soll-Ist-Vergleichs, Quelle: eigene Darstellung, Daten: ATKIS

Die Teilbewertung des Soll-Ist-Vergleichs zeigt für die Region München, dass die Entwicklung im mittleren Maße der Festlegung des Regionalplans folgt. Demgegenüber kann für die Region Westsachsen eine hohe Übereinstimmung sowohl im Hinblick auf die Realnutzung als auch auf den Flächennutzungsplan festgestellt werden. Allerdings muss berücksichtigt werden, dass erst wenige Gemeinden der Region Westsachsen überhaupt einen Flächennutzungsplan aufgestellt haben. Für die übrigen Instrumente werden die Untersuchungsergebnisse des Soll-Ist-Vergleichs in Tabelle 3 abgebildet.

6.1.3 Bewertung durch die Kommunen

Eine Einschätzung, ob mittels Regionaler Grünzüge schutzwürdige Freiraumflächen vor eine Bebauung geschützt werden konnten, fällt den meisten Kommunen schwer. Nur rund 50 % der befragten Städte und Gemeinden gaben eine Bewertung ab. Diese Kommunalvertreter halten das Instrument in der Regel für erfolgreich. In der Region München fällt das Urteil insgesamt etwas kritischer aus (vgl. Abb. 6). Darüber hinaus stellen die Regionalen Grünzüge ein weitgehend von den Kommunen akzeptiertes Instrument der Regionalplanung dar, dessen Restriktivität grundsätzlich als angemessen angesehen wird (vgl. Abb. 7). Auffällig ist die relativ heterogene Bewertung in der Region München. Ausschlaggebend für die Forderung nach einer Abschwächung der Restriktivität können insbesondere Konflikte mit Regionalen Grünzügen bei kommunalen Planungen sein. Allerdings erkennen einzelne Kommunen auch die Notwendigkeit, den Freiraum durch restriktivere Festsetzungen und die Einschränkung von Ausnahmeregelungen besser zu schützen. Insgesamt nehmen die Kommunalvertreter eine hohe Zielerreichung, sowie einer geringe Einschränkung der kommunalen Planungshoheit durch Regionale Grünzüge wahr.

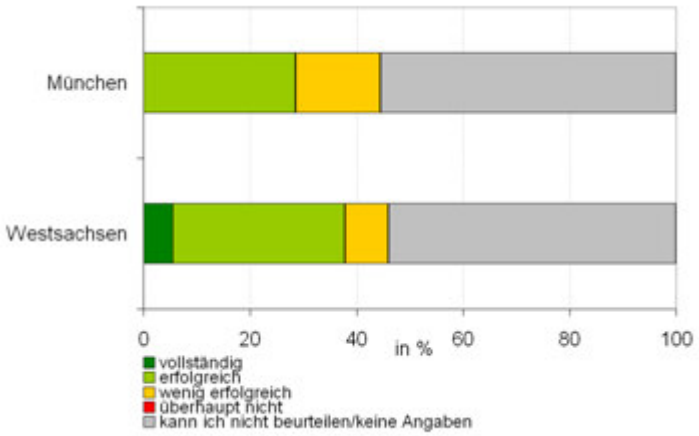

Abb. 6: Zielerreichung der Festlegungen zu Regionalen Grünzügen, Quelle: Kommunalbefragung BBSR 2009

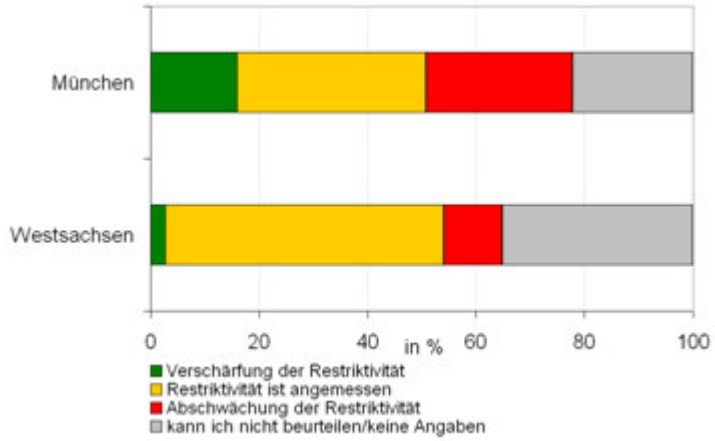

Abb. 7: Restriktivität der Festlegung zu Regionalen Grünzügen, Quelle: Kommunalbefragung BBSR 2009

6.1.4 Vollzugsanalyse

Die Träger der Regionalplanung sind bei allen Flächennutzungsplanverfahren und bei den anzeigepflichtigen Bebauungsplanverfahren als Träger öffentlicher Belange beteiligt. In ihren Stellungnahmen überprüfen sie, ob ein raumbedeutsames Vorhaben im Konflikt zu verbindlichen Festlegungen eines Regionalplans steht. Erfolgt eine negative Stellungnahme, wird dem kommunalen Planungsträger sowie der verantwortlichen Genehmigungsstelle signalisiert, dass ein Konflikt mit einer verbindlichen Vorgabe des Regionalplans besteht. Sind Ziele der Raumordnung betroffen und kann der Kommune nachgewiesen werden, dass weder eine erforderliche Beachtung noch eine Anpassung an den Zielinhalt stattgefunden hat, ist eine anschließende Genehmigung des Plans nicht möglich. Die Planung muss dann grundlegend überarbeitet werden.

Im Zuge des Stellungnahmenverfahrens bei Flächennutzungsplanungen bedingen Regionale Grünzüge relativ selten Konflikte zwischen Kommunen und Regionalplanung (vgl. Abb. 8). Das Instrument führt in vier (München) bzw. zwei (Westsachsen) Verfahren zur Ablehnung einer kommunalen Planung aufgrund bestehender Abweichungen. Da die Grundgesamtheit der Verfahren in den Fallstudienregionen erheblich differiert, ist eine instrumentenbezogene Vollzugsanalyse nur auf Grundlage relativer Werte sinnvoll. Die Differenzen sind auf abweichende Untersuchungszeiträume, eine unterschiedliche Gemeindeanzahl je Region sowie den Umstand, dass für einige Gemeinden in der Region Westsachsen noch kein Flächennutzungsplan vorliegt, zurückzuführen. Als Basis für eine vergleichende Bewertung aller Instrumente wurden für die Analyse folgende Schwellenwerte definiert. Die Konflikthäufigkeit wird als gering bewertet, wenn ein Instrument keine Konflikte verursacht hat. Treten Konflikte mit einem Instrument in weniger als 3 % aller Verfahren auf, so liegt eine mittlere Konflikthäufigkeit, bei höheren Anteilen eine hohe Konflikthäufigkeit vor. Demnach ist in der Region München von einer mittleren und in der Region Westsachsen, trotz der geringen absoluten Konfliktzahl, sogar von einer hohen Konflikthäufigkeit auszugehen. Der Wert verdeutlicht die Bedeutung des Instruments in der Region Westsachsen. Das Ergebnis belegt, dass das Instrument von der Regionalplanung aktiv zur Steuerung der Siedlungsflächenentwicklung herangezogen wird.

	Anzahl der Konflikte	**Anteil an allen Verfahren**	**Anzahl der Verfahren**	**Untersuchungs-zeitraum**
München	4	1,0 %	396	2005 - 2007
Westsachsen	2	3,3 %	61	2001 - 2007

Abb. 8: Konfliktfälle in FNP-Verfahren, Quelle: eigene Darstellung

6.1.5 Gesamtbewertung Regionale Grünzüge

Die zusammenfassende Bewertung bescheinigt der Region München eine mittlere und der Region Westsachsen eine mittel/hohe Steuerungseffektivität für das des Instrument der Regionalen Grünzugs. Ausschlaggebend für diese Einschätzung sind die höhere Restriktivität sowie der positivere Soll-Ist-Vergleich in der Region Westsachsen.

	Plananalyse		Soll-Ist-Vergleich	Kommunalbefragung		Plan-vollzug	Bewertung
	Restrik-tivität	Betroffenheit der Kommunen	Entwicklung folgt dem Plan	Ziel-erreichung	Einschränkung Planungshoheit	Konflikt-häufigkeit	Steuerungs-effektivität
München	mittel	mittel	mittel	hoch	gering	mittel	mittel
Westsachsen	mittel/hoch	mittel	hoch	hoch	gering	hoch	mittel/hoch

Abb. 9: Zusammenfassende Bewertung des Instruments „Regionale Grünzüge“, Quelle: eigene Darstellung

6.2 Gesamtbewertung der Instrumentenverbünde

Eine vierphasige Instrumentenbewertung wurde für jedes untersuchte Steuerungsinstrument der Regionalpläne durchgeführt. Variierende Datengrundlagen und -verfügbarkeiten führen dazu, dass insbesondere die Teilbewertung des Soll-Ist-Vergleichs auf eine Interpretation der Evaluatoren angewiesen ist. Bei einzelnen Instrumenten ist die Durchführung einer quantitativen Erfolgskontrolle insgesamt nicht möglich. In diesen Fällen musste sich die Bewertung der Steuerungseffektivität auf eine tendenzielle Aussage beschränken. Im Folgenden wird die zusammenfassende Gesamtbewertung der Instrumentenverbünde der Regionen München und Westsachsen vorgestellt.

6.2.1 Gesamtbewertung Instrumentenverbund München

Die in der Region München zur Steuerung der Siedlungsflächenentwicklung genutzten Instrumente weisen mit Ausnahme des Instrumentes Bannwald maximal eine mittlere Steuerungseffektivität auf. Zentrale Elemente des regionalplanerischen Instrumentenverbunds sind negativplanerische Instrumente. Regionale Grünzüge, Trenngrün und Landschaftliche Vorbehaltsgebiete kommen jeweils über eine mittlere Steuerungseffektivität nicht hinaus.

	Plananalyse		Soll-Ist-Vergleich		Stakeholder-befragung		Vollzugs-analyse	Bewertung
	Restrik-tivität	Betroffenheit der Kommunen	Entwicklung folgt dem Plan	Uberein-stimmung FNP/RP	Zieler-reichung	Einschrän-kung Planungs-hoheit	Konflikt-häufigkeit	Steuerungs-effektivität
Zentrale Orte	gering	mittel	gering/ mittel	-	gering	hoch	-	gering
Bereiche, für Siedlungsentwicklung	gering	mittel	gering/ mittel	gering/ mittel	gering	gering	gering	gering
Organische Entwicklung	gering/ mittel	mittel	gering/ mittel	-	mittel	gering	gering	gering/mittel
Ausrichtung Entwicklung auf geeignete Haltepunkte	gering/ mittel	mittel	mittel	-	hoch	mittel	gering	mittel
Regionale Grünzüge	mittel	mittel	mittel	mittel	hoch	gering	mittel	mittel
Trenngrün	mittel	gering	-	-	hoch	gering	gering	Tendenz: mittel
Landschaftliche Vorbehaltsgebiete	gering/ mittel	gering	mittel	mittel	hoch	gering	mittel	mittel
Bannwald	mittel	mittel	hoch	hoch	-	-	gering	mittel/hoch

Abb. 10: Instrumentenbewertung Region München, Quelle: eigene Darstellung

Das Ergebnis verdeutlicht, dass diese Instrumente keinen hohen Freiraumschutz gewährleisten können, da im Einzelfall vielfach Ausnahmen zugelassen werden. Mit Blick auf die positivplanerischen Instrumente konnte bei der Festlegung zur Ausrichtung der Siedlungsentwicklung auf geeignete Haltepunkte des SPNV die höchste Steuerungseffektivität festgestellt werden. Hier gelingt es zumindest teilweise die Entwicklung auf die entsprechenden Standpunkte zu lenken. Demgegenüber ist die Steuerungseffektivität der Zentralen Orte, der Bereiche für Siedlungsentwicklung sowie der Festlegungen zur Eigenentwicklung gering. Bei diesen Instrumenten hat bereits die Plananalyse eine geringe Restriktivität gezeigt. Auch durch die Kommunen wird die Zielerreichung überwiegend negativ eingeschätzt. Zudem belegt der Soll-Ist-Vergleich nur eine geringe bis mittlere Übereinstimmung. Dieses Resultat bestätigt in Teilen die Aussagen von Reiß-Schmidt (2003, 747), wonach es in der Region München nicht gelungen ist, die Siedlungstätigkeit auf S-Bahn-Haltepunkte, Zentrale Orte und Siedlungsschwerpunkte zu konzentrieren. Die Steuerungseffektivität des Instrumentenverbunds muss insgesamt als gering/mittel bewertet werden.

6.2.2 Gesamtbewertung Instrumentenverbund Westsachsen

Auch im Instrumentenverbund der Region Westsachsen basiert die Steuerung der Siedlungsflächenentwicklung vor allem auf negativplanerischen Instrumenten (Regionale Grünzüge, Grünzäsur, Vorrang- und Vorbehaltsgebiete zum Freiraumschutz). Diese weisen eine relativ hohe Steuerungseffektivität auf. Eine Bewertung der positivplanerischen Instrumente muss sich mit Ausnahme des Instruments Zentrale Orte aufgrund mangelnder Datengrundlagen für einen Soll-Ist-Vergleich auf eine tendenzielle Aussage beschränken. Die Ausrichtung der Siedlungsflächenentwicklung auf die Zentralen Orte ist nur teilweise gelungen. Versorgungs- und Siedlungskerne sowie Siedlungsbereiche tragen kaum zur Steuerung der Siedlungsflächenentwicklung bei. Zusammenfassend ist die Steuerungseffektivität des Instrumentenverbunds der Region Westsachsen als mittel zu bewerten. Steuerungsmöglichkeiten besitzt die Regionalplanung vor allem im Hinblick auf eine Abwehr baulicher Nutzungen von Standorten, die dem Freiraumzweck vorbehalten bleiben sollen. Eine umfassende aktive Steuerung der Siedlungsflächenentwicklung gewährleistet der gewählte Instrumentenverbund nicht.

	Plananalyse		**Soll-Ist-Vergleich**		**Stakeholder-befragung**		**Vollzugs-analyse**	**Bewertung**
	Restrik-tivität	Betroffenheit der Kommunen	Entwicklung folgt dem Plan	Uberein-stimmung FNP/RP	Zieler-reichung	Einschrän-kung Planungs-hoheit	Konflikt-häufigkeit	Steuerungs-effektivität
Zentrale Orte	gering	mittel	mittel	-	gering	mittel	-	gering/mittel
Versorgungs- und Siedlungskerne	gering	mittel	-	-	gering	mittel	hoch	Tendenz: gering
Eigenentwicklung	gering	hoch	-	-	gering	hoch	mittel	Tendenz: gering
Siedlungsbereiche	gering/ mittel	gering	-	-	gering	mittel	gering	Tendenz: gering
Regionale Grünzüge	mittel/ hoch	mittel	hoch	hoch	hoch	gering	hoch	mittel/hoch
Grünzäsur	mittel/ hoch	hoch	-	-	hoch	gering	mittel	Tendenz: mittel/hoch
Sonstiger Freiraumschutz	hoch	hoch	mittel/ hoch	mittel/ hoch	-	gering	hoch	mittel/hoch

Abb. 11: Instrumentenbewertung Region Westsachsen, Quelle: eigene Darstellung

6.2.3 Zusammenfassende Einschätzung

Die Mengensteuerungskapazität der Instrumentenverbünde ist in beiden Regionen nur minimal ausgebildet. Dies hat insbesondere in der Region München den Effekt, dass der hohe Siedlungsdruck, der in keinem Stadt-Umland-Raum in Deutschland ein vergleichbares Niveau erreicht, nur unzureichend auf die besonders geeigneten Standorte mit sehr guter ÖPNV-Erschließung abgeleitet werden kann. Da der Immobilienmarkt in der Stadt München extrem angespannt ist, bedarf es auf den S-Bahn-Trassen leistungsfähiger Entlastungsorte, wo durch umfangreichen Wohnungsbau schienennah das Wohnungsangebot für die Region erheblich ausgeweitet werden kann. Gleichzeitig ist es erforderlich an den Standorten, die in der Region nicht über eine geeignete attraktive ÖV-Infrastruktur an die Landeshauptstadt angebunden sind und die nicht in ausreichendem Maße ein zentralörtliches Dienstleistungsangebot bieten, die Expansion der kommunalen Baulandentwicklung deutlich einzuschränken. Zwar ist dies auch mit freiraumschützenden Instrumenten möglich, eine effektivere Steuerung kann allerdings mit positivplanerischen Instrumenten der Mengenregulierung erfolgen, die in Bayern der Regionalplanung aber nicht von der Landesplanung zur Verfügung gestellt wird.

Das Defizit der Mengenregulierung ist in der Region Westsachsen nicht ähnlich stark zu spüren, wie in der Planungsregion München, da seit Ende der 1990er Jahre der Siedlungsdruck auf Standorte im Umland der Stadt Leipzig erheblich abgenommen hat. Wäre hier noch ein vergleichbarer Drang auf Standorte der „grünen Wiese“ gegeben, wie während der ersten Jahre nach der Wiedervereinigung, könnte die Expansion des suburbanen Raumes durch rein standortsteuernde Instrumente der Regionalplanung ebenfalls nur sehr eingeschränkt bewältigt werden. Da in diesem Raum heute nur noch ein verhältnismäßig schwacher Siedlungsdruck besteht und die Stadt Leipzig schon seit Jahren Reurbanisierungsgewinne verzeichnen kann, erscheint hier eine Erweiterung der Mengensteuerungskapazität der Regionalplanung nicht so dringlich wie in der Region München.

7 FAZIT

Eine entscheidende Rolle bei der Weiterentwicklung von praxistauglichen Planevaluationsansätzen spielt der Mix geeigneter Evaluationsmethoden. Das Refina-Vorhaben hat gezeigt, dass erst die Kombination qualitativer und quantitativer Methoden der Sozialforschung und der Raumwissenschaften die Evaluatoren in die Lage versetzt, instrumentenbezogene Planevaluationen durchzuführen, bei denen die Einschätzungen (Wirkungstheorien) unterschiedlicher Akteure integriert werden müssen.

Vier Aspekte sind bei der Planung von Planevaluationen zu berücksichtigen:

- 1)Intensivinterviews in der Sondierungsphase sind die Grundlage, um auf Seiten der Evaluatoren ein vertieftes Verständnis der Instrumente und ihrer Anwendung zu gewinnen. Unterbleibt eine Interviewphase, kann das Wissen externer Evaluatoren in der Regel nicht auf ein Kenntnisniveau heranreifen, das zur Formulierung ausreichend aufgeklärter Hypothesen über Wirkungen und Erfolg der Instrumente für notwendig gehalten wird.
- 2)Stakeholderbefragungen zu den Instrumenten des Regionalplans sind eine wichtige Grundlage, um nicht nur Einschätzungen über die Wirkungen von Instrumenten zu gewinnen, sondern auch um die Akzeptanz der Instrumente und ihren Reformbedarf abschätzen zu können.
- 3)Viele zur Verfügung stehende Verfahren der statistischen und geo-statistischen Analyse können nur dann sinnvoll für die Evaluation einzelner Regionalplaninstrumente angewendet werden, wenn hochauflösende, kleinräumige Geodaten in Zeitreihen vorliegen. Die Anwendbarkeit von Analysemethoden hängt somit entscheidend von den zur Verfügung stehenden Grunddaten ab. In vielen Fällen muss die Hypothesenbildung in Abhängigkeit von den nutzbaren Datenbeständen organisiert werden.
- 4)Wird das Gesamtergebnis einer instrumentenbezogenen Evaluation aus komplexen Teilanalysen abgeleitet, ist dem gesamten Bewertungsvorgang ein besonderes Augenmerk zu widmen. Bisher wurde eine qualitative Vorgehensweise praktiziert. Zu prüfen ist, ob durch quantitative Verfahren die Objektivität und Vergleichbarkeit der Synthese gesteigert werden kann.

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Face to Face with Fantasy: the City of Utopian Places

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1 ABSTRACT

Urban Happiness may not be just another utopia engendered by planners to lure citizens into the circuits of cities' real estate businesses. The Royal Institute of British Architects seem to look seriously at the topic, as suggested by the book edited by Jane Wernick on RIBA's behalf 'Building Happiness' (Black Dog Publishing, 2008). It brings the viewpoints of a varied number of authors about the pursuit of happiness as a meaningful political goal. On the other hand, recent developments in the theory of place, as I approach in my book called 'Rethinking the Meaning of Place' (Ashgate Publishing, 2010), seem to welcome the production of newly invented places (themed malls, revamped historic areas, etc) as important actors in the pursuit of happiness in today's cities. It is the intention of this paper to bring together the two lines of thought in order to achieve a better understanding of placemaking and placemarketing as techniques that promote the attractiveness of cities by producing new 'places of urbanity'.

2 THE ATTRACTIVENESS OF CITIES

You do not need to be an expert in urban studies to perceive that today's cities are experiencing a new trend in their concern with the offer of attractiveness, a trend increasingly observed in major global cities, all over the world and in all the five continents. There is nothing intrinsically new about this, however: people are used to flock to Lourdes, France, for example, simply for their happiness of being present in a place where a miracle has once been performed; similarly, in Ancient times, Romans crowded to Rome to watch Christians being shredded by hungry lions, just for the thrill of it. For them, this was a source of happiness. Both Lourdes and Rome were considered attractive cities, though by different standards. Herein lays an important first truism that helps to understand the slender difference between thrills and happiness, 'thrill not necessarily equaling happiness' (Schwartz, 2008:136). Cities' attractiveness though, either giving thrills or producing joy, has to do with the pursuit of happiness, a target frequently included within the consumption ethics that deeply permeates our twenty-first century society ideals. To be is to have, according to the principles of this society. But, to be happy, to have happiness, is often confounded with having (and being – which would be quite opposedly to the Heideggerian understanding, by the way). Accordingly, cities do compete among each other to become attractive both to visitors as well as to residents. This competitiveness is already acknowledged as an area of specific interest in urban studies, and some authors, such as Simon Anholt, for example, develop long elaborations on the topic (Anholt 2003; 2009), their basic arguments dealing, usually, with the branding that cities struggle to acquire in their competitiveness process. A sort of subdued competition seems to be in the order of the day among today's cities, that try to become known as, say, the City-light (Paris), or the World's Cultural Capital (New York), or the Carnival Paradise (Rio de Janeiro). This competition is often confounded with the supply of happiness, that is to say, cities attempt to allure people in terms of the amount of happiness they are supposedly able to provide them. As such, it is not surprising to find experts extensively discussing about this "pursuit of happiness" in actual urban environments. A good example of this is the recent publication named 'Building Happiness', encouraged by the Royal Institute of British Architects (RIBA), which approaches the subject with an unprecedented emphasis. The book is edited by Jane Wernick on RIBA's behalf, and presents a whole set of arguments focusing on the search for happiness as far as urban behaviours are concerned. Several authors and distinguished professionals bring about their opinions on what can be understood as happiness, insofar as living in urban environments is concerned. It is interesting to notice that, most of the times, attractiveness is understood as the power to produce happiness. So, in this context, providing happiness is often understood as a surrogate for cities achieving high attractiveness ranks in competitive grounds through the happy places they are able to produce. All in all though, a distinguishable point can be initially sorted out: more than ever before, happiness is actually for sale in contemporary cities. This is a first and important characteristic of these cities, especially for my area (Architecture-Urbanism), which is known for its crucial commitment to producing places for people – places designed for people being happy by using them. This search for happiness marked quite strongly the old heroic times of Modernist Urbanism in the early twentieth century,

as acknowledged in the above mentioned book. One of the authors quotes Le Corbusier saying that architecture produces happy people and that happy towns are those that have an architecture, an assertive that probably explains why 'Architecture thus becomes one of the most powerful mechanisms in the delivery of the promise of happiness on which modernity is founded' (Till, 2008:126, original emphasis).

2.1 The Production of Happiness

There are several tracks conducing to the production of happiness in present-day cities. Surprisingly, some of them are public and freely accessible, as some authors have more thoroughly examined (see, for example: Carmona et al. 2003; Carr et al. 1995; Kayden et al. 2000; PPS 2002; Whyte 1990). The majority of tracks, however, involve private and expensive businesses and it is on these grounds that the contributions of areas such as Urban Planning, Real Estate Development, and ICT Industry, can bring more practicable deeds. Fortunately, many of these areas's agencies seem to have understood the importance they play for heightening the attractiveness of cities, and their contributions have shown progresses accordingly. Indeed, the self-awareness of urban planning, for instance, can be clearly ackowledged in a statement I have recently selected and reproduced in a publication. The statement is part of a publicity campaign for a new urbanization in the state of Florida (USA), and it runs as follows: 'For those of us in the business of creating new places .... It's been said that great sculptors have the ability to unlock the image held inside a block of stone. In a sense, that's what great planners do as well. They strive to unlock the place held inside a piece of land' (apud Castello, 2010, forthcoming). Such an argument seems quite adequate to herewith introduce the topic of place and the close interrelationships the topic has to the question of the production of happiness.

Places have a strong phenomenological connotation nowadays. Going to a place, enjoying the experience a place has to offer, may sometimes double with being happy, double with happiness. Traditionally closer to the Humanities, the concept of place has expanded its reach up to a point in which it now touches several disciplines simultaneously. One can say that the concept now acquires a supra-disciplinary status, that encompasses sociological, anthropological, geographical, tourist, cultural, philosophical, architectural, environmental and spatial themes, and, somewhat rather unexpectedly, also touches themes more closely related to administrative, managerial, economic and political grounds. Definitely, the concept of place can be said to have reached a transdisciplinary range nowadays. In fact, the importance of the concept for the goal of 'liveable, healthy, prosperous cities for everyone' cannot be sufficiently overemphasised, since it is its foundational aim to design spaces for people to live in and to enjoy living experiences in suitable civilized conditions: 'Architectural psychology, environmental psychology, people/environment studies, human factors of design or psychostructural environics, call what you may, has been concerned explicitly in making better, happier and more humane environments' (Mikellides, 2008:86). In other words, places are crucial for the production of happiness in urban surroundings. Architects, in their best knowledge and good will, diligently tried to design places, though they did so under the strict Modernist functionalist rules. Some way or another (and this is a long discussion), the places did not work. At the end of the day, architects became tired of assuming the blame of designing what became branded as placelessness (Relph 1976; 1996) or, even more pessimistically, non-places. This contributed to set up a contemporary rethinking of the concept of place: once one of the noblest principles in Architecture-Urbanism, the concept of place has now incorporated a double meaning in today's practice of urban planning. On top of its traditional social meaning, a Place can now incorporate a strong economic meaning, thereby acquiring an additional urban function: the concept today also deals with urban economics. This is a second important characteristic of contemporary cities. The making of a place now comes together with the marketing of that place – Placemaking doubles with Placemarketing – and the newly formed duet assemble forces to jointly work towards the production of happiness, and, hence, rather unpredictably, to encourage the creation of a (sort of) market of happiness. This is an entire new aspect in the theory of place, and deserves a little more elaboration, insofar as the concept of place moves from the previous functional bias it used to have in Modernist Architecture-Urbanism, and favours a more phenomenological approach now, in post-modern times, reflecting the important existential role of the concept and its protagonism as an environmental nexus that registers the anthropical transformation of the human environment.

2.2 The Market of Happiness

Most actions involved in the making of a place call for the participation of an architect or a planner. As a matter of fact, in this respect, there are many complexities that end up in the hands of architects, who on top

of having to respond to intricate and unforeseen changes being constantly introduced into urban realms, '… still face the challenge of shaping public space – from piazza to Plaza…. Indeed, architects are actively searching for new forms in which to house contemporary public life' (Avermaete et al., 2009: 19). This is a challenge considerably bedevilled by the fact that the public realm undergoes a continual change, starting by the startling change brought about by the new ways of perceiving what is public and what is private. This is a third important characteristic of contemporary cities. French philosopher François Ascher recognizes quite clearly these perceptual changes by stating that in certain situations, the social practices performed in a place are the real cause to confer to that place its public character (Ascher, 1995; 2008). In other words, the traditional prerogatives that used to establish the distinction between public and private seem to be no longer in force; at least, in the strict sense they used to have. The three pronged public-private distinction established long time ago (in fact, during the French Revolution, 1798), based on ownership, accessibility, and purpose (Avermaete et al., 2009:25), has experienced a thorough change, and, today, there is a kind of "democratization" in terms of what is considered as public domain, and a classic example is provided by the sociologist Sharon Zukin who points out to the fact that the access to the (semi)public spaces of shopping malls becomes de facto public spaces (Zukin, 1997).

In present times one can discern a factual typology of places distributed right through the whole extension of urban environments. In my research work I signal to three types (and to their specific variations): I call them places of aura, places of memory, and places of plurality (Castello, 2010, forthcoming). Places of Aura are those originated from spatial stimuli, material or abstract. Places leaning upon traditional or historical elements associated to temporal dimensions I term places of Memory. And places stimulated from the interaction among people due to their interpersonal relations in the environment are termed as places of Plurality. All types can be responsible for the production of happiness and to attribute quality to urban spaces. All types can deliver whatever utopias and fantasies people are daydreaming with. Moreover, all types can be also responsible for offering what is known as "urbanity", an environmental quality inherent to urban areas. This quality can even be understood as a surrogate for happiness, that is to say, once you are in the presence of urbanity, it is likely that you may embark on a experience that will involve happiness.

The difficult point is that you must pay to use many of these places of urbanity (or of happiness). In contemporary times, it is as if a "market of happiness" became institutionalized in certain urban areas. Significantly, it is precisely here that the contributions of Urban Planning, Real Estate Development, and ICT Industry areas become substantially decisive: they can make this market more accessible and, hence, THEY CAN MAKE CITIES MORE ATTRACTIVE!

Though this contribution is sometimes quite explicit, like the celebrated case of the reurbanization of PotsdamerPlatz in Berlin, Germany, in many occasions it remains understated, like in the rehabilitation of neglected old central quarter's areas, like the Bastakia zone in old Dubai, United Arab Emirates.

It follows some illustrations of places of urbanity in different cities and continents that include either implicit or explicit external contributions from various development agents.

3 HAPPY PLACES ARE HERE TO STAY

And which are those places?

Even if presented under very different configurations, mostly daily reality cases include illustrations that encompass shopping activities and services industries, such as entertainment, culture, leisure and tourism. In fact, the absolute majority of the newly invented places is constituted of commercial and services activities like shopping malls, recycled historical settings, restaurants, entertainment places, sports complexes, hybrid complexes, multiplex cinemas, museums, libraries – places which try to "clone" qualities found in consecrated other places, or which create what is believed to produce the urban attractiveness known as urbanity.

As mentioned earlier, one of the most renowned illustrations of newly invented places of urban attractivity comes from Europe. The reurbanization of the PotsdamerPlatz area in central Berlin, an area heavily destroyed by Second World War bombings is, undoubtedly one of the most expressive examples of the creation of public places by private agents. In this case, the initiative came from Daimler-Benz-Chrysler and from Sony Corporation, among others agents (FIGS. 1-2). One of the most interesting actions to highlight in this case is that the reurbanization involved both space and time determinants, as if illustrating one former

assertive by Zaha Hadid about her '…idea that one could return to a previous moment in time….to investigate the issues of that time and what they could imply in terms of change and newness…. Juxtaposing two "times" created a superimposition and, eventually, hybridization. Things that had occurred at different times could now happen simultaneously' (Hadid, 2009:141). The space that located PotsdamerPlatz before war times was a great central place. The space that locates PotsdamerPlatz in today's times is a great central place again.

Fig. 1: Berlin. Arrival to PotsdamerPlatz Station, Fig.2: Berlin. PotsdamerPlatz, Sony Area

Striking examples come from Asian countries, mainly from those once referred to as the Asian Tigers. Bangkok, Thailand, pioneered in shopping cutting-edge activities, by introducing the strategy of allocating a grouping of various shopping malls in a single key central area known as Siam (FIGS. 3-4). A similar situation is found in the island of Singapore, where there is an enormous succession of huge malls that parade along a single avenue, the busy Orchard Road (FIGS. 5-6). The United Arab Emirates, in turn, provide the legendary example of Dubai, perhaps the most fantastic private development in the whole world, with its palm-shaped islands, and the like. But that can also be renowned for a beautiful piece of heritage preservation, presented by the historic area known as Bastakia, a beautifully successful refurbishment in the city's oldest area (FIG.7).

Fig. 3: Bangkok. Public areas shared by shopping malls, Fig. 4: Bangkok. Siam Area

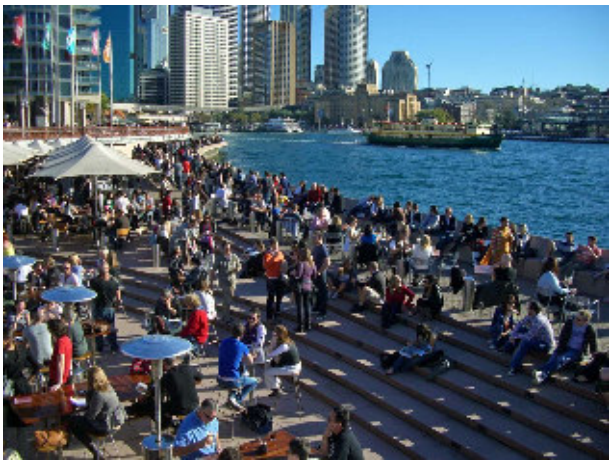
Fig. 5: Singapore. New Ion Orchard Mall, Fig. 6: Singapore. Orchard Road

Cultural activities are prodigal for inducing the creation of attractive places, and one classic illustration of this trend comes from Africa, in Cairo, Egypt, with the creation of a genuine entertainment park in the Gizeh area of the pyramids, offering not only the expected historical emotions, but also the Sound-and-Light attractions that ultimately entice the establishment of lots and lots of retail outlets, services and leisure industries (FIG.8).

Fig. 7: Dubai. Bastakia Area, Fig. 8: Cairo. Gizeh Area

Oceania has excellent examples from down under, and probably the most distinguished ones are located in Australia. The Sydney Opera House, for instance, established itself as a celebrated place which soon earned the status of a national brand for the country as a whole. Today, it is a fêted place for Sydney inhabitants and for world tourists alike. Perhaps only the ensemble composed by the area named Darling Harbour can rival to the Opera House area as one of the legitimate places of urbanity in Sydney (FIGS. 9-10).

Finally, illustrations in North America are copious, since it was there that the highly successful practice of creating thematic places, like Disney's theme parks in Florida and California, festival places like South Street Seaport, in New York, and entertainment fantasies, like Fisherman's Wharf in San Francisco (FIG.11), were actually born. New York excels in the practice of creating "public" places – though, at the end of the day, privately owned. The initiatives of William H. Whyte, who successfully negotiated and bargained with private investors for the insertion of public spaces in their developments, became worldwide celebrated. A detailed book organized by Jerold Kayden, the New York City Department of City Planning, and the Municipal Art Society of New York, suggestively titled "Privately Owned Public Space", registers with minutiae this New York City experience.



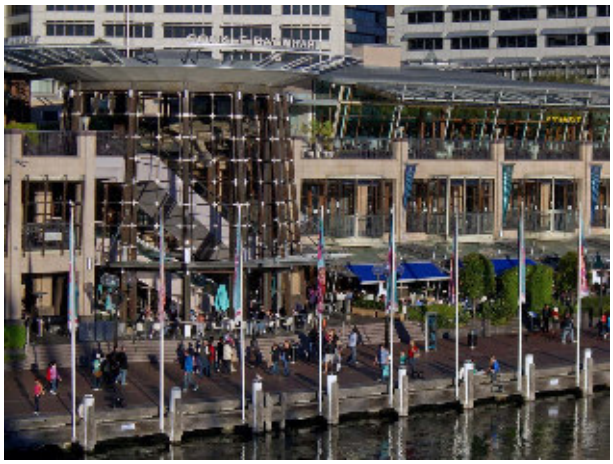


Fig. 9: Sydney. Opera House Area, Fig. 10: Sydney. Darling Harbour Area

But South America follows short, not only by emulating North American theme parks and fantasy places (Hannigan, 1998) as by introducing up-to-date technicalities like, for example, the creation of airports that double as hybrid complexes, intended for the generation of public places. This latter case is quite clearly illustrated by the airport of Porto Alegre, Brazil, my home city, to which I will grant some extended notes.

Fig. 11: San Francisco. Fishermans Wharf Area, Fig. 12: Porto Alegre. Central Location of Airport

In Brazilian terms, the refurbishing of the International Airport Salgado Filho, in Porto Alegre, has brought innovation to the airport national scene by creating a multifunctional mega-complex – a veritable city-building – as it is increasingly found in major airports across the world. Its programme combines very diverse activities, such as shopping mall, leisure and entertainment spaces, transport terminus, medical and clinic services, exhibition and museum spaces, hospitality and food services. It generated a concentration of hybrid buildings that seek to play a similar role to that found in urban commerce and service centres. The building's surroundings the airport also added further functions to the complex, with international hotel chains benefiting from direct links to the city's overground-metro system's Airport station, and new road axis into the city centre or to towns in the metropolitan region. Further to that, comes the unusual proximity to Porto Alegre's central area, easily accessible from the complex (FIG.12), collaborating to explain the quick success the complex achieved in becoming a place of attractiveness for the city's population. The variety of functions acts as a catalyst to generate an atmosphere of plurality. The architect Bernard Tschumi sees airports as an opportunity for the creation of places. In the project for Kansai, in Osaka (Japan), for example, he sought '... to enlarge the airport into an event, a spectacle, a new city of interchange and exchange, of business, commerce and culture (…)' (Tschumi 1994:105). In Porto Alegre, it can now be asserted that the plural space of the Airport Complex is also starting to be perceived as a place, attracting a good number of people, including inhabitants and tourists who visit it to enjoy the incipient 'urbanity' created there, frequenting the airport simply to have a coffee or read a newspaper in a comfortable and safe place – using the airport as a tertiary place, as Oldenburg (1999) teaches us. Or simply to go shopping, flirt in the food hall, show an attractive place to a friend, watch one of the new releases in the cinemas, since Porto Alegre's airport was the first to offer a cineplex in Brazil (FIG.13), or just for an enjoyable visit with family

or friends. Furthermore, it is now possible to talk of an expansion of 'placeness' at the airport: in April 2005 the space in front of the airport Complex was chosen to house the 'Cidade Elétrica', an especially assembled mobile structure for popular mega-events such as major pop concerts. On a 40,000-m2 site in the Parque Condor, the Cidade Elétrica is equipped with food plazas, chemical toilets, and first aid and security systems. The opening event involved especially run public transport using the Airport metro station as transfer point, enabling access to one more event associated with the plurality connected with the airport place, indicating it as a source of an agglomeration economy. Confirming the trend, this space currently houses the 'Pepsi on Stage', a venue for popular rock shows, heavily attended by young people from all parts of the city, and organized by Pepsi-Cola.

It is also worthwhile registering that Porto Alegre has recently engaged on yet another production of a public attraction promoted by the private sector. As it happens in other parts of the world, the city's cultural scene got enriched by the construction of a grand new art museum, sponsored by the "Fundação Iberê Camargo", a private Foundation, dedicated to a local artist. One of the most exciting attractivity factors presented by the museum is its design by one world-famous Portuguese architect, Alvaro Siza, winner of the 1992 Pritzker prize, who won, for his Porto Alegre project, the Lion d'Or from the Venice Architecture Biennial of 2002, while still in blueprint phase (FIG.14).

Fig. 13: Porto Alegre. Airport Cineplex, Fig. 14: Porto Alegre. Iberê Camargo Museum

4 CONCLUSION

But, ultimately, what is happiness? This, of course, is an extremely delicate question.

'Happiness is a by-product of numerous human emotions triggered by the convergence of many things: a sense of security and belonging, an association of pleasant memories, a connection to the past and to the place, a 'positive' (of course, relative and subjective) aesthetic where one feels uplifted, a sense of possibility and openness, and an impression of choice' (Scwhartz, 2008: 134). It goes without saying that the projects mentioned in this paper deal, one way or another, with at least one or many of the things included in this emotion known as happiness. Since the projects show clear engagements to entrepreneurial corporations, they clearly contain heavy arguments for understanding the crucial role played by entities such as Urban Planning, Real Estate Development, and ICT Industry areas in the creation of places of attractiveness in contemporary urban environments. They also represent a clear illustration of the role of a new economic urban component – the creative economy – as an important instrument of urban development (Florida 2004; 2005), which has been incorporated into the repertoire of strategies of urban planning and urbanism that seek new paradigms for meeting the growing concern with increasing the attractiveness of cities, to transform them into places people feel increasingly attracted to live in, work or visit.

Lastly, there are three arguments worth remembering, in order to better understanding the actual conclusions: (i) Architects have been constantly working for the pursuit of happiness, this pursuit being an explicit objective of the Modernist period, as observed by Le Corbusier. (ii) The Making of Places in Post-Modernist times received a crucial help by the newest area of Placemarketing; in Modernist times, traditional place design led to placelessness and non-places. (iii) The boundaries between private and public space have become very thin and seemingly, tend to become even thinner along the twenty-first century public-private initiatives in urban areas.

Whether acceptable or not, the three arguments do not represent more than just a single step towards the provision of better cities for people. 'Architects have a duty to respond to social changes, but they also have a leading role to play in redefining concepts like public and private' (Avermaete et al., 2009:49). To this matter, I conclude with some disquieting and thought-provoking arguments expressed by Juhani Pallasmaa, who remind us of the long way we still have to pursue towards our goal of better cities:

'Are the problems that guide the formation of the public sphere, perhaps, entirely beyond the grasp and control of architecture and the conscious intentions of the architect?...Are the reasons for the loss of the public dimension perhaps hiding in the invisible mechanisms and structures of modernization, globalisation, mass production and consumption, mobility, constant change, economic power structures and the processes of shrewd profit making?...Have we become servants of today's cultural processes instead of directing those processes ourselves?' (Pallasmaa 2009: 128).

All photographs shown in this paper are from the Author's Personal Collection.

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Freiburg's way to sustainability: the role of integrated urban and transport planning

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1 ABSTRACT

Since the mid-1950's Freiburg im Breisgau has experienced big growth in both population (ca. 62%) and in the number of workplaces. This trend has been still present in the last two decades (ca. 17%) what is not common among German cities. The city must balance between rising number of cars caused by rising population and the quality of life which attracts new inhabitants and new investors mostly in high-tech.

In attempt to alleviate growing demand on transport, the city extended the tram network and new lines have been constructed to serve areas of new settlement. It is a tool for making transport behaviours more sustainable and to keep low share of cars in the modal split and the tram lines are the backbone of the urban development, especially for new housing areas. The chance for the region is seen in using existing rail tracks for a development of a regional train network. The most important key to success is coordination of urban development and transport policies.

This paper presents the experiences of the city of Freiburg and the region. It focuses on three most important aspects: transport solutions for new settlements within the city limits (Rieselfeld and Vauban), development of regional train connections (inter alia Breisgau-S-Bahn) serving the growing towns and villages in the surrounding region and quality of non-motorized traffic in city centre. The authors evaluate the applied solutions and they show that urban growth can go hand in hand with sustainability and can be used for modal split improvements.

2 INTRODUCTION

Freiburg (full name: Freiburg im Breisgau) is a middle-size (about 220 000 inhabitants at all) university city (hosting almost 30,000 students) in south-west Germany. Surrounded by the Black Forest Mountains and located in the foothills of the Schlossberg, city straddles the river Dreisam. The location causes the specific shape of the city but city is relatively flat. There are not any natural barriers for cycling and for relevant tram network construction.

The city plays an important role for the surrounding region. Around 95,000 people are employed in the city. In 2003 around 68,000 commuters travelled daily into the city to work, and some 16,000 residents commuted to jobs outside the city. Most of commuters (65%) go to or from Freiburg by car. The city has witnessed systematic growth of commuters from region and to region. In 1970 there were only 34,000 commuters to the city and 3,000 from the city, in 1987 adequately: 53,000 and 8,000 and in 1997 – 64,000 and 14,000. Additionally, the city attracts about 3 million tourists a year.

The city is located on the Mannheim-Basle railway also known as the Rheintalbahn which is one of the heaviest used railways in Germany. The city is also served by the A5 Frankfurt am Main - Basel motorway (located on western suburbs) and three federal roads.

According to the last traffic survey in 1999 (Verkehrsentwicklungsplan, 2002) the modal split was: walk – 23%, bicycle – 27%, public transport – 18%, car drivers – 26%, car passengers – 6%. Freiburg has been witnessing a significant improvement of transport sustainability. In 1982 it had been respectively: 35%, 15%, 11%, 30% and 9%. The huge reduction of car use was possible thanks to a lot of different measures. The best known of all these was the introduction of cheap monthly ticket called "Umweltkarte" ("environmental card") in 1984, present named "Regio-Karte" ("region card").

According to FritzRoy and Smith (1998) the success of public transport in Freiburg can be chiefly accounted for by the introduction of a cheap travel pass in 1984 with the essential characteristics of unlimited use at zero marginal financial cost, interpersonal transferability and wide regional validity. Although the rules of ticket have been changed partly – e.g. there was introduced a not transferable monthty ticket a little bit cheaper, the popularity of "Regio-Karte" is still high. About 86% of all trips using public transport in the city

are done by owners of monthly or yearly tickets (Statistisches Jahrbuch, 2009). But this well known ticket is only one pillar of the sustainable transport policy in Freiburg.

The strategic Transport Development Plan (Verkehrsentwicklungsplan, 2020) sets goals to reach until 2020 even more sustainable modal split: walk – 24%, bicycle – 27%, public transport – 20%, car drivers – 24%, car passengers – 5%. Therefore a lot of different measures shall be implemented in the next years, to promote urban friendly modes of transport. On the one hand there are traffic management activities like extension of the tram , development of cycle infrastructure, or the pedestrian traffic quality improvement; on the other hands are urban planning tools like limitation of spatial development, better utilisation of inner-city areas (braunfield investments), mixed use (traditional neighbourhood design). It is worth to underline that the goal can be reached by the synergy of these different activities.

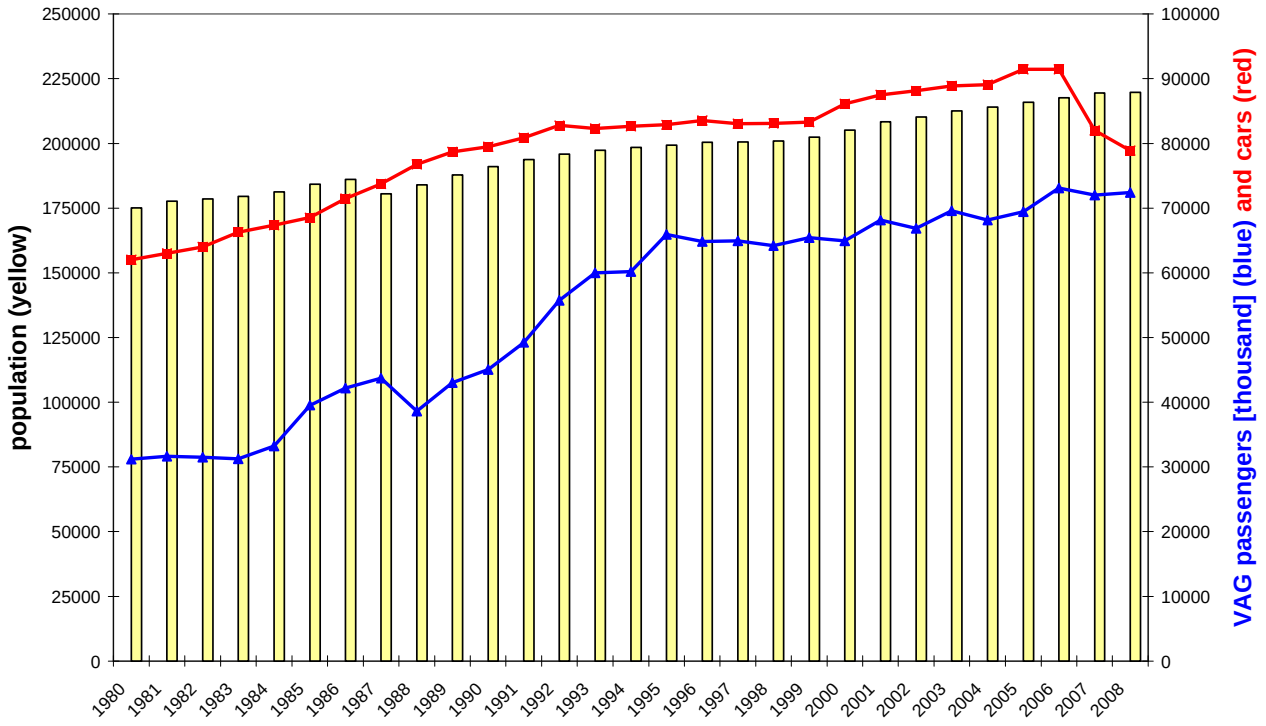

Fig. 1. Population, passengers of Freiburger Verkehrs AG [in thousands] and passenger cars (1980-2008) (source: own compilation based on Amt für Bürgerservice und Informationsverarbeitung, Stadtamt Freiburg im Breisgau)

3 HISTORY OF TRANSPORT MANAGEMENT

Freiburg has many advantages for sustainable development. The city has never destroyed the historical centre to improve the car accessibility and the phase of the modernism in urban planning did not leave its strong stamp on urban structure. It was huge difference to some other German cities which had car-oriented transport policies. In those cities the changes have come slowly after the 1973 oil crisis.

Furthermore, in 1969 the city introduced first Integral Traffic Plan. The Plan respected interests of non motorized inhabitants although the main planned form of transport were private cars. Two years later the Cycle Path Network Plan was carried out and passed the city council. Cycling became an important part of transport policy. In 1972 the city decided to retain and expand the tram network. The development of tram network based on modern concepts: separated tracks, priorities on intersection with traffic lights, higher average speed. The name for this new tram system is "Stadtbahn" ("urban rail") instead of "Straßenbahn" ("tramway"). In 1973 the entire city centre was converted into a pedestrian zone. It created good conditions for pedestrian traffic and started new urban culture with significant role in shopping of Old Town and rising importance of walking, cycling in transport behaviours.

After a decade in 1979 the new Integral Traffic Plan passed the city council. It gave equal priority to pedestrians, cyclists, public transport and individual motorized vehicle traffic.

The next transport document was approved a decade later – in 1989. The Comprehensive Traffic Plan has already different objectives to reduce of car traffic volume. Two main tools were the promotion of environmentally friendly modes of transport and the distinct restrictions for car traffic. Over the last decades Freiburg has become well known for its model measures in environmental protection. In this context conclusive Integral Traffic Plan has made a key contribution. Freiburg's Integral Traffic Plan thus compromises a clearly differentiated integral system with the sectors: local public transport, cycle traffic, pedestrian traffic and motorized vehicle traffic. The main goal of the traffic plan is to reduce the negative effects of car traffic in order to an improvement for living and environmental conditions in our city.

The newest Transport Development Plan (2002) brings continuity. The same objectives are still on the agenda: better quality of life, better public transport, better conditions for pedestrians and cyclists. The plan adjusts the goals to new conditions: the growth of population and the spatial development.

4 LOCAL PUBLIC TRANSPORT INFRASTRUCTURE DEVELOPMENT

Simultaneously to more and more environmental friendly transport policies there has been progress in development of local public transport infrastructure. Trams should be the core of the system and the extension of the tram network has become a central factor in our urban transport policy. The first modern track based on concept "Stadtbahn" ("urban rail") was opened in 1983. It connected the high density residential areas located on western part of city with the city centre. Two years later the track was extended to a new neighbouring settlement. In the 1980's there was one more investment – optimization of tram network in the city centre (one track was moved to other street).

According to the natural conditions – limitation by Black Forest – the spatial development is in principally in western direction. The main investments in tram networks have been done and are planned in western districts.

Next investments, also in western districts, were done in the 1990's: tram track to industrial area (1994) and to Rieselfeld – model district (1997). It worth to underline that the line to Rieselfeld had been opened before the contraction of new district was finished.

In the late 1990's there was a broad discussion about the next steps to extend the "Stadtbahn" system. It also was a discussion about transport policy and its implications on urban development. The city government planed in the late 1990's to construct a new line connecting the city centre with the new urban areas in the south west of Freiburg. All lines come together at one intersection, the Bertoldsbrunnen, the historic heart of Freiburg, the spot the city was founded 880 Years ago. The Freiburger Verkehrs AG argued that this intersection is not longer able to cope with all the old and new tram lines and will become a bottleneck for further extensions. The company suggested to build a new bypass beside the historic town centre. The discussion was very complex but the key question was: where is the heart of the city? All the people, including the retailers argued that it is the key that the new trams line have to bring the people to the heart of the city. The government and members of the city council argued that the city centre can no longer be the historic town alone but has to be extended to the west. As already mentioned the urban development did go west. But most members of the council voted that the new tram line has to go directly into the historic town, like all the others do. There were broad and controversial discussions over years, in 1999 there was a public referendum with no clear result and at the end the majority of council members decided to connect the new tram line to the historic Bertoldsbrunnen, and it was build this way.

This dispute delayed the development. So the new line to Haslach was constructed in 2002/2004 and was basis for the long awaited tram line to by Vauban inhabitants a connection to city centre (opened in 2006).

Now, ten years later, the inner city bypass is part of the new extensions plans and in the future the planned network will allow both, to serve the historic part of the city and to bypass the city on new line.

At the current time, further line extensions are planned, extending the tram network by more than 50% to 33 km. The plans have three important investments: the already mentioned inner city bypass (allowing to avoid tram, pedestrian and cyclists overcrowded Bertoldsbrunnen – see fig. 6), north-western extension to new university campus and Freiburg fairs area, and eastern extension to train station Littenweiler and district behind the station. This extensions will mean 83% of Freiburg's inhabitants and 88% of places of work will be directly accessible by tram within a 600 m radius from stops.

The tram must be fast and comfortable to be successful. Speed is achieved when the tram has its own track independent of private car traffic on the roads. All new lines will have their own track, partly running together with the cars but having priority by traffic signals and traffic management and existing lines will be converted wherever possible. At the same time, a swift tram journey is achieved by priority traffic control.

The buses, partly running on separate lanes, have a shuttle and supplementary role to the tram network.

It is worth to mention that there is wide public participation at development of tram network. The northern extension of tram network (planned to be constructed until 2012) was consulted with inhabitants in frame of an international project – "GenderAlp", as a task "Implementing Gender Mainstreaming in spatial planning". The idea of this project was to find new ideas for participation. Public participation was seen as toll for quality-management in the planning process. The gender approach was used to plan the participation of a new tram line and it should be a requirement oriented. The second idea was the implementation of gender mainstreaming in the technical and planning departments of the administration and to develop new guidelines for participation. The result of this broad participation was an unanimous vote for the tram extension in the city council and a easy and fast legal procedure with no caveat.

5 NEW SETTELMENTS

One important sign of Freiburg's sustainability policy are two new quarters: Rieselfeld and Vauban. The well-known solution is Vauban, although the beginning, due to delays caused by problems with construction new tram line. The planned measure of efficiency of integrated urban and transport planning was before of all the reduction of car trips number and motorization level (Cerfontaine, 2007; Nobis 2003, Ryan, Throgmorton, 2007).

The motorization level of all Vauban in 2008 was 167 cars/1000 inhabitants. Higher level was observed in Rieselfeld, the second model district of Freiburg – 290 cars/1000 inhabitants, while the average level for whole city is about 392 cars/1000 inhabitants. Since the 1990's the level of motorisation had been stable (oscillating about 450 cars/1000 inhabitants) but since 2007 Freiburg has been witnessing rapid decrees of motorisation level (see fig. 1).

The goal of the traffic concept was not to create a small, car-free district for environmentalist but to establish a whole district where car is not needed for life. The stress was to reduce the use of cars, not to ban the car in the district. The most important tool to create these behaviours was the idea to have no parking direct beneath or under the homes nor in the residential streets. So most of small streets close to homes are excluded from parking. There is allowed only short term parking for deliveries of goods (e.g. shopping) or to pick-up someone. So there is only a very few motorized traffic and that improves the quality of living, because there is less noise and more safety especially for children. The car can be parked on the main street of district but there is at weekdays between 9:00 and 19:00 a paid parking zone mandatory also for inhabitants. Inhabitants having cars have possibility to buy a place in one of three multi-store car parks. They are located on the district edges. This makes public transport easier to reach – tram stops are usually closer to homes than the car parks. Additionally, short distance to walk to the next shop or to the next cafe is a barrier to frequent use of car. No parking at door steps is called as "parking-free living", not a quite new idea but seldom transferred to reality in the way Freiburg did.

German local or regional law forces the developers to have an appropriate number of parking places (for cars and also for bicycles) depending of the usage of buildings. The cost of this rules are usually paid by all inhabitants, having car or not having car. In Vauban is different: families without cars are exempted from participating in the costs of community car park. Car-free inhabitants thus save the substantial money of a parking place. The restriction for parking on streets make impossible to park for free a car in Vauban. If someone decides to have a car, he needs to buy a park place in multi-storage garage.. And the concept provides also an idea if there is a strong shift in travel behaviour in the future and all people in Vauban will have own car. Although there is no trend in this direction at all, the concept would allow to build one more multi-story car park in the Western Edge of the area, but this parcel is still a green area where children are playing.

The whole transport policy for Vauban district is based on "push and pull strategy". Only restrictions for cars could not be successful. In exchange for limitations for car inhabitants receive good public transport: high

frequency (at work days every 7,5 minutes, and at Sundays every 15 minutes) tram line to the city centre and the bus connection to some suburbs.

There is planned to build at the closure of the tram terminus the station for regional rail. It is worth to mention that on the one hand this is an element of mobility concept for Vauban on the other hand this is a part of public transport strategy for Freiburg and region – to make intermodal stops on all regional rail tracks. Thus passengers going to targets located in the city but before the city centre (riding from home) are not press to ride by train to main station and come back by tram. It allows not only to short travel time but to balance the passenger density in trams: to reduce in the city centre and to rise on suburbs.

Inhabitants without car can use special offer of car sharing association (Car-Sharing Südbaden - Freiburger-Auto-Gemeinschaft e.V.). These cars are addressed especially to Vauban inhabitants and the cars park on district. Additionally, those residents who joined the car sharing association receive a one-year free pass for all public transportation within Freiburg and "BahnCard 50" a loyalty card offered by Deutsche Bahn, allow passengers to get 50% discount on standard rail fares (Enocha, Taylor, 2006).

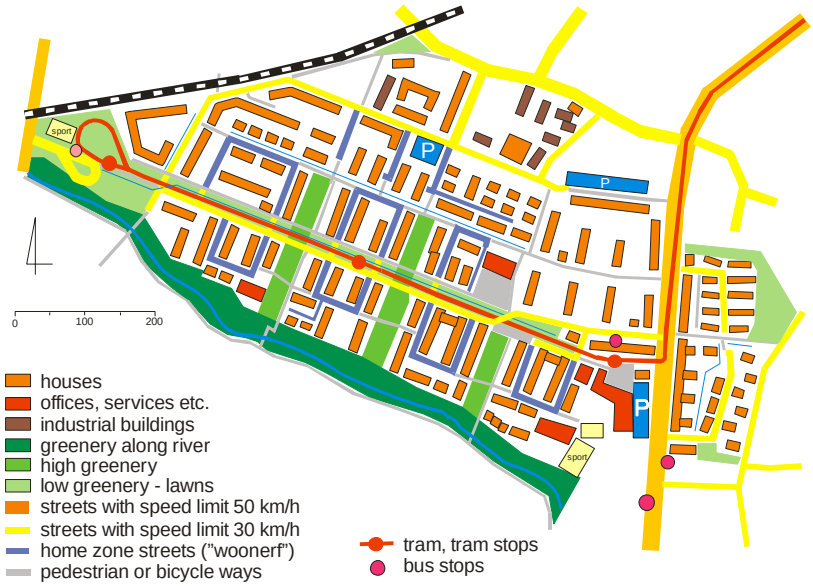

Fig. 2. Vauban district in Freiburg (source: own compilation based on Open Street Map)

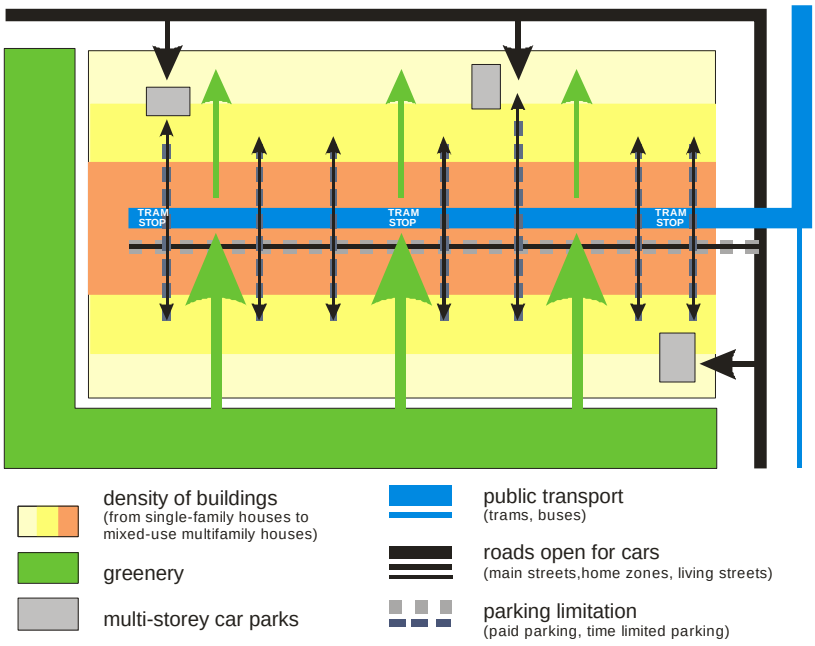

Fig. 3. Idealized schema of modern sustainable settlements in Freiburg (source: own compilation)

The most important factor of car use reduction seems to be mixed land use. The plan of district is based on the traditional neighbourhood design. The population density is fairly high what makes tram connection

relatively profitable (Apel et al., 2001; Loose, 2001). The most important services like school, kindergartens, a farmer's market, a shopping centre, restaurants, cafes, are within walking distance. On the district are about 600 workplaces. Access to recreation is very easy – the district is cut by three axes of greenery (see fig. 2 and fig 3.). This type of urban design can be called as "fractality". Each part of settlement is a district in miniature: houses, greenery, services.

6 REGIONAL TRANSPORT

A successful public transport policy can no longer be limited to a city's own boundaries, but instead it must operate regionally. The neighbouring counties: Breisgau-Hochschwarzwald and Emmendingen have collaborated with Freiburg to form a metropolitan area joint public transport association. The city in co-operation with neighbouring counties has successfully started to expand our integrated rail and bus system. The most important project is the "Breisgau S-Bahn" (Suburban Rail in Breisgau Region) (see fig. 4).

The Land of Baden-Württemberg is supporting the public transport association in this venture. At a cost of 400 million EUR, this plan envisages a regional rail system also integrating Freiburg's tram network and the regional and local busses with closely coordinated timetables interlinking the whole region.

This plan will help to shift the balance considerably in favour of the public transportation network. The extension of the public transportation network in metropolitan area is one of the main factors in the policy of the coming decade, supported by all the relevant political groups.

The first line of these integrated regional local traffic system started operation between Freiburg and Breisach on the Rhine River in 1998. This rail system is being complemented by a dense bus network to cover the communities without own train station.
The accessibility of the suburban rail system and the tram network must be improved with transfer possibilities for cyclists (Bike&Ride) and car drivers (Park&Ride). Up until now, more than 2,600 P+R parking spaces have been established in the city of Freiburg and about 2,400 at the stations throughout the region. Bicycle parking spaces are already available at many stops and train stations, where the bicycles are protected against theft, the wind and the weather. These options will be expanded consistently over the coming years.

The railroad to Breisach two decades before was planned to be closured. The introduction of a suburban rail (Breisgau-S-Bahn) in regular tact and integrated with Freiburg's fare system has changed the inhabitants transport behaviours. At present, trains at weekdays operates every half hour but demand is higher. Thus there are plans to extend to twin track railroad and to electrify. The planned frequency at weekdays is every quarter.

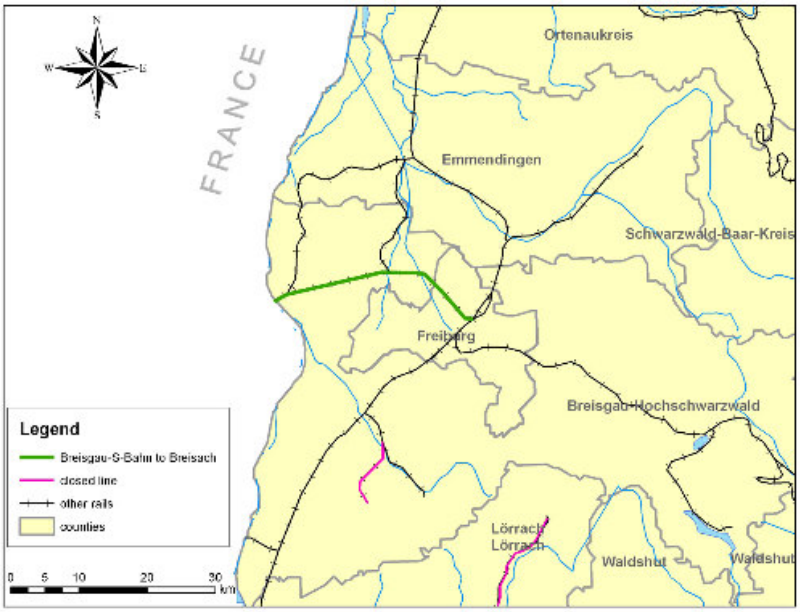

Fig. 4 Breisgau-S-Bahn line to Breisach (Source: own compilation)

Fig. 5. High frequently suburban rail (Breisgau-S-Bahn) was an impulse for housing estates development in the vicinity of the train stations. Ihringen. (Photo: M. Beim)

7 PEDESTRIAN AND CYCLING FRIENDLY CITY

The main focus of Freiburg's transport policy is to provide attractive alternatives. This is generally the better and more effective approach than imposing restrictions and bans.

Nevertheless, certain restrictions are naturally unavoidable within the frame-work of traffic policy. The most far-reaching restriction is the creation of car-free areas and pedestrian zones. As early as 1973, Freiburg converted the entire historic part of the city into a pedestrian zone, incidentally against strong initial protest by the shops affected. It is almost impossible to imagine our main street in the heart of the city, Kaiser-Joseph-Straße, was the Federal highway along which the entire motor vehicle traffic from North to South only a few decades ago was squeezed through the Rhine Valley. Characteristic for the Freiburg pedestrian zone is that the shops and department stores can be reached directly very easily by bus and tram.

The total length of pedestrian areas in 2008 was 8 535 m including 6 938 m pedestrian zones partly opened for deliveries. The network of pedestrian streets has not been extended in last years.

The importance of cycle-oriented traffic policy, i.e., providing a further alternative apart from the public transportation network is misjudged too often. The special attraction of the cycle policy is that within a short period and with only little investment and follow-up costs, it is possible to achieve tremendous changes. This is especially important in times of tight budgets.

Since the 1970's, the city of Freiburg has enlarged the cycle ways network to 99,5 km. During the first few years, the main emphasis was given to expanding the cycle path network at the city outskirts, which could also serve for cycle trips. In more recent years priority has been given to increasing the extension and structural alteration measures designed to lead cyclists into and across the inner city. In addition to extending the cycleway network, we must carry out other related measures. In this context, over the last few years over all more than 8.000 cycle parking spaces have been provided, some as a result of reallocation of existing car parking spaces.

Cycle traffic causes sometimes conflicts with other users, especially with pedestrians. The cycle facilities in Freiburg are designed to avoid this. The cycle lanes on roadways are preferred in cases where car speed is limited to 50 km/h. In traffic calming zones ("Tempo 30" or living streets) cycle traffic is on roadways without special facilities (one exception are contra-flow lanes in one way streets). Only in case of low pedestrian and cycling traffic are common ways for both groups of users. In the area of the main tram stop "Bertholdsbrunnen" was introduced a strictly bicycle parking prohibition (see fig. 5). This rule caused huge controversy among cyclists but it was needed to ensure good quality for public transport passengers changing trams. And today there are no more discussions and the parking system works sufficiently for everyone. The cyclists find a place (in distance about 100 m from Bertholdsbrunnen) where they can leave and lock their

bicycles and the tram passengers can chance the trams and the pedestrians can walk around without parked bicycles as a barrier.

Remarkable in 2009 is the introduction of special mirrors called "Trixi-Spiegel" which allow truck and car drivers to observe cyclists riding on cycle lanes to the advanced cycle stops (see fig. 7). This small measure has significant improved the cyclists safety on intersections with traffic lights (Rau, Haag, 2010).

Fig. 6. Bicycle parking prohibition around the main change stop of tram network in Freiburg - Bertoldsbrunnen caused controversies and is usually not respected by cyclists (Photo: M. Beim)

Fig. 7. "Trixi Spiegel" mirror which allows truck drivers to observe cyclist riding parallel (Photo: M. Beim)

8 PARKING RESTRICTION

Since 1990, the local council has implemented the concept of parking space management throughout the city centre. All public parking spaces cost money since that time. The principles of parking space management are:

- Downtown residents are entitled to park in public streets within a reasonable distance to their apartments in the form of a "parking permit solution."
- Regular long-stay parkers, above all employee commuters, are induced to switch over to other forms of transport by "tightening of the parking space screw."
- At the same time appropriate measures, as for example Park&Ride, are made available in the region to enhance the attraction of coming into the city by bus and tram rather than by car, especially to

bring customers and visitors into the city. This is important for Freiburg as a tourist city and a regional shopping centre.

- This is all designed to force long-stay parkers out of the city centre, which in the interest of Freiburg's economy and retail trade because the turnover frequency of the parking space is increased.

9 CONCLUSIONS

Transport policy must cover all areas of town planning and urban development with a comprehensive strategy. Town planning must ensure that as little avoidable traffic arises as possible. Above all, as it was already mentioned, Freiburg tries to apply these principles when planning new urban districts but also in giving priority to inner development before outer development of new houses and offices.

As a general principle, traffic avoidance strategies are to be taken into greater account in town planning. This means - in contrast to the failure of urban planning segregation concepts of past years - working and living must be integrated. Decentralized town planning of the new residential districts includes cultural and social activities, a multiplicity of shops and services as well as the pub round the corner and helps, of course, to avoid traffic.

General urban development policy, regional policy and traffic policy are interwoven intimately and must be considered as a whole unit. Housing policy and traffic policy must be seen as being interrelated. New housing clusters in the city and in the region should only be developed along the public transportation network axis. Urban development and traffic policy must be implemented unremittingly and with patience. Spectacular results in shifts within the modal split can only emerge after a moderate period of time.

Having a look at the modal split development between 1982 and 1999 indicates that we cannot only report on future intentions and projects, but in reviewing the years since 1976 we are already in a position to make a provisional appraisal and to record results in Freiburg. Overall this development in the modal split is very remarkable. Naturally, in Freiburg - as in Germany as a whole - the private car density has increased considerably. Consequently, the transport policy aims at having car owners drive a great deal fewer miles on the average. Drivers make much more frequent use of the green modes of rail, bus and bicycle. The city office hopes that this trend can continue.

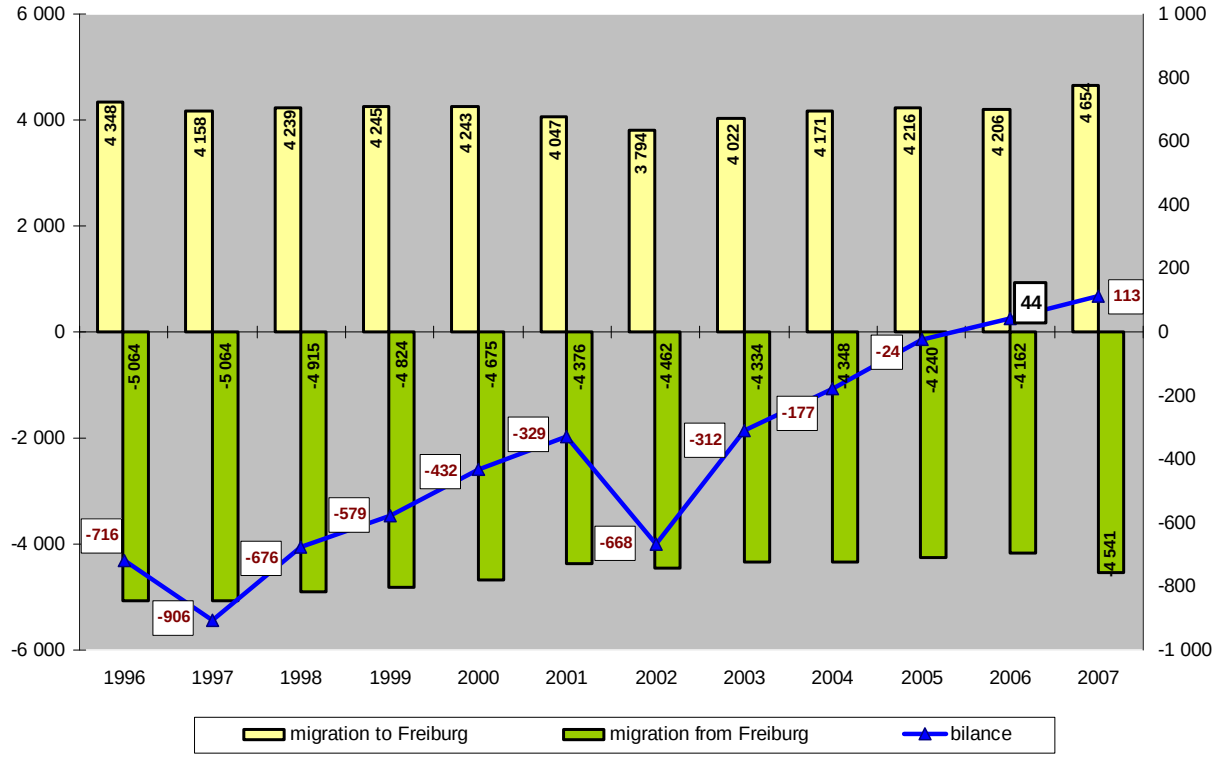

Fig. 8. Migration from Freiburg to neighbouring counties (Landkreis Breisgau-Hochschwarzwald and Landkreis Emmendingen) and from these counties to Freiburg in 1996-2007 (source: own compilation based on Amt für Bürgerservice und Informationsverarbeitung, Stadtamt Freiburg im Breisgau)

Consequent policy of urban renewal (first of all revitalization of old districts), modern concepts of new districts based on traditional neighbourhood design and sustainable transport development has achieved the success. In the last years more people have moved from suburban counties (Landkreis Breisgau-Hochschwarzwald and Landkreis Emmendingen) to the city than have migrated to suburbs. The reurbanisation has started.

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reviewed paper

Functional Regions Defined by Urban Centres of (Inter)National Importance – The Case of Slovenia

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1 ABSTRACT

The main focus of this paper has been to determine the functional regions in the heterogeneous area of Slovenia defined by integrated urban system at the (inter)national level. The notion of polycentric urban development is taken from the local and regional perspective based on the principle of proximity where co-operation, exchanges and networks among cities can contribute to the development of integrated urban systems to overcome the legacy of the inherited urban structures. Delineation of Slovenia into functional regions is based on labour market approach, where daily labour commuting has been considered as the main factor, which determines connectivity/relation between predefined local urban centres and municipalities in the functional regions. The urban centres of national and international importance in Slovenia have been determined mainly according to the number of inhabitants and their role in the polycentric urban system of Slovenia according to the Spatial Development Strategy of Slovenia (SPRS 2004).

2 INTRODUCTION

The main aim of sustainable spatial development policy of a country is balanced development of the whole territory, considering also sustainable development of wider area from the international perspective. European Spatial Development Perspective (ESDP 1999) defines three fundamental goals that should be achieved equally in all the EU regions. The goals are economic and social cohesion, conservation and management of natural resources and cultural heritage, and a more balanced competitiveness of the European territory. For achieving these goals the present state of regional development has to be studied as the base for further economic and political decisions. Each analysed territorial area should be based on complex, open, dynamic and nonlinear system that works on basis of functional connections between smaller and larger territorial areas. Region is in this way considered as a dynamic system that is very complex and difficult to manage from the administrative point of view. Because of that i.e. »functional region« is the most appropriate unit for economic analysis and for interaction of political, social and economic processes (Tomaney and Ward 2000).

Nowadays, the urban region/area has become the most essential functional level of urban and regional systems (Antikainen 2005). However, two main concepts have appeared: the concept of Functional Urban Area (FUA) and the concept of Functional Urban Region (FUR). These concepts are some of the means to study social and spatial disparities in different city centred (urban) areas, and related problems, such as residential segregation, outward diffusion of economic activities and people from urban cores or disparities in labour markets.

The European FUA concept focuses on categorizing dense built-up areas that form contiguous cores of urban areas, and commuters' belts; FUA is therefore a unit from which a fixed percentage of commuting to work is directed mainly within the area. The FUA limits are determined through percentages of commuters having their job in the core or in another FUA unit. For example, the project ESPON 1.1.1 (2004): Potentials for polycentric development in Europe considered functional urban areas, as travel-to-work areas of the main urban centres according to the common criteria implemented for approximately 1600 FUA in 29 European countries. Here, FUA consisted of an urban core and the surrounding area that was economically integrated with the centre, and represented the (sub)regional labour market area. In the countries with more than 10 million inhabitants, FUA was defined as having an urban core of at least 15,000 inhabitants and over 50,000 in total population. For smaller countries, FUA should had have an urban core of at least 15,000 inhabitants

and more than 0.5% of the national population, as well as having functions of national or regional importance.

Like the European FUA concept, the Functional Urban Region (FUR) concept reflects an urban definition and delimitation based on daily flows, in practice often commuting to work. It represents another attempt to capture the economic sphere of influence of a city with a core city defined in terms of concentrations of employment and a commuting hinterland composed of all those areas from which more people commute to the particular city in question than to some other city. In everyday language, FUR is probably best approximated by the term metropolitan area. However, the FUR concept is broader that FUA concept: they are more extensively defined than local labour markets or travel to work areas, because they impose no cut-off limits (such as 15 or 20 % of their resident population) on commuting. They are more urban, indeed metropolitan, because they do impose lower limits, of 15,000 – 20,000 jobs before counting a focal urban area as an urban core.

A Functional Region (FR) is a region characterised by a high frequency of intra-regional economic interaction, such as intra-regional trade in goods and services, labour commuting and household shopping patterns (Karlsson and Olsson 2006). From that sense, FR concept is much broader than FUR (or FUA) concept. The basic characteristic of a functional region is the integrated labour market, in which intra-regional commuting as well as intra-regional job search and search for labour is much more intensive than the inter-regional counterparts. The dominant concept in defining functional regions is that of (local) labour markets (Cörvers, Hensen and Bongaerts, 2009); that was illustrated by the substantial literature in this field by, for example, Andersen (2002), Coombes, Green and Openshaw (1986), Casado-Di´Az (2000), Eurostat (1992), and OECD (2002).

In some previous research (Drobne, Konjar and Lisec 2009; Konjar, Lisec and Drobne 2010), the methods to delimitate the functional regions using only data on commuters have already been analysed and discussed for Slovenia. Those methods have been already tested to define administrative regions of Slovenia as well (Drobne et al 2009). In this work labour market approach has been used to define functional regions in Slovenia using pre-defined centres of national and international importance of Slovenia – according to the (SPRS 2004) – as core centres for functional regions. For that purpose, we discuss first the polycentric urban and regional development concepts of Slovenia in Section 3. In Section 4, background of functional regions, materials and practical methodology for identifying functional regions using labour market approach are presented. Moreover, the functional regions in Slovenia are calculated using software developed by the authors of this paper.

3 POLYCENTRIC URBAN AND REGIONAL DEVELOPMENT CONCEPTS IN SLOVENIA

According to the implementation of the hierarchy of central places defined by Vrišer (1988), seven levels of central places were designed for spatial planning and regional policy purposes in Slovenia: local centres (1-4 lower level) and regional centres (5-7 higher level) in the Long-term Development Plan of Slovenia 1986-2000 adopted in 1986 as the comprehensive strategy for social, economic, spatial, regional and environmental development of the Republic of Slovenia within the former Yugoslav Federation. This development plan was formulated according to the concept of polycentric development considering specificities of different (geographical) areas (»planning regions«) and the network of regional and local centres (58 towns) with different population size and functions. The most important 12 regional centres were: Ljubljana, Maribor, Celje, Kranj, Novo mesto, Nova Gorica, Murska Sobota, Postojna, and several city clusters (conurbations) such as: Koper-Izola-Piran, Trbovje-Zagorje ob Savi-Hrastnik, Slovenj Gradec-Ravne na Koroškem-Dravograd, Krško-Brežice, Jesenice-Radovljica, with their gravitation areas (i.e. »planning regions«) covering the whole territory of Slovenia (see Fig. 1).

After independence of Slovenia in 1991 and the local government reforms since 1994 with transformation of former (larger) communes (62) to new small NUTS 5 municipalities (147-192-193-210-211, etc.), the urban hierarchy has been slightly transformed in the Spatial Development Strategy of Slovenia (SPRS 2004) defining »centres of (inter)national, regional, inter-municipal importance« – together 51 »urban centres« with 64 towns and other urban settlements, considering also urban conurbations (city clusters) at all levels. The most important regional centres (or the »centres of national importance«) in SPRS (2004) are: Ljubljana, Maribor, conurbation Koper-Izola-Piran, Celje, Kranj, Novo mesto, Nova Gorica, Murska Sobota, Velenje, Postojna, Ptuj, and conurbations: Slovenj Gradec-Ravne na Koroškem-Dravograd, Jesenice-Radovljica-

(Bled), Zagorje ob Savi-Trbovlje-Hrastnik, Krško-Brežice-(Sevnica) with their gravitation zones (i.e. 15 potential functional urban areas) that are not territorially specified and overlap between each other. Ljubljana, Maribor and conurbation Koper-Izola-Piran are also considered as »centres of international importance« due to their size, the status of a capital city of Ljubljana, the importance of the port of Koper in Central Europe, and geographical location of urban conurbation Koper-Izola-Piran near the borders with Italy and Croatia, and the second largest city of Maribor near the border with Austria, close to Hungary and Croatia (see Fig. 2).

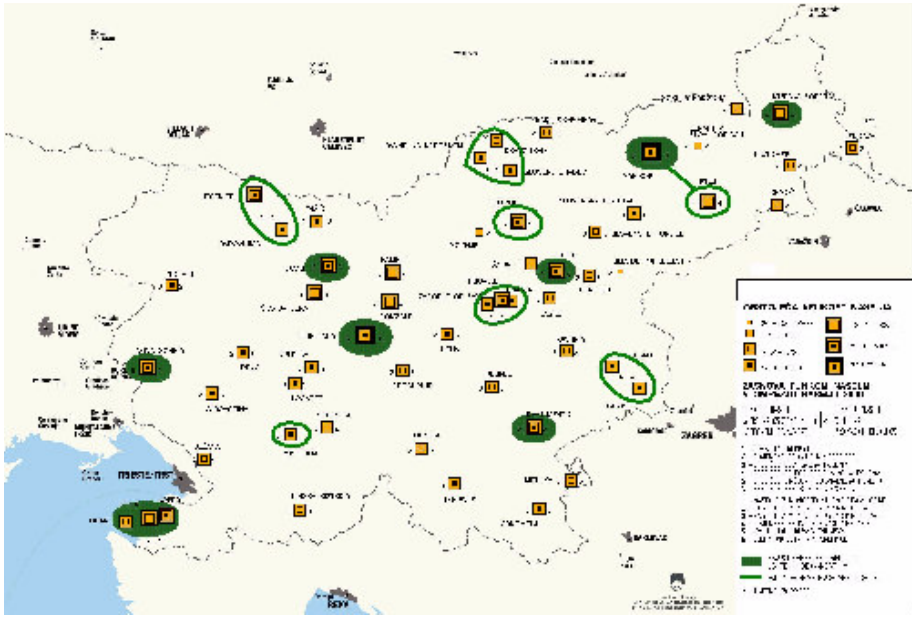

Fig. 1: Long term development plan of SRS 1986-2000 (1986): Urban network of 15 regional centres (denoted by green colour) and 43 local centres with city conurbations

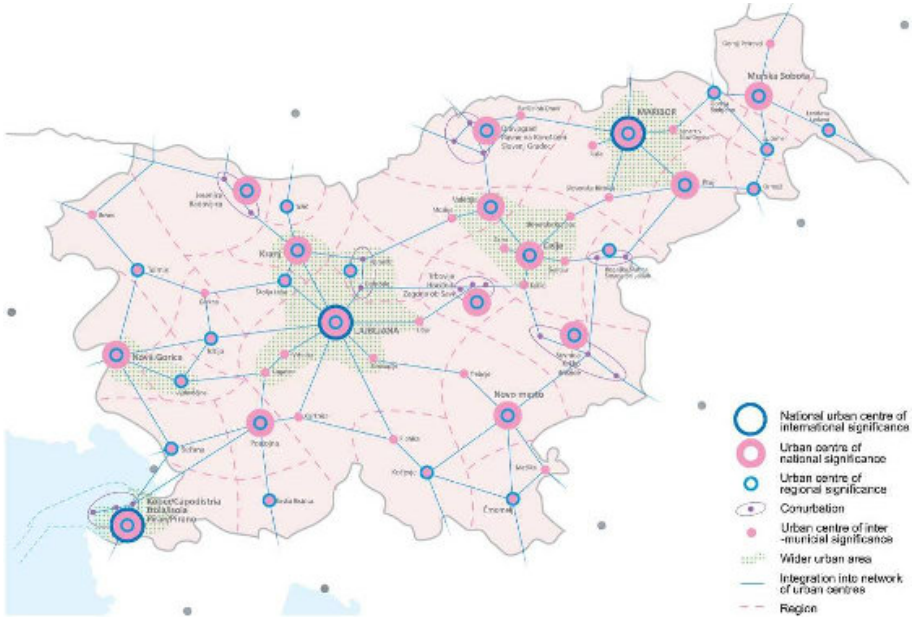

Fig. 2: Centres of (inter)national, regional and inter-municipal importance (regional and local centres) with city clusters, agglomerations and functional urban areas in the polycentric urban system of Slovenia (SPRS 2004)

Fig. 2 shows 51 »urban centres« of Slovenia (43 towns and 8 urban conurbations (21 towns and urban settlements) equals to 64 towns and urban settlements) defined by (SPRS 2004):

- 3 »centres of international importance«: Ljubljana, Maribor and Coastal conurbation (Koper-Izola-Piran);
- • 12 »centres of national importance«: 8 towns (Murska Sobota, Ptuj, Celje, Velenje, Kranj, Novo mesto, Postojna, Nova Gorica) and 4 urban conurbations (Jesenice-Radovljica-(Bled); Zagorje

ob Savi-Trbovlje-Hrastnik; Slovenj Gradec-Ravne na Koroškem-Dravograd; Brežice-Krško-(Sevnica);

- 16 »centres of regional importance«: 13 towns and 3 urban conurbations (Domžale-Kamnik; Šmarje pri Jelšah-Rogaška Slatina; Tržič-Bistrica);
- 20 »centres of inter-municipal importance«.

These 15 »centres of national importance« can be treated also as regional centres in Slovenia. Twelve of them are also centres of statistical NUTS 3 regions. Towns of Ptuj and Velenje were in 2008 proposed by the Government of RS as centres of two new administrative NUTS 3 provinces. Only one »centre of national importance« – city cluster (conurbation) Jesenice-Radovljica-(Bled) in Gorenjska statistical NUTS 3 region has not been officially proposed as the centre of new administrative NUTS 3 province.

In the polycentric development concepts from 1980s, the most important urban centres in Slovenia (e.g. regional centres) with their gravitation areas (planning regions) have been already highlighted. The new polycentric urban development concept (as before) emphasises the improved (equal) accessibility to public goods – administration, jobs, services and knowledge, that is located in these urban centres which are also important transportation nodes in Slovenia, and in Central Europe. Therefore polycentric development of (3-12-16-20) regional and local (urban) centres corresponds to the balanced regional development concept and development infrastructure along main European corridors V and X. During the preparation of the (revised) polycentric development concept in the Strategy of Spatial Development of Slovenia (SPRS 2004), the importance of urban agglomerations, city conurbations and their morphological and functional urban areas are being envisaged by the experts and policy makers, with potentials for cross-border cooperation taking in consideration improved cross-border mobility, accessibility, institutional links and networks, and cross-border, inter-regional and trans-national cooperation, and Slovenia's accession to the EU in year 2004.

3.1 Functional urban areas

Most jobs and economic activities in Slovenia are concentrated in the urban areas of Ljubljana, Maribor, Celje, Coastal conurbation Koper-Izola-Piran, followed by Kranj, Novo mesto, Velenje, Nova Gorica. Therefore travel-to-work migrations are the most intensive towards these cities. Most intensive commuting occurs in the gravitation areas of the largest employment (regional) centres such as Ljubljana, Kranj, Maribor, Celje, Velenje, Krško-Brežice, Koper-Izola-Piran, Novo mesto, Nova Gorica, Ptuj, Slovenj Gradec-Ravne na Koroškem, Murska Sobota. The Strategy of Spatial Development of Slovenia (SPRS 2004) promotes 15 »centers of national importance« (e.g. regional centres), including four city clusters, their gravitation and commuting zones as potential functional urban areas, even though they are not territorially defined. Twelve of these 15 centres of national importance are also centres of current 12 NUTS 3 (statistical or development) regions.

The project ESPON 1.1.1 (2004) considered functional urban areas (FUA) as travel-to-work areas of the main urban centres according to the common criteria implemented for approximately 1600 FUA in 29 European countries. The FUA consists of an urban core and the surrounding area that is economically integrated with the centre, and represents the (sub)regional labour market area. The analysis of FUA in Slovenia was prepared firstly according to the proposed methodology without any special modifications. As a result, six FUA of European importance were selected: Ljubljana (with Kranj), Maribor (with Ptuj), Celje (with Velenje), Novo mesto, Koper-Izola-Piran and Nova Gorica. According to the weighted results of ESPON 1.1.1. indicators (2004), Ljubljana FUA is the only urban area in Slovenia with the status of »weak« MEGA (Metropolitan European Growth Area) as one of 76 MEGAs in Europe. Due to the sea port function of international importance Koper-Izola-Piran FUA was given the status of transnational/national FUA while Maribor (with Ptuj), Celje (with Velenje), Novo mesto, Nova Gorica were identified as regional/local FUA.

Since it is important for Slovenia to be focused on small towns and middle-sized cities, and for the purpose of implementation of the INTERREG IIIB project PlaNet CenSE in Slovenia, the Ministry of Environment and Spatial Planning of RS (re)defined 10 FUA in 2006 having showed the most important regional centres – Ljubljana, Maribor, Koper-Izola-Piran, Celje, Kranj, Velenje, Novo mesto, Nova Gorica, Ptuj, Murska Sobota. Despite lower criteria for identification of other urban centres, the project did not take in consideration four city clusters of national importance (as one urban centre) with the common travel-to-work and gravitation areas. Therefore, it is more likely to talk about 15 FUA of European importance in Slovenia,

including MEGA Ljubljana, that are also important urban nodes in the polycentric and balanced development of Slovenia. Fig. 3 shows 10 FUA (re)defined in 2006 and marks 5 potential FUA (from top to bottom: Slovenj Gradec-Ravne na Koroškem-Dravograd; Jesenice-Radovljica-(Bled); Zagorje ob Savi-Trbovlje-Hrastnik; Brežice-Krško-(Sevnica); Postojna).

Most recently »Strategy for Regional Polycentric Urban System in Central-Eastern Europe Economic Integration Zone« (RePUS 2007) project implemented under the framework of the EU programme INTERREG IIIB CADSES addressed the problems of a more balanced, sustainable and polycentric urban system of middle-sized cities and small towns, that could strengthen emerging Potential Economic Integrating Zone (PEIZ) in Central and Eastern Europe. According to the RePUS methodology implemented in Austria, Italy, Hungary, Czech Republic, Hungary and Slovenia, 42 local functional urban areas (as local labour systems) and 17 regional functional urban areas (as regional labour systems) were identified in Slovenia (RePUS 2008); see Fig. 4.

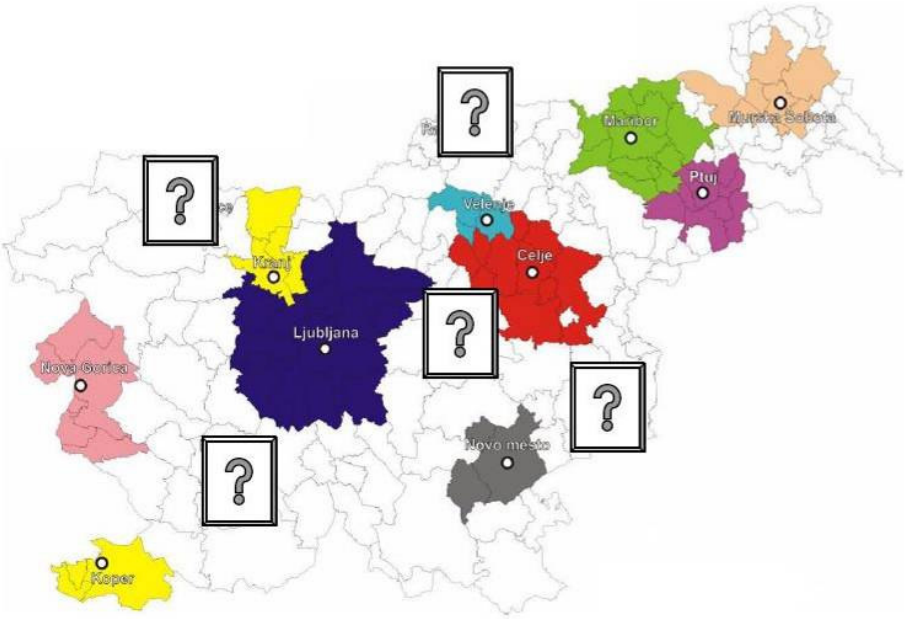

Fig. 3: Ten functional urban areas in Slovenia in 2006 (PlaNet CenSE 2006)

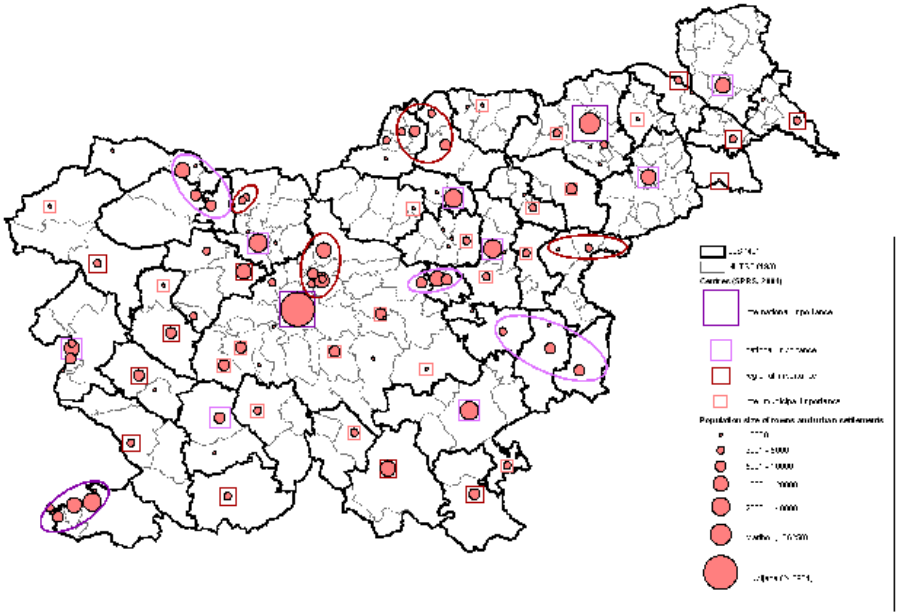

Fig. 4: Local and regional functional urban areas with urban network in Slovenia (RePUS, 2008)

4 FUNCTIONAL REGIONS

Functional region (FR) is the region defined by much more intense economic interactions inside the region than with any other area outside the region. A functional region is characterised by its agglomeration of

activities and by its intra-regional transport infrastructure, facilitating a large mobility of people, products, and inputs within its interaction borders.

In practise, two different concepts to delimit travel-to-work-areas are used: (a) delimitation around a centre, and (b) delimitation using algorithms or cluster analysis based on combination of distance, closeness, commuting thresholds, travel times, etc. It should be noted that certain centre-based definitions normally do not represent a division into regions or an exhaustive breakdown of the national territory but correspond to areas of extended urban influence; those portions of the national territory which lie outside this area of influence are all considered as rural areas. In delimitation based on centres, particular care needs to be taken in definition of these centres. While some countries identify centres according to the population or level of employment, others consider commuting conditions. In the latter case, the centre must be »self-sufficient«, which means that the number of workers living and working there is higher than the number of workers commuting to another centre, or it must attract a number of workers that is substantially higher than the number of workers leaving the centre to work outside.

4.1 Delimitation of functional regions using labour market approach

In our application of delimitation of functional regions, we used centre-based labour market approach that uses one-way commuter flows of inter-municipal working population. The model for delimitation of functional regions was described and discussed in (Drobne, Konjar and Lisec 2009), where centres had been defined by »functional approach« considering only data on commuters. Here, the municipalities were used as the smallest geographical areas to aggregate them into the functional regions. Data on inter-municipal commuting to work were acquired from Census 2002 (SORS 2009a). In 2002, there were a total of 287,272 inter-municipality commuters between 192 municipalities in Slovenia.

Urban centre			***Municipality***	
Rank	***Name***	***Population***	***Name***	***Population***
1	Ljubljana	268,423	Ljubljana	276,091
2	Maribor	96,408	Maribor	113,113
3	Koper-Izola-Piran-Lucija-Portorož	48,865 (24,658+11,317+4159+5793+2938)	Koper, Izola, Piran	84,638 (51,354+15,946+17,338)
4	Celje	38,047	Celje	48,991
5	Kranj	36,357	Kranj	54,188
6	Zagorje ob Savi-Trbovlje-Hrastnik	27,844 (6546+15,525+5773)	Zagorje ob Savi, Trbovlje, Hrastnik	44,750 (17,098+17,545+10,107)
7	Velenje	25,935	Velenje	33,226
8	Jesenice-Radovljica-Bled	24,715 (13,542+5924+5249)	Jesenice, Radovljica, Bled	48,674 (21,828+18,698+8148)
9	Novo mesto	22,874	Novo mesto	35,570
10	Ptuj	18,321	Ptuj	23,699
11	Brežice-Krško-Sevnica	18,374 (6558+7027+4789)	Brežice, Krško, Sevnica	67,487 (24,238+25,600+17,649)
12	Slovenj Gradec-Ravne na Koroškem-Dravograd	17,885 (7519+7030+3336)	Slovenj Gradec, Ravne na Koroškem, Dravograd	37,425 (16,662+11,722+9041)
13	Nova Gorica-Šempeter pri Gorici	16,810 (13,054+3756)	Nova Gorica, Šempeter-Vrtojba	38,250 (31,911+6339)
14	Murska Sobota	11,705	Murska Sobota	19,433
15	Postojna	8994	Postojna	15,455

Tab. 1: Urban centres of (inter)national importance (SPRS 2004) in municipalities and population on 1.1.2009 in Slovenia (SORS 2009b)

As a first stage of the applied methodology for delimitation of functional regions, municipalities that are strongly self-sufficient should be identified. In our application we used 15 centres of national and international importance defined in the Spatial Development Strategy of Slovenia (SPRS 2004), and already

indicated on Figs. 3 and 4. Tab. 1 shows 15 urban centres and urban conurbations of (intern)national importance in Slovenia (SPRS 2004) and the central (self-sufficient) municipalities that were applied in the labour market approach of delimitation of functional regions of Slovenia; note, that urban centre Šempeter pri Gorici has been included in a new urban agglomeration, together with Nova Gorica, due to very high percentage of commuters between them.

When self-sufficient municipalities, respectively groups of municipalities defined as urban conurbations, were defined, chains of municipalities from central (groups of) municipalities were created till condition (1) was satisfied:

$$\mathbf{FR}_i = \{x : f_i(x) \geq f_j(x)\}, \quad (1)$$

where $f_i(x)$ is the commuting frequency to the centre i at a location x, $f_i(x)$ is the commuting frequency to the centre j at a location x, and FR_i is the extension of the functional region i

$$(\mathbf{FR}_i = \{x : f_i(x) > 0\})$$

In practise, the chains of municipalities to the self-sufficient centres have been formed using bellow explained procedure. The chains have been calculated automatically using our own software based on Java platform, which considers the principle of maximum commuting flows for three types of municipalities: (a) the municipalities, that are directly connected with their maximum commuting flow of working population to the central municipality; (b) municipalities that are not directly connected with their maximum commuting flow to the central municipality, but they are connected with their maximum commuting flow to non self-sufficient municipality, which is than connected to the one of the central municipality; and (c) the pairs of municipalities, which present to each other the destination of the maximum flows, have been connected to the region, in which the direction of the second maximum flow was oriented.

Fig. 5 shows three functional regions defined by two urban centres and one urban conurbations of international importance at the NUTS 2 level, and Fig. 6 shows fifteen functional regions defined by nine urban centres and six urban conurbations of national importance in Slovenia at the NUTS 3 level.

From Fig. 5, the huge functional influence of the capital of Slovenia, i.e. Ljubljana, is evident at the NUTS 2 level. In the case of three functional regions, functional region of Ljubljana cover 78 % of the country (!). That is also the result of ESPON 1.1.1. (2004), where Ljubljana FUA is the only one urban area in Slovenia with the status of »weak« MEGA (Metropolitan European Growth Area) as one of 76 MEGAs in Europe (see also Fig. 7).

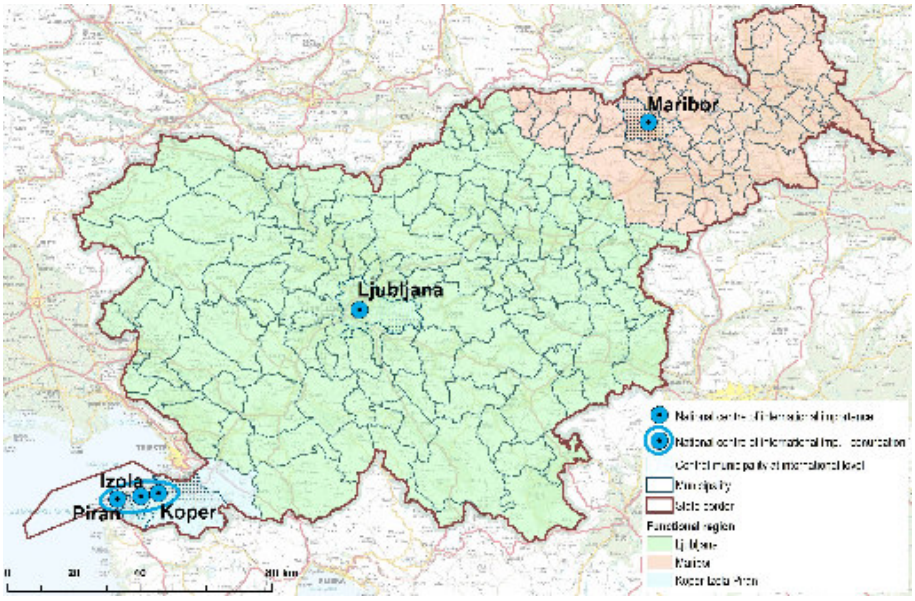

Fig. 5: Three functional regions defined by two urban centres and one urban conurbations of international importance in Slovenia

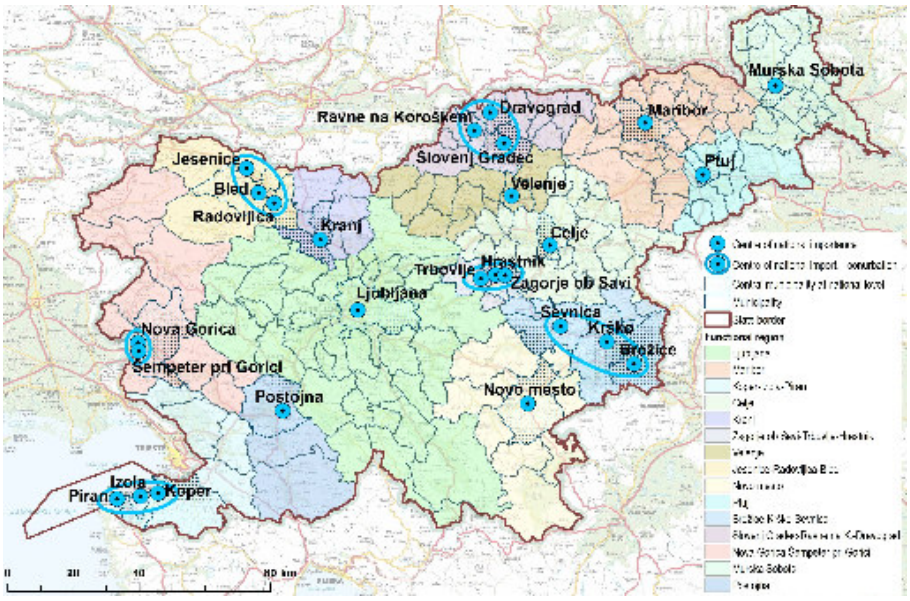

Fig. 6: Fifteen functional regions defined by nine urban centres and six urban conurbations of national importance in Slovenia

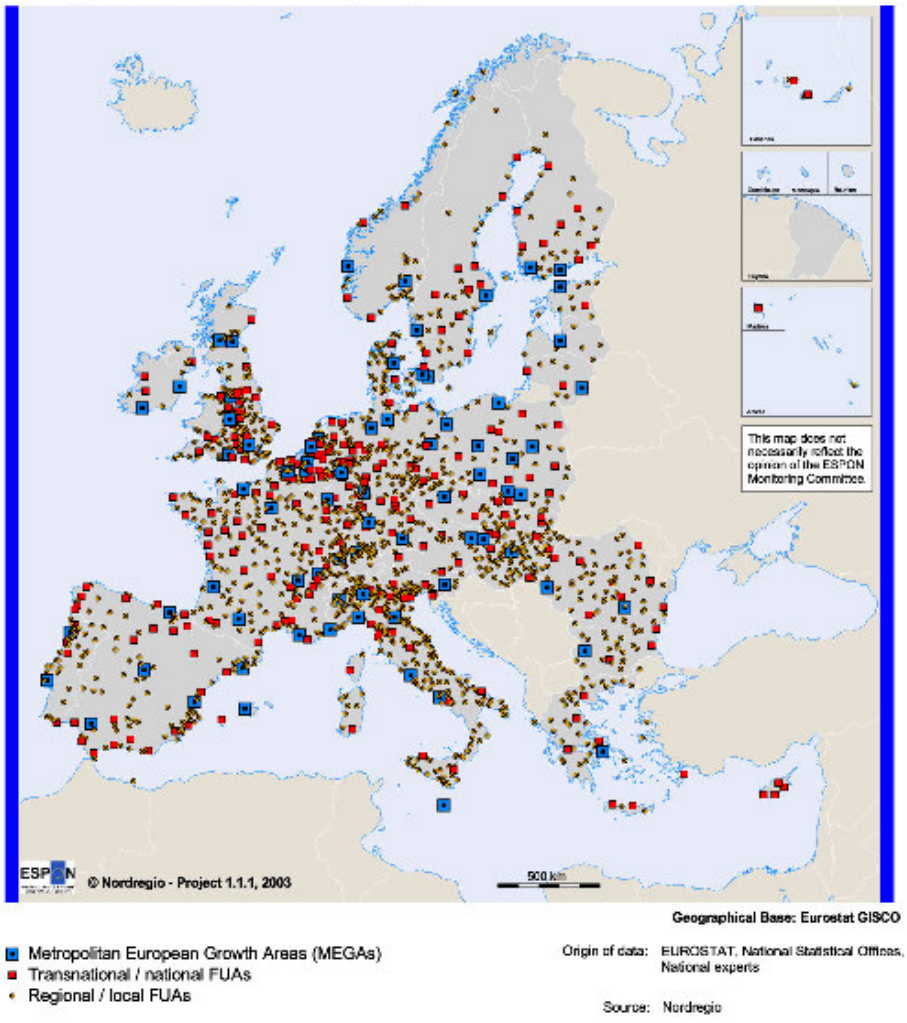

Fig. 7: Typology of functional urban areas (FUAs) in Europe (ESPON 2004)

Tab. 2 and 3 show some basic characteristics of functional regions at NUTS 2 and NUTS 3 level in Slovenia. At both level, functional region Ljubljana has the highest population. Discrepancy between functional regions at NUTS 2 level is obvious: urban conurbation Koper-Izola-Piran can not compete with functional region Ljubljana at all: there is almost 17-times less population in the smallest FR (Koper-Izola-Piran) than in the largest FR (Ljubljana) at NUTS 2 level of Slovenia!

This proportion remains the same at the NUTS 3 level (between Postojna and Ljubljana) – but with the exception of Ljubljana (and Maribor) other functional regions are more comparable at the NUTS 3 level. The average functional region at NUTS 3 level has population of almost 135,490 inhabitants (without Ljubljana 100,340 inhabitants).

Delimitation of functional regions around the urban centres and urban conurbations at NUTS 3 level in Slovenia has re-arranged the relative importance of functional connections in the (functional) region. Ranks of the importance (according to the population in the analysed entities) are not same for urban centres (and conurbations) and for functional regions (compare Tab. 1 and Tab. 3). Comparing the relative importance of functional regions to relative importance of urban centres (conurbations), there are five functional regions that have higher relative importance than their urban centres (including urban conurbations); those are Celje, Novo mesto, Nova Gorica-Šempeter pri Gorici, Murska Sobota and Brežice-Krško-Sevnica. Five functional regions with lower relative importance than their urban centres (conurbations) are Koper-Izola-Piran-Lucija-Portorož, Kranj, Velenje, Jesenice-Radovljica-Bled and Zagorje ob Savi-Trbovlje-Hrastnik. And, five functional regions of Ljubljana, Maribor, Ptuj, Slovenj Gradec-Ravne na Koroškem-Dravograd and Postojna have the same relative importance than their urban centres (conurbations).

Rank	***Functional region***	***Population***		***Number of municipalities***
		Number	***%***	
1	Ljubljana	1,488,805	73,2 %	134
2	Maribor	454,793	22,4 %	72
3	Koper-Izola-Piran	88,764	4,4 %	4
	Slovenia	***2,032,362***	***100,0 %***	***210***

Tab. 2: Population and number of municipalities in functional regions at NUTS 2 level in Slovenia

Rank	***Functional region***	***Population***		***Number of municipalities***
		Number	***%***	
1	Ljubljana	627,565	30,9 %	41
2	Maribor	265,423	13,1 %	28
3	Celje	190,423	9,4 %	20
4	Novo mesto	110,081	5,4 %	14
5	Koper-Izola-Piran	108,778	5,4 %	7
6	Nova Gorica-Šempeter pri Gorici	101,908	5,0 %	11
7	Murska Sobota	99,237	4,9 %	23
8	Kranj	93,920	4,6 %	7
9	Brežice-Krško-Sevnica	79,075	3,9 %	7
10	Ptuj	73,859	3,6 %	16
11	Velenje	67,868	3,3 %	12
12	Slovenj Gradec-Ravne na Koroškem-Dravograd	67,778	3,3 %	11
13	Jesenice-Radovljica-Bled	66,368	3,3 %	7
14	Zagorje ob Savi-Trbovlje-Hrastnik	44,750	2,2 %	3
15	Postojna	35,329	1,7 %	3
	Slovenia	***2,032,362***	***100,0 %***	***210***

Tab. 3: Population and number of municipalities in functional regions at NUTS 3 level in Slovenia

5 CONCLUSION

The ESPON 1.1.1 project (2004) found that Slovenia is one of the most polycentric European countries despite the small size of the country. This is a direct consequence of polycentric spatial and regional development policies since the end of 1960s. Polycentric development concept and distribution of jobs, services and financial subsidies have been also an instrument of balanced regional development policy in Slovenia, which was (partly) modified only by the local development (communal) policy in 1970s, and market reforms in 1990s. During 1990s the polycentrism has been in the shadow of centralisation tendencies and macro-economic priorities of Slovenia, as the new independent country, and the incomplete local government reforms. But the polycentric development concept has been present again since year 2000 in the most important new strategic development documents, such as the economic policy, regional policy, and spatial development policy, that are also complementary with the goals of the EU policy documents, looking over polycentrism as the main principle that guarantees effective, moderate and balanced spatial development (Zavodnik Lamovšek, Drobne and Pichler Milanović 2009).

In the paper, we discussed polycentric urban and regional development concepts in Slovenia which results defined urban centres of international and national importance in Slovenia (SPRS 2004). Using those, pre-

defined, centres of national and international importance of Slovenia as core centres and labour market approach, we defined functional regions in Slovenia. Functional regions have been analysed at NUTS 2 and NUTS 3 levels. As showed by other authors before, the daily interaction in the labour market can be considered as a good approximation for the functional region. In this way, delineation of functional regions can be used as a good starting point and framework for further analyses and research.

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🏆 *reviewed paper*

Generative Solar Design. Lichträume, Schattenkörper und dynamische Sonnenstandssimulation mit Open-Source-Software

Wolfgang Höhl

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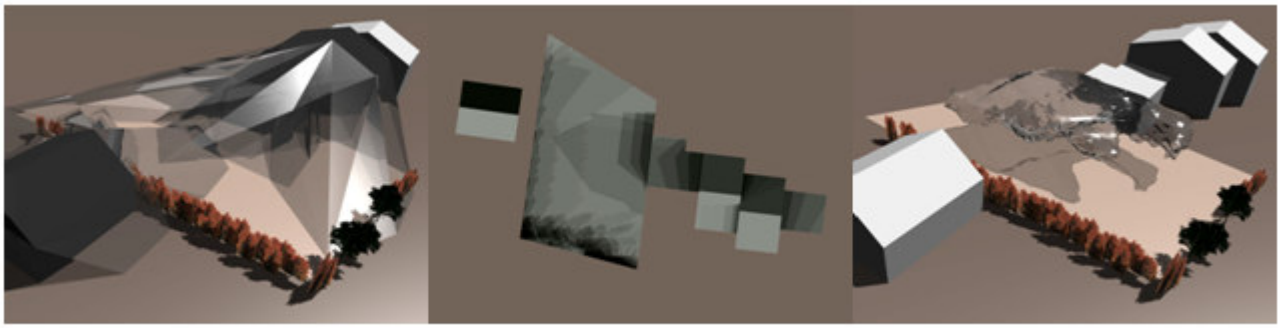


Schattenkörper, Bauplatzverschattung und maximal besonntes Volumen als generativer Entwurf. Renderings © 2009 Wolfgang Höhl

1 ABSTRACT

Wenn das Sonnenlicht selbständig Räume gestalten könnte - wie könnten sie aussehen? Wären es amorphe Lichträume und fließende Schattenkörper? Die dynamische Sonnenstands- und Fluidsimulation mit Open-Source Software zeigt neue Wege der intelligenten Tageslichtplanung.

Die Thematik ist nicht neu. Räumlich-grafische Verfahren zur Tageslichtplanung gehören seit langem zum Repertoire moderner Architektur. Neu sind hingegen die Möglichkeiten, diese Verfahren mit freier Software zu interpretieren und im generativen Architekturentwurf zu nutzen.

Dieser Beitrag beschäftigt sich mit der Umsetzung räumlich-grafischer Verfahren zur Sonnenstandssimulation mit den freien Softwarepaketen Blender 2.48a und GIMP 2.6.2. Angewendet wird dabei ein Mix von drei verschiedenen Techniken: Scripting mit Python, Texture Baking und dynamische Fluidsimulation.

In den ersten vier Abschnitten werden folgende Fragen behandelt: Welche Hardware und Software brauche ich? Welche Verfahren zur Tageslichtplanung gibt es? Wie funktioniert ein Setup für 'Generative Solar Design' mit Open-Source Software? Wie lassen sich die Baumassen nach Besonnung und Verschattung optimieren? Am Beispiel eines realen Bauplatzes werden konkrete Lösungsansätze formuliert. Eine abschließende Zusammenfassung zeigt weitere interessante Forschungsansätze und Perspektiven.

Diese neuen technischen Möglichkeiten sollen anregen, selbst mit Open Source Software zu experimentieren!

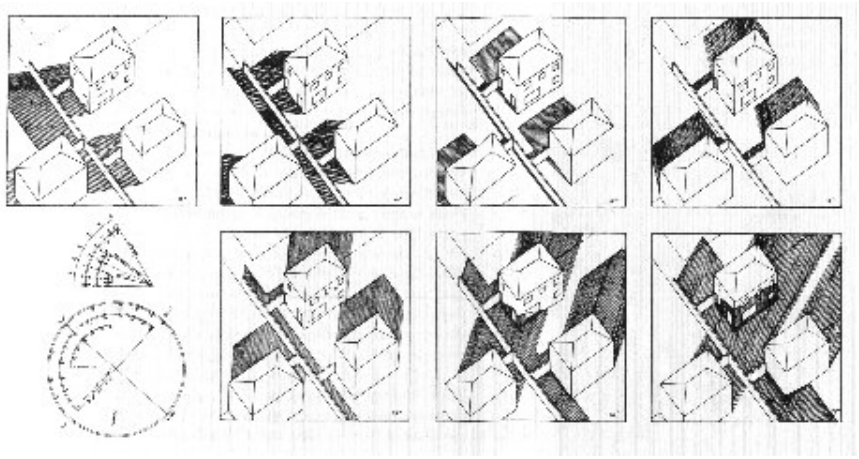
2 WELCHE HARDWARE UND SOFTWARE BRAUCHE ICH?

Alle Ergebnisse in dieser Arbeit wurden mit nachfolgend angegebener Hard- und Softwarekonfiguration erzielt. Denkbar wären aber auch andere Betriebssysteme, wie Microsoft Windows XP oder MacOS, oder ähnlich leistungsfähige Hardware.

Software	Blender 2.48 a GIMP 2.6.2 Yaf(a)ray 0.1.0 (optional)
Pythonscripts	sun_gui-D.py quantitybill.py
Betriebssystem	Ubuntu 8.10 (Intrepid Ibex) Kernel Linux 2.6.27-11-generic GNOME 2.24.1
Hardware	Hewlett Packard HP 6735 b
Prozessor	AMD Turion X2 Dual Core Mobile RM-72
Arbeitsspeicher	2048 MB RAM
Grafikkarte	512 MB ATI HD 3200
Harddisk	250 GB
Anzeigesystem	15,4“ WXGA Widescreen matt

3 WELCHE VERFAHREN ZUR TAGESLICHTPLANUNG GIBT ES?

Licht, Luft, Sonne! Das waren, unter anderen, die drei zentralen Forderungen der klassischen Moderne. Es gibt bis heute mehrere gebräuchliche Verfahren zur Tageslichtplanung und sehr viele hervorragende realisierte Beispiele zum solar optimierten Architekturentwurf. HAAS-ARNDT und RANFT [2007] nennen sieben Verfahren zur professionellen Tageslichtplanung: rechnerische Verfahren, grafische Schattenkonstruktionen, die grafische Bestimmung des Tageslichtquotienten, Messungen mit Horizontoscop und Sonnenstandsdiagramm, Simulationen am realen Modell, Computersimulationen und die fotometrische und physikalische Lichtmessung. Betrachtet werden in diesem Beitrag lediglich grafische Schattenkonstruktionen, Messungen mit dem Horizontoscop und Computersimulationen.



Grafische Besonnungsanalysen von Alexander Klein. Aus: KLEIN, Alexander: Der Südtyp: Das Einfamilienhaus mit Südorientierung, Stuttgart 1934, in: OSWALT, Philipp, REXROTH, Susanne (Hrsg.): Wohltemperierte Architektur – Neue Techniken des energiesparenden Bauens, Verlag C. F. Müller, Heidelberg 1995, S. 53

Schon um 1931 entwickelte Alexander Klein, neben anderen Analysemethoden, ein grafisches Verfahren zur Bestimmung der Besonnung im Tages- und Jahresverlauf. Es ermöglichte ihm, verschiedene Grundrissvarianten besser zu beurteilen und eine optimal besonnte Alternative auszuwählen. 1934 erscheint sein Buch „Der Südtyp: Das Einfamilienhaus mit Südorientierung“.

„In diesem Buch formuliert er die wesentlichen, noch heute gültigen Prinzipien des solaren Bauens – Südorientierung, Zonierung in unterschiedlich temperierte Bereiche, Maximierung der sonnenzugewandten Flächen und Minimierung der Aussenoberfläche zur Vermeidung von Wärmeverlusten.“ [OSWALT 1995]

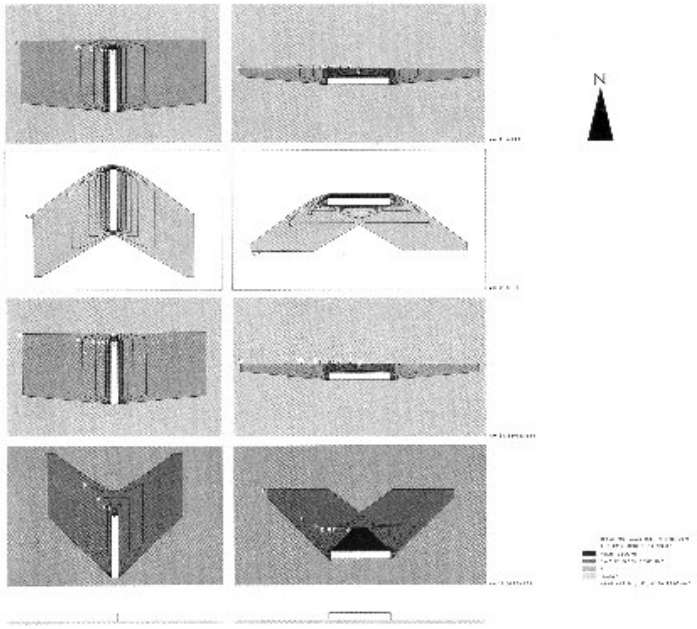
Konsequent gestaltet er seinen Gebäudeentwurf nach den Erkenntnissen seiner Besonnungs- und Verschattungsanalysen. Auch für Roland Rainer war die Besonnung immer ein zentrales Planungselement. Er nutzte grafische Schattenkonstruktionen zum Beispiel zur Darstellung der Besonnungszeiten eines Grundstücks abhängig von der Orientierung der Gebäudezeile.

Hannes Meyer verdeutlicht diesen interessanten Planungsansatz in seinen Thesen:

„ ... wir errechnen die sonneneinfallswinkel im jahreslauf und bezogen auf den breitengrad des baugeländes, und wir konstruieren danach den schattenfächer des hauses im garten und den sonnenlichtfächer des fensters im schlafzimmer. Wir errechnen die tageslichtbeleuchtung der arbeitsfläche im innenraum, ... : der hauskörper ist bei uns ein akkumulator der sonnenwärme. ...“ [CONRADS 1981]

1952 gründete der Architekt Friedrich Tonne das Institut für Tageslichttechnik in Stuttgart und entwickelte das Horizontoscop. Das Horizontoscop ist ein grafisch-optisches Instrument zur Bestimmung der Dauer der Besonnung beziehungsweise der Verschattung von vorgegebenen Orten. Es unterstützt die Tageslichtplanung bei Neubauten und Verbesserungen bei bestehenden Gebäuden. Stereografische Sonnenstandsdiagramme erlauben die Bestimmung der Sonnenstandsposition für jeden beliebigen Zeitpunkt für einen konkret vorgegebenen Ort. Über ein fotografisches Verfahren kann die Dauer der Besonnung und der Verschattung von konkreten Orten bestimmt werden.Der Vorteil des Instruments liegt in seinem relativ einfachen Setup und seiner guten Nutzbarkeit im Innen- und im Aussenraum. [BORN 2006]

Auch die japanische Baugesetzgebung nutzt räumlich-grafische Verfahren im Baugenehmigungsverfahren. Die sogenannte „Set-Back-Line“ regelt die Baukörperform nach Besonnung und Verschattung in dicht bebauten Gebieten.

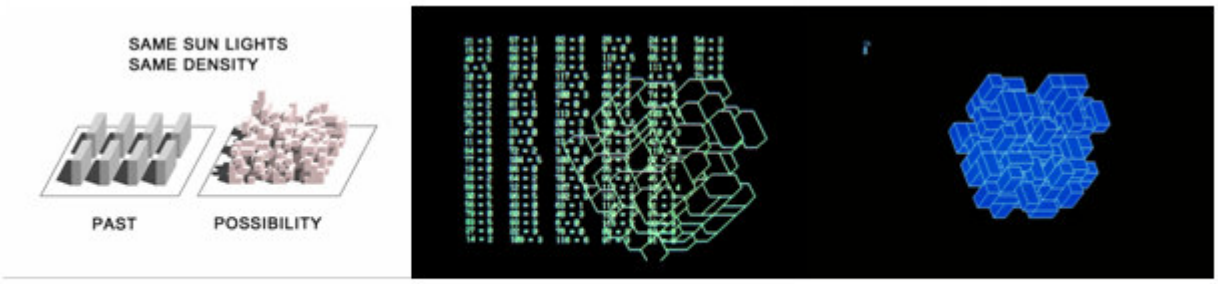


Besonnungszeiten in Stunden, Gebäudezeilen in unterschiedlicher Orientierung, in: RAINER, Roland: Vitale Urbanität - Wohnkultur und Stadtentwicklung, Böhlau Verlag, Wien 1995, S. 54

Horizontoscop und Sonnenstandsdiagramm . © 2009 Institut für Tageslichtechnik, Stuttgart

Der japanische Architekt Makoto Sei Watanabe entwickelte eines der ersten generativen Verfahren für den Architekturentwurf. Das Sonnenlicht moduliert dabei Form und Dichte der Bebauung. Ab 1995 entstanden

die generativen Computermodelle der „City of the Sun God“ und der „Sun God City 2“. [WATANABE 2002]



City of the Sun God . Studien © 1995 - 2009 MAKOTO SEI WATANABE RCHITECTS' OFFICE , Tokyo/Japan

1996 präsentiert Ernst J. Fuchs (the next ENTERprise – architects, Wien) einen der ersten computergestützten, autokatalytischen Architekturentwürfe. Für ein Grundstück in Zirl/Tirol entwickelt er aus der konkreten Besonnungssituation eine räumliche Struktur für ein Einfamilienhaus. Wie ein „räumliches Datenfeld“ initiieren Verschattung und Besonnung einen generativen Prozess, der die finale Gebäudeform entwickelt. Nach einigen automatisierten Programmschleifen entwickelt sich ein vielfältig gegliedertes Gebäude auf hohen Stützpfeilern über dem Bauplatz. [HÖHL 1999]

4 'GENERATIVE SOLAR DESIGN' – DIGITAL MOCKUP MIT OPEN-SOURCE SOFTWARE?

Blender bietet viele Möglichkeiten für die Architekturvisualisierung. Mit Blender sind nicht nur klassische Visualisierungen und Animationen möglich. Auch komplexe interaktive 3D-Walk-Throughs und einfache Games können Sie mit Blender sehr unkompliziert gestalten.

Mit vielen, so genannten Pythonscripts können Sie den herkömmlichen Funktionsumfang von Blender sehr rasch erweitern. Für ein generatives Setup zur solaren Gestaltung brauchen Sie zwei zusätzliche Skripte: eines zur Sonnenstandssimulation (sun_gui-D.py) und ein weiteres, um Flächen und Volumina messen und festhalten zu können (quantitybill.py). Sie finden diese Skripte in den Foren von www.blender.org. Der Gebrauch der 3D-Software Blender ist relativ komfortabel. Blender steht als freies Softwarepaket zum Download für die gebräuchlichsten Betriebssysteme zur Verfügung.

In Blender lassen sich beliebigee 3D-Baumassenmodelle aus Ihrer standardmäßigen Architekturanwendung importieren. Laden Sie das Pythonscript sun_gui-D.py Ihrer Blenderdatei hinzu und folgen Sie im Setup den Anweisungen des genannten Pythonscripts. Damit hätten Sie die Grundbestandteile für ein Solar Setup schon beisammen. Wenn Sie nun eine bestimmte Tageszeit eingeben, können Sie mit dem Animationsbutton jeden Sonnenstand zu jedem beliebigen Ort und zu jeder Zeit auf der Welt simulieren. Ein wertvoller link im Pythonscript hilft Ihnen, den korrekten Längen- und Breitengrad zu bestimmen. Sie können das Ergebnis über den internen Renderer oder auch über Yaf(a)ray als Bild ausgeben.

Der generative Architekturentwurf ist eine offene, zyklische Optimierungsschleife. Sie schaffen technische Rahmenbedingungen und generieren danach verschiedene Formen. Aus der ersten Generation dieser Formen wird die am meisten geeignete ausgewählt und weiterentwickelt, indem die Optmierungsschleife wiederholt wird. Wie sieht das nun konkret aus?

5 WIE LASSEN SICH DIE BAUMASSEN NACH DER BESONNUNG OPTIMIEREN?

Zunächst wird der maximale Raum festgelegt, in dem sich der Entwurf entwickeln kann. Danach können automatisch Formen generiert werden. Diese Formen können nach Besonnung, Verschattung oder anderen sinnvollen Kriterien (z.B.: dem Verhältnis von Oberfläche zu Volumen) bewertet und ausgewählt werden, dann wiederholt sich die Prozedur, bis die optimale Form gefunden ist. Dieser Prozeß wird im Folgenden in zehn Schritten dargestellt:

- Darstellen der Situation . Nachbargebäude und Bepflanzung
- Berechnen der Verschattung des Grundstücks

- Modellieren der Schattenkörper
- Festlegen des Umfangs der Bebaubarkeit
- Darstellen von Baumasse, Baugrenze und maximalem Lichtraum
- Generativer Entwurf innerhalb der optimal besonnten Baumasse
- Formtypen, Auswahl und Weiterentwicklung der besten Form
- Neuerliche Prüfung von Verschattung und Besonnung
- Remodeling von Schattenkörper und Baumasse
- Wiederholung der Optimierungsschleife bis zum finalen Rendering

6 OPTIMIERUNG DER BEBAUUNG NACH BESONNUNG UND VERSCHATTUNG

6.1 Darstellen der Situation . Nachbargebäude und Bepflanzung

Wie dieser Prozess funktioniert, wird an dem nun folgenden Beispiel demonstriert. Der konkrete Bauplatz befindet sich nahe am Starnberger See, zirka 30 km südwestlich von München. Das Grundstück liegt am Rande einer dörflich gewachsenen Siedlungsstruktur. Die Umgebung besteht aus Einfamilienhäusern, gebaut in den letzten vier Jahrzehnten. Das Grundstück ähnelt einer langgestreckten Raute. Die längeren Seiten liegen nach Westen und Osten. An diesen beiden Seiten schließen auch die Nachbargrundstücke mit ihrer Bebauung oder zum Teil mit hohen Hecken an. An der kurzen Nordseite liegt die Erschließungsstraße, Nach Süden grenzen einige Bäume und Büsche das Grundstück von einer anderen Anliegerstrasse ab

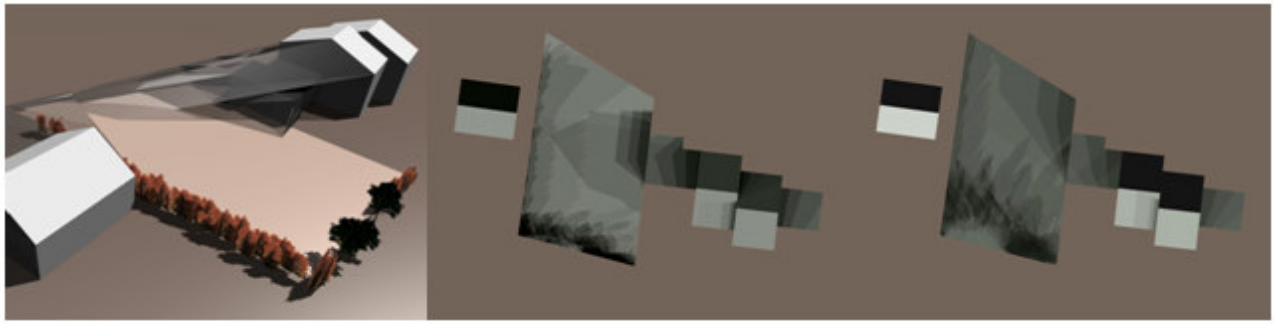
Situation mit Nachbargebäuden und Bepflanzung . Renderings © 2009 Wolfgang Höhl, München

6.2 Berechnen der Verschattung des Grundstücks

Die Verschattung des Grundstücks (stündlich von z.B.: 06:00 – 18:00 Uhr) wird zu drei verschiedenen Terminen berechnet: 22.06. (Sommer), 21.03./23.09. (Frühling/Herbst) und 22.12. (Winter). Dafür werden drei neue Blenderdateien erstellt. Im Dialogfeld des Pythonscripts sun_gui-D.py können anschließend die Werte entsprechend eingestellt werden. Wenn man die Dateien getrennt voneinander speichert, kann man nun eine Datei nach der anderen öffnen, und die Verschattung zu jedem konkreten Termin berechnen lassen.

Dabei wird stundenweise vorgegangen. Jeder Schattenverlauf wird mit ‚Texture Bake' auf das Grundstückspolygon ‚gebacken'. Sie erhalten so zu jedem der drei Termine 13 Bilder als Texture Bakes vom Grundstück. Diese Bilder können in einem Standardgrafikformat exportiert werden. Mit einem geeigneten Bildbearbeitungsprogramm (z.B.: GIMP) werden diese Texture Bakes als Ebenen aufeinandergelegt und zu einem Gesamttagesbild verschmolzen. Anschließend kann dieses Gesamttagesbild wieder auf Ihr Grundstück in Ihrer Blenderdatei projiziert werden. Damit erhalten Sie drei Schattenbilder für die entscheidenden Schlüsseltermine im Frühjahr/Herbst, Sommer und Winter.

Danach können die zugehörigen Schattenkörper zu jedem Termin modelliert werden.

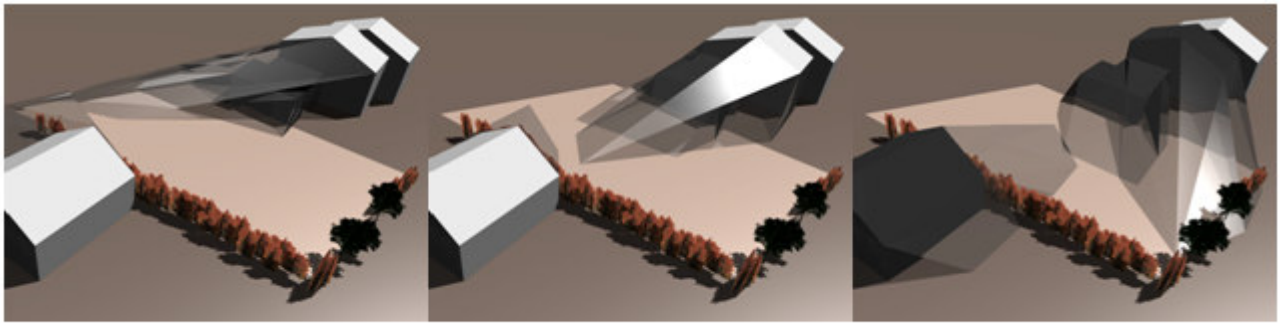


Verschattung des Grundstücks am 22. Juni (Sommer), am 21. März/23. September (Frühling/Herbst) und am 22. Dezember (Winter). Renderings © 2009 Wolfgang Höhl, München

6.3 Modellieren der Schattenkörper

Mit einer geeigneten Modellierungstechnik (z.B.: Face Extrude, Poly-by-Poly Modeling), können nun die Schattenkörper nach dem vorgegebenen Umgebungsmodell und den zugehörigen Schattenbildern modelliert werden.

Das kann einige Zeit in Anspruch nehmen. Der Aufwand lohnt sich aber.

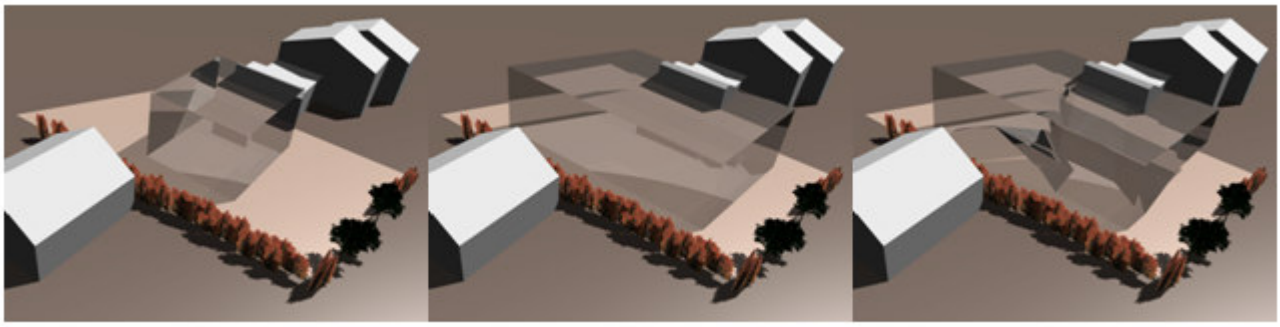


Modellieren der Schattenkörper nach Umgebung und Schattenbild . Renderings © 2009 Wolfgang Höhl, München

6.4 Festlegen des Umfangs der Bebaubarkeit

Als nächstes wird das Maß der baulichen Nutzung bestimmt.

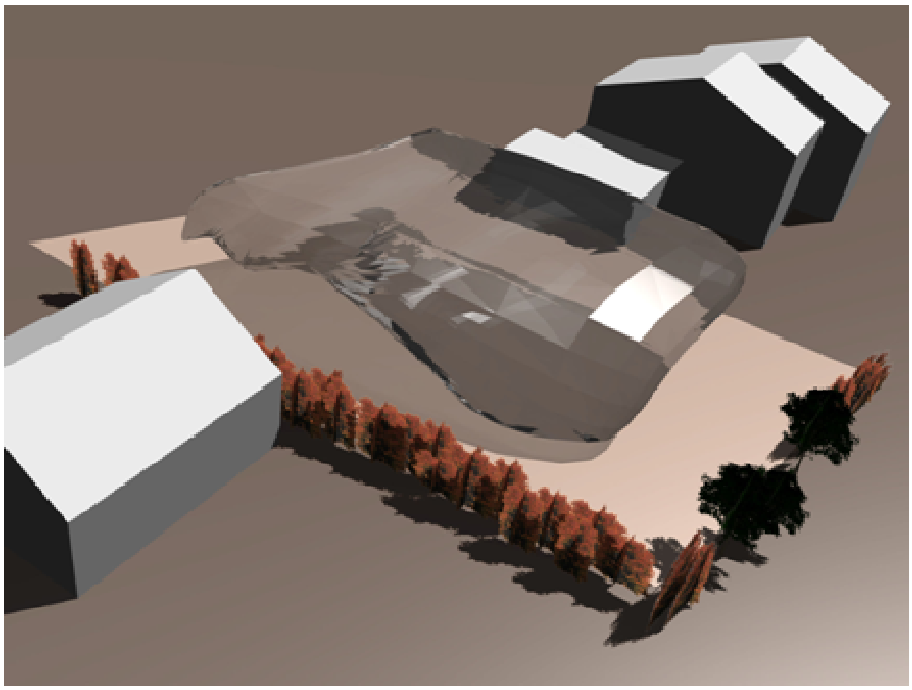
Grundstücksgröße	604,25 m²
Geschossflächenzahl (GFZ)	0,30
Maß der baulichen Nutzung	**181,28 m²**
Grundflächenzahl (GRZ)	0,20
Maximal zulässige Grundfläche	**120,85 m²**
Bruttogeschosshöhe	3,50 m
Maximale Gebäudehöhe (2 Geschosse)	7,00 m
Maximal zulässiges Volumen	**634,48 m³**



(1) Maximal zulässiges Volumen nach GFZ und GRZ = 634,48 m³. (2) Maximales Volumen nach Abstandsflächen = 1934, 03 m³. (3) Maximales Volumen abzüglich Schattenkörper = 1490.94 m³. Renderings . © 2009 Wolfgang Höhl, München

6.5 Darstellen von Baumasse, Baugrenze und maximalem Lichtraum

Der kleine Quader im ersten Bild entspricht dem maximal zulässigen Volumen von 634,48 m² auf der maximal zulässigen Grundfläche von 120,85 m². Das zweite Bild stellt das größtmögliche Volumen über der maximal bebaubaren Fläche unter Berücksichtigung der notwendigen Abstandsflächen dar. Dieses größtmögliche Volumen nach Abstandsflächen wird nun mit den konstruierten Schattenkörpern verschnitten. Der Restkörper, den Sie dadurch erhalten, ergibt den größtmöglichen Umraum, in dem sich der generative Entwurf nun entfalten kann (maximaler Lichtraum). Das Volumen beträgt 1.490,94 m³. Dieser maximale Lichtraum kann so modifiziert werden, daß im Endergebnis ein optimales Verhältnis von Oberfläche zu Volumen besteht. Dazu eignet sich, zum Beispiel, ein ‚Subsurf Modifier'. Das optimierte Volumen nach dieser Prozedur beträgt nun 1.066,03 m³. Das ist das Volumen, in dem sich der generative Entwurf nun entwickeln kann. Im nächsten Schritt wird das Volumen des optimierten maximalen Lichtraumes mit ‚Flüssigkeit' gefüllt



Optimierter maximaler Lichtraum = 1066.03 m³ . Rendering © 2009 Wolfgang Höhl, München

6.6 Generativer Entwurf innerhalb der optimal besonnten Baumasse

Mit diesem Verfahren ist es möglich, endgültige Lage und die Form des Baukörpers zu bestimmen. Füllen Sie dazu den optimierten maximalen Lichtraum mit ‚Flüssigkeit'. Das mögliche Füllungsvolumen beträgt, nach der oben geführten Rechnung, maximal 635 m³.

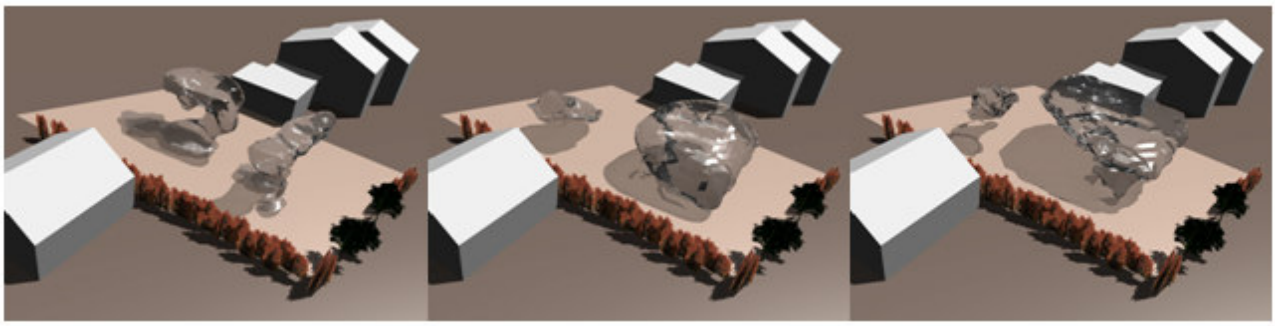
Die Werkzeuge zur Fluidsimulation bieten eine Menge an Variablen und Einstellungsmöglichkeiten. Hier ist es notwendig, eine geeignete Konfiguration zu finden und auszuwählen, um den optimierten maximalen

Lichtraum zu füllen. Verschiedenen Setups geben eine Fülle an Möglichkeiten zu experimentieren und auf diese Weise die unterschiedlichsten Formen zu erzeugen.

6.7 Formtypen, Auswahl und Weiterentwicklung der besten Form

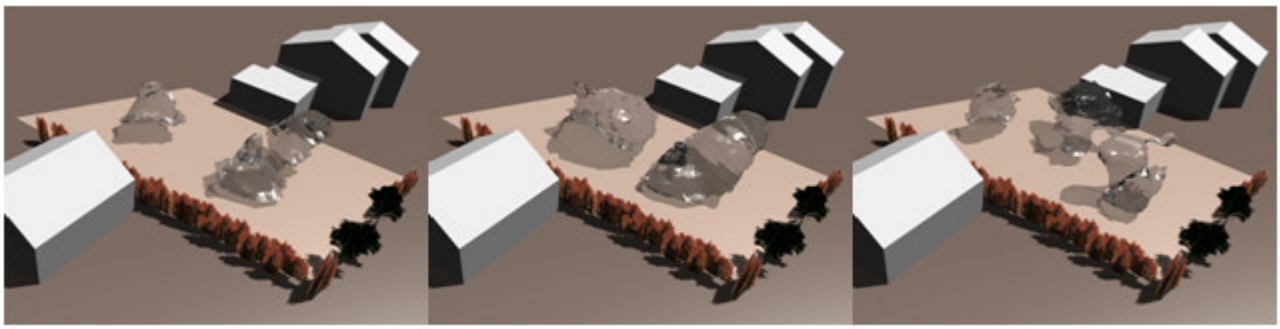
Abhängig von der experimentellen Anordnung können nun verschiedene Formtypen entstehen: In diesem Fall entwickelten sich „Quellen“, „Säulen“ und „Wolkenbügel“. Diese Formen sollten nun nach geeigneten Kriterien (z. B. nach der Verschattung) geprüft und die am meisten geeignete Form ausgewählt werden..

„Quellen“:



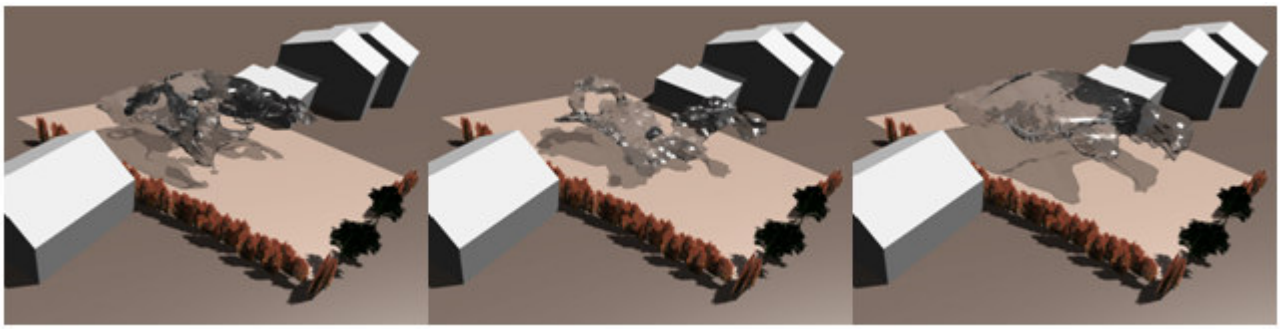
Quellen Nr. 1, 2 und 3 . Renderings © 2009 Wolfgang Höhl, München

„Säulen“:



Säulen Nr. 1, 2 und 3 . Renderings © 2009 Wolfgang Höhl, München

„Wolkenbügel“:



Wolkenbügel Nr. 1, 2 und 3 . Renderings © 2009 Wolfgang Höhl, München

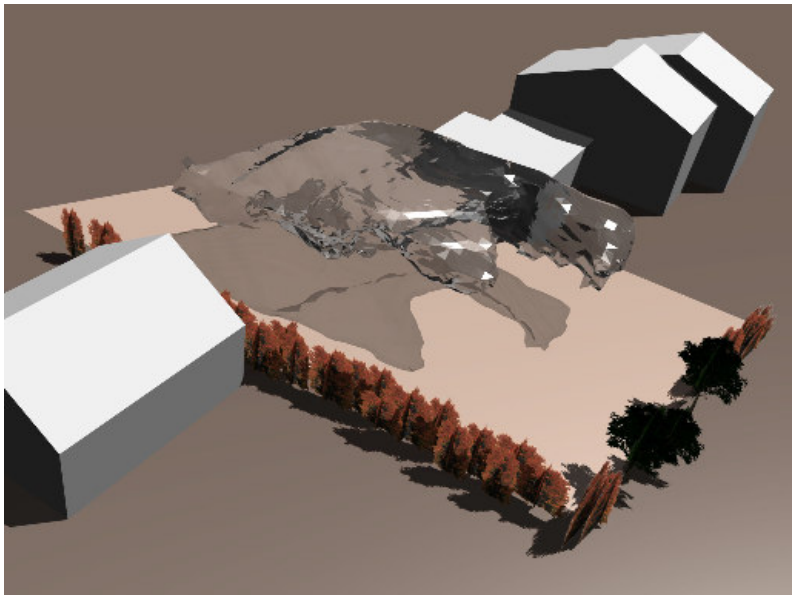
6.8 Neuerliche Prüfung von Verschattung und Besonnung

In diesem Fall habe ich mich für den generativen Entwurf „Wolkenbügel Nr. 3“ entschieden. Sie hat ein Volumen von 479,95 m³. Selbstverständlich können weitere, alternative Parameter zur Auswahl der optimalen Form frei gewählt werden. Beispielsweise können sich räumlich zusammenhängende Formen besser eignen, als disperse. Danach kann die Optimierungsschleife wiederholt werden: Besonnung und Verschattung werden geprüft und der Baukörper neu gestaltet.

6.9 Remodeling von Schattenkörper und Baumasse

Das Remodeling ist in diesem Beitrag nicht explizit dargestellt. Es funktioniert durch einfachen Neustart des Prozesses und eine wiederholte Optimierungsschleife, bis die optimale Form gefunden ist.

6.10 Wiederholung der Optimierungsschleife bis zum finalen Rendering



Generativer Entwurf „Wolkenbügel Nr. 3“ . Ansicht Südwest . Rendering © 2009 Wolfgang Höhl, München

Generativer Entwurf „Wolkenbügel Nr. 3“ . Perspektivische Ansichten . Renderings © 2009 Wolfgang Höhl, München

7 CONCLUSION

Sehr zufrieden kann man mit dem Gesamtverhalten des Systems sein. Die Ergebnisse sind im Entwurfsprozeß sehr gut anwendbar. Der Datenaustausch zu anderer Standardsoftware funktionierte sehr gut.

Die Pythonscripts lieferten einwandfreie Ergebnisse. Abhängig vom verwendeten Betriebssystem und der verwendeten Blenderversion gab es geringe Unterschiede in der Performance.

Das Erstellen der Verschattungsbilder mittels Texture Baking funktionierte sehr gut, genauso wie die Montage der Einzelbilder mit GIMP und der Wiederimport der Grafiken als UV-Texturen. Dieses Offline-Verfahren ist hier zeitlich noch sehr umfangreich und kann bestimmt an vielen Stellen über geeignete Scripts automatisiert werden.

Die Wege zur automatisierten Formgenerierung der Schattenkörper können ausgebaut und verbessert werden. Momentan ist hier vorwiegend der Nutzer des Systems gefragt.

Die Werkzeuge zur Fluidsimulation verhielten sich stabil, die Anwendung ist relativ einfach. Etwas umständlich bleibt allerdings noch die Volumensbegrenzung mittels des Pythonscripts quantitybill.py. Zukünftig wird zu testen sein, ob nicht andere Werkzeuge wie zum Beispiel Partikelsysteme bessere, schnellere und genauere Ergebnisse liefern können. Gerade in Hinblick auf die Entwicklung von konstruktiv relevanten und statisch wirksamen Baukörperformen könnte das interessante Wege aufzeigen.

Sehr erfolgreich verliefen auch, hier nicht näher bezeichnete Versuche, die Verschattungsberechnung geschossbezogen, in kleineren Einheiten zu wiederholen und den Baukörper dementsperechend zu remodellieren.

Komplementär zu dieser Offline-Technologie bieten heute neue Echtzeit-Renderingverfahren (z.B. mit der kostenpflichtigen Software EcoTect) einfachere Möglichkeiten der interaktiven Sonnenstandssimulation. Diese Technologie verdeutlicht sofort und in Echtzeit das Schattenbild eines bestimmten Gebäudeentwurfs. Dies ist in zweierlei Hinsicht nützlich: einerseits während des Entwurfs für den gestaltenden Architekten, andererseits zur Bewertung fertiger Entwürfe durch die Wettbewerbsjury oder den Bauherrn.

(1) Verschattung Grundstück mit Nachbarbebauung, (2) maximal besonnte Grundfläche und (3) nach der Besonnung optimierter Architekturentwurf . Simulationen mit EcoTect . Computer Generated Images (CGI) . © 2010 Wolfgang Höhl, München

Diese Computersimulationen bilden in diesem Bereich ein wertvolles Werkzeug, mit dem unsere Häuser tatsächlich zu Akkumulatoren der Sonnenwärme werden können.

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GeoFinanzen: Unterstützung kommunaler Entscheidungsprozesse durch kartographische Präsentation von Finanzdaten

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1 ABSTRACT

Städte sind geprägt durch Soziale Ungleichheit und das Fehlen finanzieller Mittel. Entscheidungen über die Zukunft der Städte werden von Gremien getroffen, die auf aus den Verwaltungen stammende Informationsquellen zurückgreifen müssen. Die Daten, die dabei zugrunde liegen, haben zwar räumlichen Charakter, werden jedoch meist in nicht-räumlichen Präsentationsformen dargeboten. Daraus resultiert ein Mangel an raumbezogenem Wissen, der mit der in der vorliegenden Arbeit diskutierten Vorgehensweise behoben werden soll. Als Anwendungsbeispiel dient dabei der Haushalt der Stadt Trier. GeoFinanzen verortet Daten aus dem Ergebnis- und Finanzhaushalt 2009, führt diese zusammen, verschneidet sie mit sozio-demographischen Merkmalen und ermöglicht dadurch neue Einblicke in räumliche Zusammenhänge im Sinne einer explorativen Datenanalyse (Spatial Data Mining). Neben der Haushaltsaufstellung können die aufbereiteten Daten auch als Controllinginstrument der Verwaltung genutzt werden. Fachplaner können mit adaptierten Versionen themenspezifische Erkenntnisse gewinnen und in zukünftige Planungen einarbeiten. Finanzen und Raum können somit zu einer Einheit werden, in der sozialräumliche Disparitäten auch unter Einsatz entsprechender finanzieller Verteilungsrelationen innerhalb der Städte bekämpft werden können. Die Zielgruppe bilden kommunale Entscheider, wobei neben der Politik auch Verwaltung sowie die Bürger in Frage kommen. Dabei ist darauf zu achten, dass die Zielgruppen in dem betrachtenen Handlungsprozess der Haushaltsaufstellung unterschiedliche Handlungen vollziehen und daher die kartographischen Medien entsprechend nutzerorientiert gestaltet werden müssen. Der vorliegende Beitrag stellt die Vorgehensweise zur Aufbereitung der Haushaltsdaten und Einsatzbereiche von GeoFinanzen vor.

2 EINFÜHRUNG

“Wohin fließt eigentlich das Geld in der Stadt?” war die Eingangsfragestellung, die die Autorin zur Bearbeitung des vorliegenden Themas veranlasste. Falls sich in der Verteilung der Finanzströme einer Kommune bestimmte räumliche Muster aufdecken lassen, könnte dieses Wissen in Zukunft genutzt werden, um eine einseitige Mittelverteilung zu vermeiden. Das Ziel liegt dabei nicht darin, eine homogene Mittelverteilung zu fordern – vielmehr möchte GeoFinanzen mit der Georeferenzierung von kommunalen Finanzdaten ein Bewusstsein für die Dimension „Raum“ in Zusammenhang mit Investitionen und Leistungszuweisungen schaffen. In diesem Artikel wird ein Einblick in das Forschungsprojekt gegeben und Zwischenergebnisse präsentiert.

Kapitel 2 stellt den Handlungsbedarf auf kommunaler Ebene hinsichtlich der Haushaltsauftsellung vor und ordnet somit die Aufgabenstellung von GeoFinanzen in den kommunalpolitischen und wissenschaftlichen Kontext ein. Neben der Vertiefung der relevanten Handlungszwänge werden die Möglichkeiten der Kartographie aufgezeigt, innerhalb der bei der Haushaltsaufstellung stattfindenden Entscheidungsprozesse Unterstützung zu leisten. Kapitel 3 stellt Methodik und Resultate der Georeferenzierung des Trierer Kommunalhaushaltes dar. Kapitel 4 beschäftigt sich abschließend mit Analysen, die mit den aufbereiteten Daten durchgeführt werden können und somit neue Einblicke in Stadtstrukturen liefern, sowie deren Umsetzung in sog. Kartographische Modellformen. Des Weiteren werden, mit Bezug auf die in Kapitel 2 dargestellten kommunalen Entscheidungsprozesse bei der Haushaltsaufstellung, Einsatzmöglichkeiten von GeoFinanzen aufgezeigt. Ein Ausblick auf die weiteren Entwicklungsschritte schließt die Arbeit ab.

3 KOMMUNALER HANDLUNGSBEDARF BEI DER HAUSHALTSAUFSTELLUNG

Der Handlungsbedarf bei der kommunalen Haushaltsaufstellung ist durch zwei große Einflussgrößen gegeben: die Zunahme der Partizipation der Bürgerinnen und Bürger und die damit verbundene Anforderung der transparenten Haushaltsaufstellung sowie die Frage der Sozialen Ungleichheit, deren Bekämpfung eines der Ziele kommunaler Stadtplanung darstellt. Neben Erläuterungen zu transparenter Haushaltsaufstellung und räumlichen Disparitäten werden in diesem Kapitel abschließend die Akteure, der Prozess der Haushaltsaufstellung und die daraus resultierenden möglichen Handlungsfelder der Kartographie gegenüber gestellt.

3.1 Transparenz der Haushaltsaufstellung

In den letzten Jahren, die von leeren öffentlichen Kassen gekennzeichnet waren, trat bei kommunalen Akteuren verstärkt die Auffassung ein, dass Bürger einer Stadt in die Haushaltsaufstellung eingebunden werden sollten. Nicht zuletzt, um Kürzungen und Streichungen besser kommunizieren zu können. Die Idee des Bügerhaushalts ist keineswegs neu, der erste wurde bereits im Jahr 1989 in Porto Alegre (Brasilien) aufgestellt. Die Umsetzung in den deutschen Kommunen erfolgte seitdem jedoch bei Weitem nicht flächendeckend. Über 200 Kommunen arbeiten in Europa, Amerika und Australien bereits mit diesem neuen Beteiligungsinstrument (BAUMANN U. A. 2003). Bürgerhaushalte können in unterschiedlichen Verfahren aufgestellt werden. Gemeinsam ist diesen die Konzentration auf eine Information und Mitsprache (in unterschiedlichem Ausmaß) der Bürger. Der Aufstellungsprozess eines Bürgerhaushalts ist formal gesehen identisch mit dem eines ohne Beteiligungsverfahren erstellten Kommunalhaushalts (dargestellt in Abb. 1). Er unterscheidet sich nur hinsichtlich der Akteure, die zwischen den Schritten „Einbringung Etatentwurf“ und „Verabschiedung Etat“ einbezogen werden: zu den Kommunalpolitikerinnen, Kommunalpolitikern, Verwaltungsmitarbeiterinnen und Verwaltungsmitarbeitern gesellen sich die Bürgerinnen und Bürger. Problematisch bei Bürgerhaushalten stellt sich die Komplexität der Haushaltsmaterie dar. Ein Konzept zur transparenten Aufbereitung des Haushalts zur Weiterentwicklung des Bürgerhaushalts wird daher von BAUMANN U. A. (2003) gefordert. Die Autoren sind der Meinung, dass eine stadtteilbezogene Darstellung des Haushalts die Bürger vor Ort besser erreichen könne. Marzahn-Hellersdorf hat eine solche sozialräumliche Haushaltsdarstellung vorgenommen. Die räumliche Auflösung (Stadtteil) ist jedoch sehr ungenau. Zudem wurden jeweils nur ausgewählte Aufgaben von den Fachabteilungen bewertet und räumlich aufgegliedert. Auch in anderen Kommunen, national wie international (z.B. St. Denis in Frankreich), wird eine Aufsplittung der Investitionen nach Stadtteilen vorgenommen. Der Bürgerhaushalt Berlin-Lichtenberg berücksichtigt die räumliche Dimension der Maßnahmen insofern, dass bei den Beschreibungen der einzelnen Leistungen des Bezirksamtes eine Aufschlüsselung nach den räumlichen Untereinheiten, den Stadtteilen, erfolgt (BEZIRKSAMT LICHTENBERG VON BERLIN 2007). Für die gruppierten Leistungen wird angegeben, welcher Anteil jeweils auf einen Stadtteil entfällt. Dabei werden verschiedene Indikatoren zur Berechnung der Anteile verwendet, z.B. Anzahl der Einwohner je Stadtteil bei der Sportförderung. Wirkungsradien der Maßnahmen bzw. die Ausgaben des Verwaltungshaushalts spielen dabei jedoch keine Rolle, ebenso wenig die Gegenüberstellung der Stadtteile zu einem gesamtstädtischen Wirkungsgefüge oder eine kleinräumige kartographische Darstellung. In der Stadt Trier wurde für das Haushaltsjahr 2010 erstmals ein Bürgerhaushalt aufgestellt (VORWERK/LOOSEN-BACH 2009).

3.2 Soziale Ungleichheit und Räumliche Disparitäten

HRADIL (2001, S. 28f.) nennt drei Komponenten Sozialer Ungleichheit: zum Einen betrifft sie durch Werte der Gesellschaft geprägte Güter, die als wertvoll gelten, zum Anderen deren ungleiche Verteilung in der Gesellschaft, die zudem regelmäßig erfolgt. Mit dem Zusammenhang zwischen Sozialer Ungleichheit und der räumlichen Dimension beschäftigen sich besonders die Sozialgeographie, die Stadtgeographie und die Stadtsoziologie. Die räumliche Problematik der Sozialen Ungleichheit besteht darin, dass benachteiligte Bevölkerungsgruppen über geringe Ressourcen verfügen und somit auf günstigen Wohnraum angewiesen sind. Sie sammeln sich daher in bestimmten Stadtquartieren, wodurch Prozesse des down-cycling und der Segregation eingeleitet werden. Letztere hat zwar nicht nur Nachteile, wie z.B. von… HÄUßERMANN (2005) untersucht. FRIEDRICH (1999, S. 282) geht davon aus, dass sich selbst verstärkenden Effekte der Dimensionen räumlicher Armut in Zukunft immer stärker angreifen und in ghettoähnlichen Vierteln münden, in denen sich soziale Ausgrenzung räumlich verfestigt. Als Lösung des Dilemmas fordert sie eine Eingrenzung marktwirtschaftlicher Prinzipien in der Stadtpolitik. Negativ wirkt Segregation dadurch, dass schlechte Ausstattung, periphere Lage und negatives Image des Wohnumfelds die soziale Ausgrenzung der von Armut betroffenen Menschen verstärken (vgl. SCHACHT (1999, S. 290)). In der Stadtsoziologie gibt es eine Diskussion über den Raumbezug Sozialer Ungleichheit, die sich zwischen der Idee der Enträumlichung und der Verräumlichung bewegt. DANGSCHAT/HAMEDINGER (2007, S. 12) schließen sich der zweiten Gruppe an und betonen, dass der “physische Raum (...) zugleich Ressource und Constraint für das Handeln des Individuums, das sich mit anderen in Konkurrenz um die Besetzung und Verteidigung des Territoriums befindet“, sei.

Der Zusammenhang zwischen Sozialer Ungleichheit und Raum wird von einigen Stadtgeographen in Frage gestellt. So sieht BECK (1986, 137f.) im Rahmen der Lebensstildiskussion „neue, typischerweise sozial gemischte urbane Stadtsiedlungen“ anstelle der zuvor existierenden proletarischen Milieus. Ebenso schreibt Schulze (1992) von einem Rückgang der Segregation und der geographischen Signifikanz von Herkunft und Wohnumfeld. Seine Aussage, „Für unsere Alltagswahrnehmung gilt immer mehr jeder kann überall wohnen; seine gegenwärtige und vergangene Umgebung informiert nur wenig über Existenzformen“ (SCHULZE (1992, 196)) trifft auf die Struktur der Stadt Trier jedoch in keinster Weise zu. Drei Gebiete der Stadt sind bereits als Programmgebiete der Sozialen Stadt deklariert, weitere Gebiete befinden sich in einem deutlichen Abwärtstrend. Nach ROSOL (2009) ist das Eintreten der Stadtplanung für Unterprivilegierte im Sinne einer parteilichen Anwaltsplanung bedingt durch den neoliberalten Umbau der Städte in den Hintergrund gerückt. Dennoch stellt sich Kommunen nach wie vor die Frage, wie die negativen Folgen der Ungleichheit zum Wohle der gesamten Stadt abgemildert werden können.

Zur Messung von Sozialer Ungleichheit bestehen Indikatoren-Sets, wie von FALLER U. A. (2005) für die Stadt Saarbrücken entwickelt. Diese Indikatoren umfassen die Themnbv men Einkommen, Wirtschaft, Bildung/Qualifizierung, Bevölkerungs- und Haushaltsstruktur sowie Wohnen. Mit Hilfe der Indikatoren können Teilräume einer Stadt in ihrer Heterogenität dargestellt werden. Keiner der Indikatoren berücksichtigt jedoch, dass auch die Kommune selbst durch ihr Handeln Ungleichheit befördern oder abbauen kann. Durch die Georeferenzierung von Finanzdaten kann überprüft werden, ob insbesondere im investiven Bereich durch Ungleichbehandlung von Stadtquartieren Negativimages befördert und so die Abwärtsspirale weiter in Gang gesetzt wird.

3.3 Entscheidungsprozesse bei der Haushaltsaufstellung und Übertragbarkeit auf kartographische Handlungsfelder

An den Entscheidungen, die im Rahmen einer Haushaltsaufstellung getroffen warden müssen, sind viele Akteure beteiligt. Diese unterscheiden sich hinsichtlich ihres Vorwissens und ihrer Fähigkeiten. Abbildung 1 stellt den Ablauf der Haushaltsaufstellung in Zusammenhang mit den drei Akteursgruppen Verwaltung, Bürgerinnen, Bürger und Stadtrat dar. Der Etat wird zunächst durch den (Ober)Bürgermeister in den Stadtrat eingebracht. Dieser Entwurf wird dann anschließend im Rahmen der Bürgerbeteiligung diskutiert. Die Fraktionen beraten über die Ergebnisse, zunächst intern, anschließend im zuständigen Ausschuss. Den Abschluss stellen der öffentliche Beschluss sowie die Veröffentlichung des Etats dar. An allen Stellen im Entscheidungsprozess findet Kommunikation statt und werden Informationen ausgetauscht, wobei der Grad der Beteiligung der Akteure variiert. Im Rahmen des Bürgerhaushalts kann zudem der Zeitpunkt der Beteiligung der Bürger variieren. Zwei grundlegend unterschiedliche Ansätze bestehen in der Beteiligung der Büger/-innen entweder vor der Einbringung des Etatentwurfs (allgemeine Diskussion haushaltsrelevanter Fragestellungen) oder nach der Einbringung des Etatentwurfs (konkrete Diskussion der im Haushaltsplan stehenden Maßnahmen). Die räumliche Dimension der Entscheidungen in politischen Gremien wird von deren Mitgliedern zwar erkannt, so DAPP (2005), allerdings erfolgt keine entsprechende technische Unterstützung der Abgeordneten in Form von interaktiv einzusetzenden GIS, weshalb der Raumbezug in Diskussionen des Landtags sehr allgemein bleibe oder sich konkret auf die jeweiligen Heimatwahlkreise der Abgeordneten beziehe, für die diese ein stark ausgeprägtes Detailinteresse haben.

Den erforderlichen Kommunikationsprozessen können aus kartographischer Sicht zwei Handlungsfelder (nach BOLLMANN 1993) zugeordnet werden: Kartographische Informationsverarbeitung und raumbezogene Unterrichtung und Mitteilung. Kartographische Handlungsfelder stellen einen modelltheoretischen Ansatz der Kartennutzung dar, in dem der organisatorisch-kommunikative Zusammenhang zwischen georäumlichen Handlungen und den Formen der Unterstützung durch kartographische Medien abgebildet wird. Die Abgrenzung der insgesamt acht verschiedenen Handlungsfelder erfolgt auf der Grundlage des jeweils erforderlichen Informationsbedarfs und -austausches. Das Ziel der kartographischen Handlunsgfelder ist eine optimale Aurichtung der kartographischen Medien auf die jeweiligen Handlungsabläufe. Abbildung 1 stellt den Prozess der Haushaltsaufstellung, die daran beteiligten Akteure sowie daraus resultierende betroffene kartographische Handlungsfelder dar.

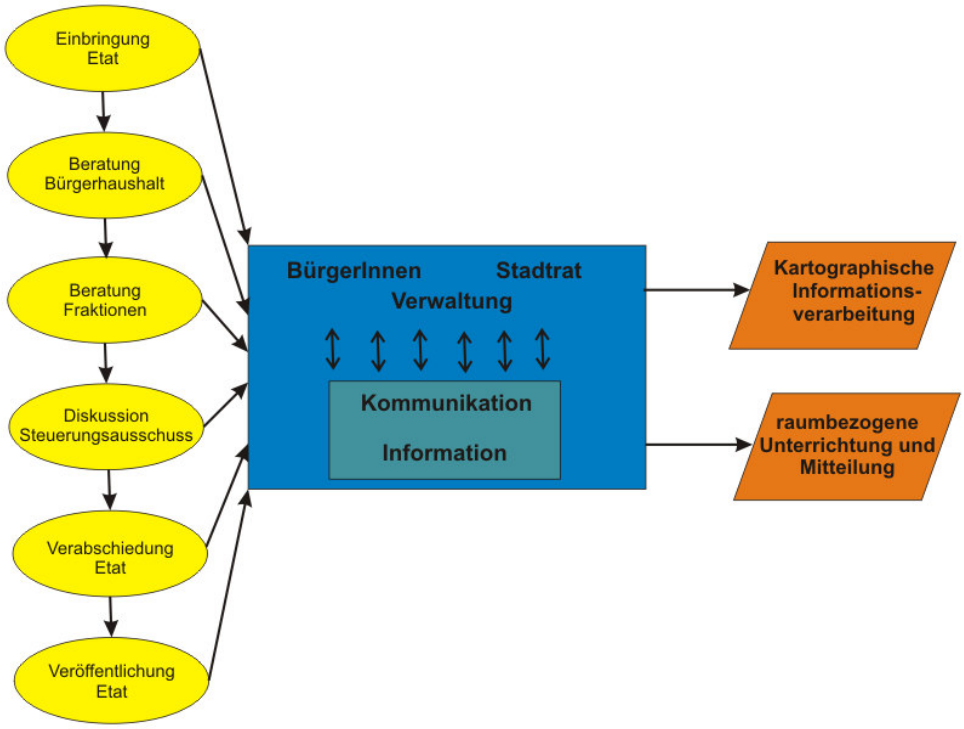

Abb. 1: Ablauf der Haushaltsaufstellung, Akteure und kartographische Handlungsfelder

3.3.1 Handlungsfeld Kartographische Informationsverarbeitung

Geographische Informationssysteme und andere Visualisierungswerkzeuge ermöglichen das Durchführen von numerischen, geometrischen und logischen Operationen sowie kognitive Analyse- und Bewertungsvorgänge. Nach BOLLMANN/UTHE (2002) werden unter diesem Handlungsfeld die GIS-Funktionsbereiche Visualisierung und Datenexploration subsumiert. Als wesentliches Kennzeichen des Handlungsfeldes halten die Autoren die wiederholte gedankliche Transformation von Daten in Informationen oder Wissen fest. Die inhaltlichen Schritte der kognitiven Verarbeitung der dargestellten Informationen bestehen beispielsweise in der Auswertung von Nachbarschaftsbeziehungen, Verteilung von Minimal- und Maximalwerten oder Clusteridentifikation. Dies geschieht besonders durch interaktive Präsentation der Daten, die wiederum eine schnelle Transformation der Inhalte ermöglicht.

3.3.2 Handlungsfeld Raumbezogene Unterrichtung und Mitteilung

Nach BOLLMANN/UTHE (2002) ist die raumbezogene Unterrichtung insbesondere in Verwaltungen oder größeren Unternehmen relevant. Der Einsatz von kartographischen Medien in diesem Handlungsfeld ist stark standardisiert, dargestellt werden Ergebnisse eines Bearbeitungsvorgangs oder mögliche Ausführungsvarianten. Raumbezogene Mitteilung versammelt sämtliche Handlungen, bei denen die Vermittlung georäumlicher Informationen zur Meinungsbildung oder Verhaltensauslösung führen soll. Bei den Darstellungen handelt es sich entweder um allgemeine, langfristig gültige Beschreibungen georäumlicher Situationen oder zeitlich begrenzte Sachverhalte. Insbesondere im Bereich der Massenkommunikation wird mit dieser Handlungsform gearbeitet. Entsprechend steht die Verständlichkeit der Informationen im Vordergrund, die Darstellungsform hingegen ist nicht oder wenig standardisiert. In GeoFinanzen kommen beide Teilbereiche des Handlungsfelds zum Tragen: Raumbezogene Unterrichtung, insofern interne Abstimmungsprozesse der Verwaltung betroffen sind, und Raumbezogene Mitteilung, insofern es um Kommunikation zwischen den unterschiedlichen Akteursgruppen geht.

4 GEOREFERENZIERUNG: VORGEHENSWEISE UND ERGEBNISSE

Ziel von GeoFinanzen ist unter anderem, darzustellen, wie Haushaltsdaten räumlich aufbereitet werden können. Die tatsächliche Georeferenzierungsquote einer Kommune ist dabei stark von der bisherigen Datenhaltung abhängig. Im Anwendungsbeispiel, der Stadt Trier, erfolgt die Datenhaltung stark dezentral. Somit unterscheiden sich die Voraussetzungen für eine erfolgreiche Georeferenzierung sehr stark nach den einzelnen Ämtern. In diesem Kapitel sollen grundsätzliche Überlegungen zur Datenaufbereitung sowie

einige Ergebnisse aus Ämtern präsentiert werden, die als stellvertretend für die drei Hauptgruppen der Datenverfügbarkeit betrachtet werden können.

4.1 Datenaufbereitung

Als Ansatz zur Georeferenzierung stehen zwei verschiedene Sichtweisen des Raumbezugs zur Verfügung. Zum Einen kann der konkrete Ort einer Investition berücksichtigt werden. Zum Anderen können jedoch auch diejenigen, die von der Investition profitieren, betrachtet werden. Zudem ist im Haushalt zu differenzieren zwischen Einzel- und Sammelpositionen. Einzelpositionen betreffen konkrete Objekte, Sammelpositionen werden nach Bedarf verausgabt. Daher kann bei Sammelpositionen vorab kein Raumbezug hergestellt werden. Es ist jedoch möglich, die Sammelpositionen ex post zu betrachten, und das räumliche Ergebnis des Vorjahres, soweit keine inhaltlichen Gründe dagegen sprechen, auf das Folgejahr fortzuschreiben.

Die unterschiedlichen Leistungen einer Kommune können differenziert werden in nicht räumliche, indirekt räumliche und direkt räumliche Leistungen. Nicht räumlich sind dabei Positionen wie Zinsen oder Verwaltungsinterna (z.B. Rechtsamt, Protokollreferat). Diese werden nicht in den georeferenzierten Haushalt einbezogen. Zinsen und Abschreibungen sind ggf. enthalten, wenn sie den einzelnen Produkten, die georeferenzierbar sind, haushaltärisch zugeordnet sind. Direkt räumlich sind Plandaten für das Folgejahr, die konkrete Investitionen betreffen, wie z.B. in Gebäude und Straßen. Reaktive Maßnahmen werden im Haushalt in Sammelpositionen abgebildet, weshalb, wie oben beschrieben, eine Betrachtung in diesem Falle nur rückwirkend möglich ist. Die dritte Gruppe bilden die indirekt räumlichen Maßnahmen, d.h., Institutionen oder Personen, die Leistungsempfänger sind. In diesen Fällen erfolgt keine sichtbare Investition der Finanzmittel, aber die Begünstigten leben an einem bestimmten Ort und sind somit prinzipiell georeferenzierbar. Abbildung 2 stellt die Varianten des Raumbezugs in Kombination mit dem jeweils verwendeten Zeithorizont anhand von Beispielen gegenüber.

Abb. 2: Raumbezug im kommunalen Haushalt

4.2 Raumbezugseinheiten

Bei der Georeferenzierung der Aufgaben des Kommunalhaushalts stellt sich die Frage, welche Raumbezugseinheit zur Verortung der Daten genutzt werden soll. Einige Datenquellen konnten adressbezogene Daten zur Verfügung stellen. GeoFinanzen hat jedoch die Belange des Datenschutzes zu berücksichtigen, weshalb eine adressgenaue Präsentation der Daten nicht möglich ist. Somit kommen die administrativen Einheiten der Stadt Trier in Frage: 99 Statistische Bezirke und 19 Stadtbezirke. Bei den durchzuführenden Analysen und der Interpretation insbesondere statistischer Kennzahlen sind die Probleme der Auswirkung unterschiedlicher Raumbezugseinheiten, das sog. Modifiable Area Unit Problem (siehe hierzu WONG/LEE (2005) und FOTHERINGHAM ET AL. (2000)), zu berücksichtigen.

4.3 Ergebnisse

Das Ergebnis der Georeferenzierung soll beispielhaft demonstriert werden anhand der Daten aus den Ämtern Theater, Gebäudewirtschaft und Soziales. Dabei werden die unterschiedlichen Varianten der Georeferenzierung vorgestellt (direkter und indirekter Raumbezug).

4.3.1 Theater

Nutzer und Nutzerinnen der Infrastruktur städtisches Theater gehören nach der in Abb. 2 dargestellten Gliederung zu den indirekt räumlichen Maßnahmen. Nicht der Stadtteil, in dem die Aufführungen stattfinden, profitiert davon, sondern der Personenkreis, der die Aufführungen besucht. Insofern ist für eine Georeferenzierung der Theaterausgaben die Erfassung der Anschrift der Kunden bei den einzelnen Verkaufsvorgängen erforderlich. Dies erfolgt derzeit am Theater Trier nicht, weshalb eine Georeferenzierung an diese Stelle zwar prinzipiell möglich, aber aus technischen Gründen nicht leistbar ist. Wenn eine Kommune ihre Ausgaben vollständig georeferenzieren möchte, wäre dies jedoch durch entsprechende Aufrüstung des Kassensystems möglich. Identische Probleme treten z.B. bei Museen auf.

4.3.2 Gebäudewirtschaft

Das Amt für Gebäudewirtschaft beschäftigt sich mit der Instandhaltung und Sanierung des kommunalen Gebäudebestandes. Dabei werden Maßnahmen durchgeführt, die schon im Vorjahr geplant und entsprechend in den Haushalt geschrieben werden. Diese können georeferenziert werden, wobei der Standort einfach, der Wirkungsradius jedoch ggf. über Expertengespräche, bei Schulen ggf. über eine Georeferenzierung der Herkunft der Schülerinnen und Schülern, zu bestimmen ist. Die Gebäudewirtschaft verfügt auch über mittelfristige Planungsdaten hinsichtlich des Investitionsbedarfs in kommunalen Gebäuden.

Zudem existieren etliche Maßnahmen, die nach Bedarf durchgeführt werden, insbesondere im sicherheitstechnischen Bereich. Diese Maßnahmen sind noch nicht objektbezogen im Haushalt enthalten, sondern unter Sammelpositionen, z.B. „Sicherheitstechnische Maßnahmen an Grundschulen“, subsumiert. Zur Georeferenzierung bieten sich somit nicht die Daten im aktuellen Haushalt an, sondern ausschließlich eine ex-post-Betrachtung der Vorjahresergebnisse. Doch auch bei jenen hält die Stadtverwaltung Trier die Ausgaben derzeit nicht komplett objektbezogen vor. Daher handelt es sich auch bei den reaktiven Maßnahmen um Ausgaben, die zwar prinzipiell verortet werden könnten, aber zunächst müssten die technischen Erfassungsmöglichkeiten entsprechend genutzt werden.

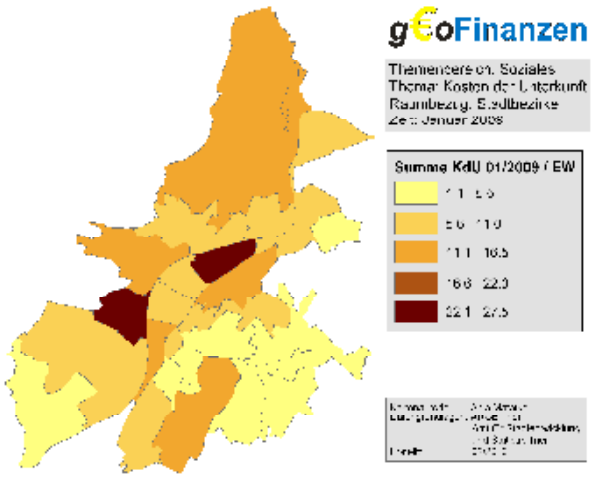

Abb. 3: Georeferenzierungs-Ergebnis KdU/EW (links) und Leser der Stadtbibliothek (rechts)

4.3.3 Sozialbereich

Im Sozialbereich werden keine Investitionen getätigt, sondern Zuschüsse an Maßnahmeträger oder Leistungen an Leistungsbezieher gezahlt. In diesem Bereich ist der Datenschutz besonders relevant. Ausgaben, die sich direkt an die Leistungsbezieher richten, stellen keine Investition in die Wohnumfeldqualität dar und sind somit bei einem Stadtteilvergleich nicht relevant, da die Höhe der Zahlungen eine Wirkung, keine Ursache benachteiligter Stadtteile ist. Die Verteilung der Leistungsempfänger im Bereich Kosten der Unterkunft (KdU), dargestellt in Abb. 3 (links), entspricht dem Bild der Sozialstruktur der Stadt Trier. Die größten Anteile befinden sich in den drei Stadtteilen, die bereits

als Soziale-Stadt-Programmgebiete aufgenommen wurden. Ein weiteres Georeferenzierungs-Ergebnis aus dem Kultursektor, die Kunden der Statdtbibliothek, dargestellt in Abb. 3 (rechts), zeigt ein komplett anderes räumliches Muster. Bezogen auf die Einwohner insgesamt ergibt sich eine sehr heterogene Verteilung der Leserschaft im Stadtgebiet.

5 DATENANALYSEN UND KARTOGRAPHISCHE PRÄSENTATION

Mit den georeferenzierten Daten ist es möglich, einzelne Themen oder Kombinationen von Themen kartographisch darzustellen und auf verschiedene Bezugsgrößen zu beziehen. In diesem Kapitel werden theoretisch mögliche Analysen und für die Visualisierung jeweils geeignete kartographische Modellformen vorgestellt. In der im Ausblick erläuterten empirischen Untersuchung zur Wirksamkeit der kartographischen Präsentationen zur Entscheidungsunterstützung werden diese sowie der Freiheitsgrad der Interaktion als unabhängige Variablen genutzt.

5.1 Analysen

Methodisch gesehen kommen zwei Gruppen von Analysemethoden in Betracht. In dieser Arbeit werden neben strukturentdeckenden Verfahren des Spatial Data Minings strukturprüfende Verfahren eingesetzt. Beide können, je nach Fragestellung, die mit Hilfe der Geodaten beantwortet werden soll, neue Informationen über räumliche Zusammenhänge liefern.

Bei den strukturprüfenden Verfahren ist insbesondere die Regressionsanalyse von Bedeutung. Sie ermöglicht die statistische Auswertung signifikanter Zusammenhänge. Insbesondere eine räumliche Auswertung der Residuen einer Regressionsanalyse kann in Bezug auf räumliche Disparitäten aufschlussreich sein. Um zu überprüfen, ob es in einer Kommune Korrelationen zwischen den herkömmlichen Indikatoren sozialer Ungleichheit (s. Kap. 2.2) und der Verteilung von Finanzmitteln gibt, werden nicht alle georeferenzierbaren Finanzdaten benötigt. Sinnvoll ist an dieser Stelle nur die Verwendung der Daten, die zu einer Verbesserung der Stadtteilstruktur führen. Eine Einbeziehung der Daten, die keine Auswirkung auf das Wohnumfeld haben, wie die Leistungen der Sozial- und Jugendhilfe, würde aufgrund der hohen Korrelationen zwischen den Indikatoren Sozialer Ungleicheit und der Verteilung der Leistungsempfänger keine stringenten Ergebnisse liefern. Der Inhalt der Regressionsanalyse kann als mehrschichtige Karte dargestellt werden. Für die Residuen der Regressionsanalyse bietet sich eine Visualisierung als Choroplethenkarte an.

Spatial Data Mining stellt eine Erweiterung des allgemeineren Begriffs Data Mining um die räumliche Dimension dar. Data Mining wird in unterschiedlichen Zusammenhängen definiert. Bei MITRA/ACHARYA (2003) und MILLER/HAN (2001) finden sich Diskussionen der diversen Sichtweisen. In dieser Arbeit wird eine aus UMSTÄTTER (2005) und MAY (2004) abgeleitete Definition zugrunde gelegt. Demnach geht es darum, in umfangreichen, digital vorliegenden Datenbeständen, interessante, versteckte Muster mit Hilfe von zum Teil automatisierbaren Suchwerkzeugen durchzuführen. Mit Hilfe von Spatial Data Mining können neue Informationen zur Entscheidungsunterstützung bei räumlichen Fragestellungen generiert werden, ohne dass zuvor Hypothesen aufgestellt werden müssen. Als Analyseverfahren stehen z.B. Clusteranalysen und Klassifizierungsregeln zur Verfügung.

Merkmal	Zeithorizont	Raumbezugseinheit	Inhaltliche Bezugsgrößen	Aggregatfunktionen
Varianten	Plandaten 2009 Ist-Daten 2008	Standort Statistischer Bezirk Stadtbezirk Gesamtstadt	Einwohner Kinder Senioren Fläche Haushalte	Ohne Summe Mittelwert

Tab. 1: Varianten von Karteninhalten

5.2 Visualisierung: kartographische Modellformen

Die darzustellenden Karteninhalte können differenziert werden nach inhaltlichen Bezugsgrößen, Raumbezugseinheiten, Zeithorizont und Aggregatfunktionen. Die einzelnen Differenzierungsmerkmale und deren Ausprägungsvarianten stellt Tab.1 zusammen.

Zur Visualisierung der Ergebnisse werden verschiedene kartographische Modellformen (zum Begriff der Modellform siehe BOLLMANN (2010)), von anderen Autoren auch als Kartentypen bezeichnet, eingesetzt. Nachfolgend werden die wichtigsten, für GeoFinanzen relevanten Modellformen erläutert. Weitere Gliederungsformen kartographischer Darstellungen finden sich bei BBSR (2009).

5.2.1 Modellform Choroplethen

Choroplethendarstellungen werden gewählt, um Wertrelationen darzustellen. Als Bezugsgröße können dabei z.B. Fläche, Einwohner gesamt, Kinder, Senioren genutzt werden. Mit Hilfe der Choroplethendarstellung können Cluster sehr schnell visuell erfasst werden. Dies ist auch bei der Generierung sog. Hot-Spots mit Hilfe statistischer Berechnungsverfahren eine deutliche Hilfe bei der Interpretation der Ergebnisse. Abb. 3 nutzt die Choroplethenkarte zur Darstellung der Verteilung von Leistungsempfängern und Lesern.

5.2.2 Modellform Flächendiagramm

Bei der Modellform Flächendiagramm werden Diagramme in Flächen platziert. Diese Darstellungsform eignet sich insbesonders, wenn Absolutwerte als Datengrundlage genutzt werden. Mit Hilfe der Diagramme können zudem Daten mehrerer Jahre gegenüber gestellt und somit Veränderungen im Zeitablauf visualisiert werden. Die Dimensionen Raum und Zeit können somit gemeinsam in Entscheidungsprozesse einfließen.

5.2.3 Modellform Standortdiagramm

Bei der Modellform Standortdiagramm werden Diagramme nicht in Flächen platziert, sondern jeweils Punktobjekten zugeordnet. Diese Modellform ist in GeoFinanzen vorgesehen für die Informationsvermittlung von standortbezogenen Daten, die nicht aufgrund von Datenschutzbelangen aggregiert werden müssen. Hierzu gehören z.B. Daten aus dem Bereich des Bauens. Abb. 4 zeigt das Georeferenzierungs-Ergebnis der kommunalen Gebäudewirtschaft. Dargestellt sind die für 2009 geplanten Investitionen. Deutlich wird dabei die Konzentration der Maßnahmen im Innenstadtbereich, was v.a. auf die Häufung von Schulen in diesem Bereich zurück zu führen ist. Bei der Betrachtung von Investitionen und der Bewertung von deren räumlicher Verteilung muss darauf geachtet werden, dass sich, je nach Jahr der Investition, das räumliche Bild schnell ändern kann. Um strukturelle Defizite aufzuzeigen, wäre somit eine längerfristige Betrachtung, z.B. von Dekaden, sinnvoll. Aufgrund der Umstellung des Rechnungswesens von kameralem auf doppischen Haushalt ist für die Stadt Trier eine solche Dekadenbetrachtung jedoch derzeit nicht durchführbar.

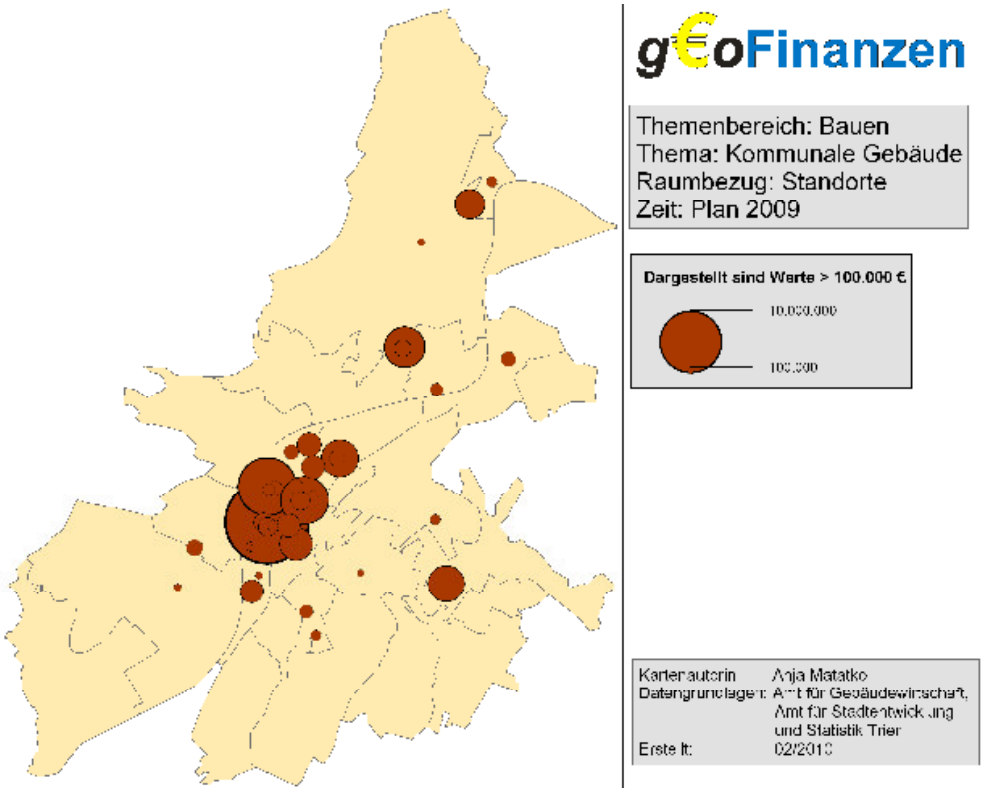

Abb. 4: Georeferenzierungs-Ergebnis Kommunale Gebäude Plan 2009

5.3 Einsatzbereiche von GeoFinanzen

Entsprechend der in Kapitel 2.3 vorgestellten kartographischen Handlungstheorie ergeben sich, unter Berücksichtigung der Ausführungen in Kapitel 3 und 4, zwei wesentliche Einsatzbereiche, in denen GeoFinanzen für Entscheidungsunterstützung sorgen kann.

5.3.1 Controlling

Verwaltungsintern sowie für die politischen Vertreter/-innen der Kommune kann GeoFinanzen im laufenden Haushaltsjahr als Controlling-Instrument genutzt werden. Technisch gesehen ist eine Anbindung der Finanzsoftware (SAP) an ein Georeferenzierungs-Tool mit interaktiver Kartenausgabe möglich. An Stelle des bisherigen Controllings, bei dem Plan- mit Ist-Werten verglichen werden, könnten so zudem die räumlichen Verteilungen der Ausgaben mit dem räumlichen Plan abgeglichen werden. Dann die Realisierungsquote eines kommunalen Haushalts liegt bei maximal 60%, weshalb selbst bei einer Planung, die keine Ungleichbehandlung vorsieht, aufgrund der Nicht-Realisierung zahlreicher Maßnahmen eine Schieflage bei der Verausgabung der Haushaltsmittel stattfinden kann.

5.3.2 Bürger-/Ratsinformation und Diskussionsplattform

Im Rahmen der Beteiligung von Bürger/-innen und Ratsmitgliedern müssen Informationen kommuniziert werden. GeoFinanzen bietet sich als räumliches Medium an, in dem komplexe Informationen visuell schnell erfasst werden können. Eine Steigerung zur reinen Mitteilung von Informationen stellt der Einsatz im Sinne einer Diskussionsplattform dar. Wie jede interaktive Kartenanwendung, könnten auch bei GeoFinanzen im Rahmen von web 2.0-Applikationen Funktionen der Rückmeldung und des Diskussionsaustausches vorgesehen werden. Es bietet sich an, neben der Darstellung der Haushaltsplanung dem Nutzer des Systems auch die Möglichkeit zu geben, Planwerte zu simulieren, um dadurch räumliche Veränderungen sichtbar machen zu können. Auch Bezugsgrößen (inhaltlicher und räumlicher Art) können ausgetauscht und dadurch neues Wissen generiert werden.

6 AUSBLICK

Bisher konnte im Rahmen des Forschungsvorhabens GeoFinanzen gezeigt werden, dass es prinzipiell möglich ist, Haushaltsdaten zu georeferenzieren und somit kartographisch aufbereiten zu können. Der Aufwand, der hierfür erforderlich ist, wird stark durch die bereits existierende Form der Datenerfassung innerhalb der Kommunalverwaltung bestimmt. Auch die Detailtiefe der einzelnen Leistungen im doppischen Haushalt stellt ein wichtiges Kriterium für die Georeferenzierbarkeit dar, da Sammelpositionen nicht oder nur mit Einschränkungen räumlich zugeordnet werden können.

Ziel von GeoFinanzen ist nicht, räumliche Disparitäten zu verhindern, sondern die Daten so aufzubereiten und zu präsentieren, dass die in die Entscheidungsprozesse involvierten Akteursgruppen in der Lage sind, entsprechend ihrer eigenen Meinung zur Frage des Für und Wider der Räumlichen Disparitäten Entscheidungen zu treffen. Daher wird in einem nächsten Schritt im Rahmen einer empirischen Untersuchung (im Sommer 2010) anhand der in diesem Beitrag dargestellten kartographischen Handlungsfelder untersucht, welche der möglichen Analysen und Präsentationsformen für welche Akteursgruppe an welcher Stelle im Entscheidungsprozess am besten geeignet sind, d.h., durch welche Unterstützungsform die räumlichen Informationen, die in einem Kommunalhaushalt enthalten sind, optimal an die kognitiven Prozesse der Informationsentnahme und –verarbeitung angepasst werden können. Bereits durchgeführte Expertengespräche mit Akteuren aus Politik und Verwaltung zeigen, dass das Interesse an einer transparenten, raumbezogenen Haushaltsdarstellung sehr groß ist.

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Googlization Factors of Saudi Eastern Province Virtual Cities. Factors Analysis of Eastern Province Virtual Cities

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1 ABSTRACT

Over the past urban areas evolves based on the human needs and the way they conduct their life activities. The agriculture era evolved the human settlements around the water and fertile lands. Then croup production and market start taking place within the settlement and re-shape its land uses.

The industrial revolution and car invention introduced industrial areas that evolved the transportation means and expanded the settlements size and changed its pattern. The human settlements become cities that have land use regulations, market mechanism, and civil infrastructure, political and environmental places.

These factors influenced the physical pattern of cities since then. On the last 20 years third evolution on emerged through Information Technology (IT) and starts showing their impact on means of human activities and consequently their settlements pattern. Various human activities used to be conducted by physical presence become attainable through virtual means. Consequently, urban areas have been influenced by the presence of IT and the policies governing it's penetration on the urban and regional level. This study attempts to study the phenomena of virtual cities in the Eastern Province in Saudi Arabia by relating their population size to their presence on the cyberspace.

Key words: Virtual cities, cyberspace, Saudi cities, Urban Information Technology, Eastern Province

2 SIGNIFICANCE OF THE STUDY

This study intended to provide new methods of analyzing cities virtual transformation through tracing its presence in the cyberspace. Furthermore, the study attempt to fill in a gap in the practical implementation on the Urban Planning practice in developing new tools relate the actual cities physical variation to their virtual cyber variation.

3 STUDY DESIGN AND METHODOLOGY

This part of the study dedicated to the study methodology which will lead to understanding the diffusion of Eastern Province cities in the cyberspace in relation to the cities size.

3.1 Study Methodology

The study used descriptive survey methodology and factor analysis as the goal of the study focus on exploring the phenomena of varies cities presence in the cyber space. The study intended to explore this phenomenon, its degree of presence and identify whether population is a determinant variable or not.

Factor analysis is frequently used to analyze and extract observation on the main factors that relates to the phenomena.

3.2 Study Population:

The study included all the cities of Eastern Province that has 15000 population or more, excluding two cities. These cities are Al-Thoqubah which is part of Al-Khubar and the indices related to it interchangeable with Al-Khubar. Second city is Al-Oyun which has show high interference in search engine from another city with the same name in Moraco. This will limit the study population with 25 cities which will be the cases studied against 9 variables as show in below matrix.

3.3 Data Collection and Variables:

The goal of this section is highlight the data collection methods and the 8 variables that will be used to explore virtual presence of each city. Each variable will be explained to introduce them as contemporary means of analyzing cities on the cyberspace.

3.3.1 Population:

This study assumes population is a determinant variable in the virtual presence of cities due to the city residence contribution to the internet content. The study will test this hypothesis against the presence of Eastern Province cities in the search engine by the level activities either provided by non-residence like news targeting the cities residence or by the citizen's interaction about their cities in the cyberspace.

3.3.2 Google Search Engine City Frequencies:

Among all the famous search engines Google is the only one has (.sa). At the same time Google is the highest visited search engine in Saudi Arabia. It is ranked the 3rd, 6th, 11th and 16th among the highly 46 websites visited in Saudi Arabia (CITC, 2009). The CITC (who is) records show the domain has been registered in 11-01-2004 with physical representation in Riyadh Saudi Arabia (CITC S. N., 2009). Hence, the Saudi Google is selected to be the search engine of this study as it is expected to provide more local content than others. On the search the restricted searches on the exact wording or phrase like "Dammam City". In addition, the Arabic language was the only language used in searching the cases. The search result appears against the researched case will be inputted in the Google search filed for the subject city. The result indicates the number of times the city has inputted in the web content and Google search engine where able to identify it.

3.3.3 Google Groups

Then similar steps with restricted search phrase like "Al-Dammam City" will be used for Google groups search. The presence of the city name on the groups search engine represents an individual interaction about the city mainly from people living in the city or people targeting cities residence. It can be considered as the interaction of the residence in the physical space through the cyberspace. This represents a duality of interaction and substitution to the face to face interaction.

3.3.4 Google Blogs Search

Similar to the groups however it differ in the mean of interaction which is based on an individual more than a group that allow individual broadcast his ideas and thoughts. It is a kind of an individual expressing himself and interests to others. This virtual media can be considered as leverage of individual to communicate to others reflecting their virtual or physical activities on the cyberspace.

3.3.5 Google Images Search

Another side of Google search engine however, it focuses only on the images about the city and their residence activities. It provides more focus representation of the duality between physical virtual. This web content take pieces of the cities and their residence activities to the cyberspace.

3.3.6 YouTube Search

Represent a transfer of interaction of cities residence from face to face story telling or events attending to virtual means. This interaction delimited the time as it can be seen at any time and distance as it can be watched of being online at any physical space. During the data collection it was clearly observed that these virtual activities are merely individuals not institutes or business.

3.3.7 FaceBook Groups, People and Events

Facebook allows different individuals and groups to network with other users who can join each other networks. It also allows privacy settings on basis of networks. Groups are used for discussions and events etc. Groups are a way of enabling a number of people to come together online to share information and discuss specific subjects. While, Facebook events are a way for members to let friends know about upcoming events in their community and to organize social gatherings in relation to their physical content.

3.4 Study Cases and Variables

The following table show a matrix of the studded cities ranked according to the population size. The matrix indicates the raw data before applying the correlation factors and indicates only frequencies. On simple stastsics the indication show lead to large city population indicates higher we content.

Case Number	City	Population	Google Search	Google Groups	Blog Search	Images	YouTube	Facebook Groups	Facebook People	Facebook Events
1	Al-Dammam	744321	89200	9990	6648	10600	1130	66	68	16
2	Al-Hafouf	287841	40400	1210	477	3700	163	7	19	0
3	Al-Mubaraz	287841	25200	500	285	2530	83	3	20	0
4	Hafr Al-Batin	231978	722000	1860	109	1520	131	8	2	0
5	Al-Jubail	222544	58500	7860	3057	7130	290	18	69	0
6	Al-Khubar	165799	65000	10100	5232	10100	145	52	224	21
7	Al-Qatif	98278	34700	1420	505	728	2270	43	68	0
8	Al-Dhahran	97446	169000	1190	396	2010	163	7	30	20
9	Tarout	80686	3860	266	32	307	229	2	7	0
10	Sehat	66038	24300	1050	441	2540	590	3	13	0
11	Al-Khafji	54464	16200	449	232	1640	123	1	10	0
12	Safwa	45202	22300	994	5899	2730	734	8	9	0
13	Ras Tanoura	41458	132000	466	39	475	13	0	0	0
14	Abqaiq	29631	5390	196	43	239	80	1	1	0
15	Al-Awamiah	25279	10800	320	162	684	648	4	8	0
16	Al-Qoudaih	25269	594	21	7	287	205	2	2	0
17	Anak	21159	5000	296	59	521	2	0	0	0
18	Al-Taraf	21004	18700	134	13	416	10	0	0	0
19	Al-Nouria	20964	1340	75	29	597	140	0	0	0
20	Al-Qaismah	20316	6290	75	58	218	16	0	0	0
21	Al-Halilah	16666	8	1	0	369	0	0	0	0
22	Al-Bataliah	16310	4	0	0	474	0	0	0	0
23	Al-Mizalah	16005	2	0	0	4	0	0	0	0
24	Al-Omran	15436	98200	352	180	612	7	0	0	0
25	Um Al-	15041	419	7	1	47	0	0	0	0

Table 3.1 STUDY Cases and Variables Matrix

		Population	GSearch	G Groups	Blog Search	Images	Youtube	FacebookGrp	FacebookPpl	FacebookEvt
Correlation	Population	1.000	.404	.668	.418	.699	.279	.611	.500	.402
	GSearch	.404	1.000	.206	.048	.169	.000	.141	.094	.232
	G Groups	.668	.206	1.000	.654	.955	.186	.802	.902	.618
	Blog Search	.418	.048	.654	1.000	.749	.318	.578	.571	.375
	Images	.699	.169	.955	.749	1.000	.192	.743	.857	.627
	Youtube	.279	.000	.186	.318	.192	1.000	.631	.299	.012
	FacebookGrp	.611	.141	.802	.578	.743	.631	1.000	.884	.556
	FacebookPpl	.500	.094	.902	.571	.857	.299	.884	1.000	.702
	FacebookEvt	.402	.232	.618	.375	.627	.012	.556	.702	1.000
Sig. (1-tailed)	Population		.000	.000	.000	.000	.000	.000	.000	.000
	GSearch	.000		.000	.183	.001	.495	.004	.039	.000
	G Groups	.000	.000		.000	.000	.000	.000	.000	.000
	Blog Search	.000	.183	.000		.000	.000	.000	.000	.000
	Images	.000	.001	.000	.000		.000	.000	.000	.000
	Youtube	.000	.495	.000	.000	.000		.000	.000	.409
	FacebookGrp	.000	.004	.000	.000	.000	.000		.000	.000
	FacebookPpl	.000	.039	.000	.000	.000	.000	.000		.000
	FacebookEvt	.000	.000	.000	.000	.000	.409	.000	.000	

Table 3.2 Correlation matrix, Determinant = 1.37E-005 which is 0.0000137

3.5 Populating the Correlation Matrix

The correlation matrix below show the top half of the table contains Pearson correlation coefficient between all pairs of variables whereas the bottom half contains the one-tailed significance of the coefficients. This matrix will be used to check the pattern of relationships. Fist, the significance value of the majority values is less than 0.05 in exceptions to three relations which are blog search with Google search, YouTube with

Google Search and face book with YouTube. The second verification will be by scanning the correlation coefficients which should be less than 0.9. This found only in one relation between Images and Google search. Finally since the determinant value is 0.0000137 which is slightly greater than the necessary value of 0.00001, the multicollinearity is not a problem for the collected data. Based on the three verification factors, the variables in the above correlation matrix correlate fairly well. And only one of the correlations is slightly large. Therefore, there is no need to consider eliminating any variable at this stage.

On the KMO and Bartlett's Test, a value close to one indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors. Furthermore, values greater than 0.5 are acceptable (Kaiser, 1974), it has be described as mediocre value which ranged between 05 and 0.7 (Hutcheson and Sofroniou, 1999). For the eastern province cities cyber data the value is 0.578, which fall in the range of mentioned earlier. Based on that factor analysis is appropriate for these data. Likewise, Bartlett's measure the significance value less than 0.05 and therefore factor analysis is appropriate.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.578
Bartlett's Test of Sphericity	Approx. Chi-Square	3.932E3
	df	36
	Sig.	.000

Table 3.3 KMO and Bartlett's Test

3.6 Factors Extraction

Three factors are extracted before extraction, after extraction and after rotation. Before extraction identified 9 linear components within the data set which are the originally entered variables. Whereas factor 1 in the initial eigenvalues and after extraction, explains the variance by 58% with 83% cumulative with second factors. While first factor explains 51% of the variance with 83.1% cumulative with the other two factors. The significant finding of the matrix above is that the first factor considered the most important as it explains the variance by 51% in the rotation loadings.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.217	57.967	57.967	5.217	57.967	57.967	4.563	50.695	50.695
2	1.222	13.580	71.548	1.222	13.580	71.548	1.553	17.257	67.953
3	1.039	11.546	83.094	1.039	11.546	83.094	1.363	15.141	83.094
Extraction Method: Principal Component Analysis.									

Table 3.4 Total Variance Explained

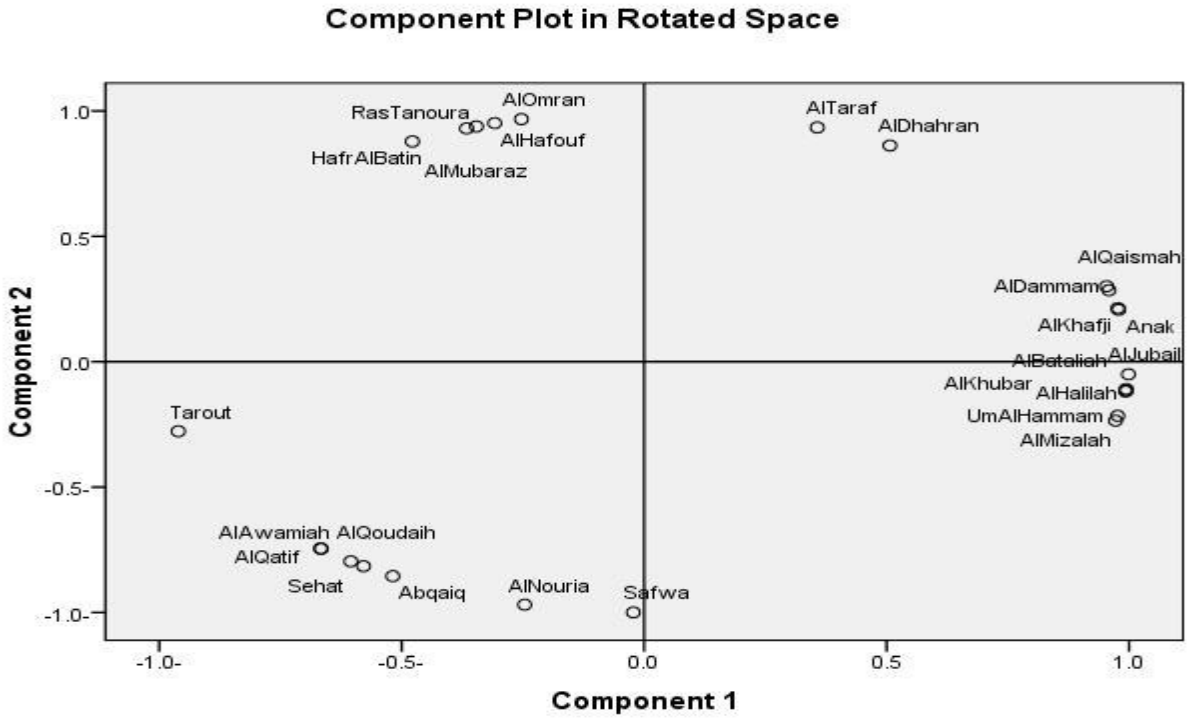
3.7 Rotated Variables Component Matrix:

The below table show the rotated factor matrix which represent the factor loadings for each variable onto each factor. It is important to note that loading less than 0.4 have not been displayed because it has been suppressed. In addition, the output has been set in SPSS to be sorted by size.

	Component		
	1	2	3
Google Images	.939		
Google Groups	.932		
FaceBook People	.920		
FaceBook Events	.772		
FaceBook Groups	.753	.573	
Blog Search	.703		
YouTube		.968	
Google Search			.949
Population	.548		.580
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 4 iterations.			

Table 3.5 Rotated Component Matrixes

The above matrix indicates there are three factors affect the diffusion of cities in the cyberspace. The variables that load highly on factor 1 seem to all related to citizens interaction in the cyberspaces as substitution to the face-to-face physical interaction. It should be noted that, population has the least loading which indicates the less relevance of population size to the city cyber presence. Only to variables load to factor 2 which are YouTube and face book groups. While Google search and population load highly in factor 3 with less load value for population. These phenomena re-enforce the low relevance between city population and its cyber presence.



4 CITIES RANKING ACCORDING TO THEIR VIRTUAL PRESENCE

This stage of the study identifies the ranking of eastern province cities according to their virtual presence in relation to Factor 1 and 2. It clearly indicates that city size is not a significant factor on cities virtual presence. However, the virtual activities that relates to cities residence interaction are determinant factors in cities variations. The figure below indicate that cities that has high ranking scores in relation to Factor 1 in which Jubal tightly attached to highest score of factor 1.

This highlights the virtual cities equalities differ in the cyber space from the actual space. Various causes might lead to like distance viruses virtual interaction and cities human capital contrition to the web content. Despite the time limitation of this study, it shades light on new diminution in analyzing urban phenomena of actual cities from their virtual peripheries in the cyberspace.

	Component	
	1	2
AlJubail	.999	
AlBataliah	.994	
AlHalilah	.993	
AlKhubar	.993	
Anak	.978	
AlKhafji	.977	
UmAlHammam	.976	
AlMizalah	.972	
Tarout	-.961-	
AlQaismah	.959	
AlDammam	.954	
Safwa		-1.000-
AlNouria		-.969-
AlOmran		.967
AlHafouf		.951
AlMubaraz		.938
AlTaraf		.934
RasTanoura		.930
HafrAlBatin	-.478-	.878
AlDhahran	.507	.862
Abqaiq	-.518-	-.855-
AlQoudaih	-.579-	-.815-
Sehat	-.605-	-.796-
AlQatif	-.666-	-.746-
AlAwamiah	-.668-	-.745-
Extraction Method: Principal Component Analysis.		
Rotation converged in 3 iterations.		

Table 4.1 Cities Rotated Component Matrix

5 CONCLUSION

This study attempted to study the phenomena of virtual cities in the Eastern Province in Saudi Arabia by relating their population size to their presence on the cyberspace. We explored the virtual presence of cities in the cyber space to indicate the significance of their cyber presence in relation to their population size.

Factors related to residence interaction in the cyberspaces as substitution to the face-to-face physical interaction seem to be the main determent in cities virtual presence. The statistical analysis indicates that the hypothesis of population is a determinant variable in the virtual presence of cities due to the city residence contribution to the internet content is rejected.

The significance appears by the virtual activities of the city residence that relates to cities residence interaction are determinant factors in cities variations. This highlights the virtual cities equalities differ in the

cyber space from the actual space. Despite the time limitation of this study, it shades light on new diminution in analyzing urban phenomena of actual cities from their virtual peripheries in the cyberspace.

It is suggested that researchers start seeking new methods in analyzing cities on the regional level by measuring the residence physical activities in relation to their virtual activities. The virtual activities of cities residence can be used as enablers of development and should be leveraged as emerging resources in regional development.

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reviewed paper

Improving intermodal transport with a focus on long distance: Selected findings from LINK –the European Forum on Intermodal Passenger Travel

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1 ABSTRACT

Intermodality, which describes both a quality of the transport system and a policy objective, has evolved over the recent years into a key word for the European transport policy and also some national transport policies. However, whereas intermodality in freight transport is being promoted with concrete support and initiatives on national and European level (e.g. Marco Polo programme), it has not yet received the same attention in the passenger sector.

The LINK project has created a European Forum on Intermodal Passenger Travel in order to enhance the combined use of different transport modes on a single journey. The project - launched in April 2007 - is funded by the European Commission (DG Energy and Transport) within the 6th Framework Programme. The intention is to sustain this platform after the 3 years funding period[1].

The LINK Forum puts the focus on long distance passenger transport[2] but including the "first and last mile". While urban intermodality has been made a topic in many initiatives, so far the long distance dimension, often also border-crossing, has not been sufficiently addressed. Trips over long distances only have a small market share in terms of total trips but account for a remarkable share of person-km[3]. They are of significance due to their economic importance, their high ecological impact and their above average rate of growth (mainly due to the development of low cost airlines).

Within the LINK project different thematic working groups of experts from across Europe developed the basis for recommendations on selected key challenges which should be tackled in order to enhance significantly intermodal transport. The recommendations target policy making as well as practical implementation on European and also on national level and refer to various fields of intervention.

2 PULL & PUSH STRATEGY FOR BUSINESS TRIPS

Making LINK's findings concrete, a strategy about the segment of business trips and job related mobility will be explained more in detail: its driving forces and context conditions, related to recommendable improvements on the one hand, and concepts for concrete measures for travellers on the other hand, mostly bridging the not sufficiently integrated long distance elements of intermodal trip chains.

The objective is to reduce monomodal car use for business trips and achieving a shift towards inter- and multimodality by calling upon companies' corporate social responsibility and by taking 'soft policy' actions to influence the regime of business trips within companies and institutions (pull factor). An important complementary lever to create supporting framework conditions is taxation regulation for company cars and reimbursement rules for (private) car use for business trips (push factor).

2.1 Relevance of the business travel segment

Constant car availability can be considered as one of the strongest reasons for habitual car use. Once established, behavioural habits are not easy to change[4]. Under these circumstances, no active choice between different transport modes can be expected. So the opportunities for fostering intermodality are further reduced. Car-based business mobility requires much less organisational effort than multi- and intermodal

[1]More information about the project: cf. Hoenninger 2008 and the project website www.LINKforum.eu

[2]Refering to trips of length >100 km (KITE), but neglecting the difference between network distance and crow-fly distance (average detour factor in some European countires: 1.3; KITE). Although intercontinental travel is not excluded in principle, it is not in the focus either.

[3]The survey on long distance travel in Germany (INVERMO) comes to the summary for the according market or travel behaviour "few are travelling a lot" (50% of long distance journey made by 10% of the population >14 years; Zumkeller et al. 2005: 72f).

[4]There are sufficient research results highlighting the importance of car-ownership and (permanent/ often) car-access for a car-oriented transport behaviour.

mobility[5], thus needs organisational support, which can be wrapped in the comprehensive approach of mobility management.

Business trips are understood as all trips made by employees or free-lancers of a company or (public) institution, which have the purpose to perform activities on behalf of the employer (i.e. regular commuting trips to/from the workplaces are not included).

Business trips account for a remarkable share of the transport market[6], and they show an increasing tendency[7]. In Germany, for example, 17% of all long distance trips (>100 km) are business trips (average 1.3 business trips per person and year). They are made by 12% of the population (>14 years) which actually makes long distance trips (INVERMO study; Zumkeller et al. 2002). Business trips in general have increased in the last decades by number, but more significantly by distance[8]. The majority of business trips are made by jobholders, and mostly by those with permanent access to a car. This is corresponding with the different opportunities to somehow "officially" use a car for business purpose, which makes a share of 1/5 of all registered motorised passenger vehicles (see table 1). In addition to the existing fleet, a major share of new cars is registered for business purpose or by businesses[9]. Controlling these will effectively affect the fleet as a whole.

type of usage / *type of registration*	private only	private + business	business only
private car	78,3 %	15,1 %	0,5%
company car (free-lancer)	0,2%	1,7 %	0,0%
company car (employer)	1,2 %	1,9 %	0,5%

Table 1: Cars in Germany by type of registration and usage (INVERMO 2005)

Next to the share it has to be pointed out that business trips follow other "rules" than trips for private purposes or trips by privately owned cars, mainly due to possibilities for tax relief. Financial instruments and their reform have indirect, but massive impact on the transport behaviour (modal choice), but are even more relevant on the strategic level concerning car ownership. Next to the ease of car purchase there is a nexus to the dual usage of company cars for private purposes: Fuel is often paid by the company. Taxation makes this appealing both for the company/employer and the beneficiary, whereas car-alternative modes partially have unequal, less favourable conditions. Taxation policy is thus very relevant for achieving strategic political objectives. In particular the EU objective on mitigation of CO2 has to be mentioned (reduction of CO2 emission in new cars 2008-2010 to 120 g/km with regard to the Kyoto objective)[10].

In addition to taxation and financial aspects, the modal choice is driven by the reputation of car drivers ("big cars = prosperity"). This recommends breaking up the circle of favourable taxation for "big" cars with high emissions and the degree of incentives and additional tax benefit for employees (business travellers).

2.2 The Concept

The recommendation is a complementary pull and push strategy to increase the share of and the market demand for inter- and multimodal business trips. Currently, long distance business trips are predominantly

[5]A company car offers permanent mobility with "flat rate" costs in contrast to the effort (transaction costs) to buy a train ticket - as backbone - and additional services (e.g. ticket for local public transport).

[6]An overview for some European countries is given by the FP6 project KITE (Knowledge Base for Intermodal Passenger Travel in Europe), see www.KITE-project.eu, particularly Collet/Kuhnimhof 2008. A close exchange between the networking and policy centrered project LINK and the more research oriented project KITE was given within the partial parallel duration.

[7]Increase of number of business trips 2004-2007 by 14% (companies and public institutions with ≥10 employees in Germany; VDR 2008)

[8]1982 - 2002: increase of trips by 14 %, increase of distances by 2 Million pkm or by 50 % (Germany-wide survey MID 2002; own calculation)

[9]In Germany (2007): 62% (Kraftfahrt-Bundesamt); 50-70% of new car sales in UK; high market shares also in The Netherlands and Sweden (OECD/ITF 2008, p. 13).

[10]A reform of the taxation related to car-use and car ownership - not only for business purposes - is an issue on European scale (e.g. EC 2002, EC 2005, TNO 2006), but also for initiatives on national level (FÖS 2008).

monomodal trips by car[11]. The recommendation aims firstly at reducing monomodal car-usage by suitable intermodal offers within a mobility management approach and secondly at changing the vehicle fleet for the still necessary business trips (company car) by taxation. In particular the segment of short long-distance trips (100-400 km crow fly trip length) needs more attention, as it offers a high potential for intermodality. Furthermore, the market segment of long or intercontinental trips is not directly put in the focus as the modal choice leads to aviation "by nature". However, the use of other modes to the airplane comes back to intermodal issues. Resrach covering business trips made by plane seems to focus solely or too much on the long distance leg (e.g. Beaverstock et al. 2009). Concenring intermodal long distance travel, in particular the air-rail combination (especially high-speed rail) attracted much attention from both research and policy making[12], whereas other modes are taken for granted.

There are factors that restrict the potential shift from car to other modes. Beside subjective attitudes, the purpose of a trip and the related luggage transport can be limiting factors[13]. Therefore, service branches (consulting, customer training, R&D) are best suited for intermodal travel as they often have to carry only portable computers, paper/print material but no heavy tools and machines.

2.2.1 Pull-factor Mobility Management

Companies and institutions elaborate and implement the pull-factor. Given their role as employers they are the relevant decision-makers concerning business trips by travel management[14] and, if existing, fleet management policies as travel decisions are made to a larger extent not by the traveller him- or herself compared to other purposes. Decision-makers have the opportunity to support sustainable mobility by corresponding rules for business travel[15] within a broader corporate social responsibility (CSR) policy. Public institutions have a particular role as travel directives of companies are often following them. Organising business trips should consider more often alternatives to the car[16]. Mobility management aims at fostering car-alternative modes and at influencing attitudes and behaviour towards sustainable and inter-/ multimodal travelling on business trips. Currently, mobility management is applied primarily on a site-based or local level[17]. But it can and should be extended to long distance (business) trips. Benefits can be both direct (e.g. financial[18]) and indirect (societal) benefits[19]. Its acceptance can be improved by demonstrating the benefits, in particular possible saving both for employers and employees.

Mobility management requires making companies and institutions aware that they are part of the transport system. The general idea is to better match the supply and the demand side with the aim to improve the conditions for the users of transport system and at same time increase the yield impacts of providers (e.g. increased demand for services). In order to achieve a shift towards inter-/ multimodality, suitable services for business trips have to be further developed[20]. The need for improvement particularly for business trips is highlighted by a study which assessed – amongst other aspects – the usage of transport services by trip purpose in Germany (Eck/Starck 2007). It resulted in worse ratings for long distance trips for business purpose and for commuting including educational purpose in contrast to shorter trips (see table 2). The

[11]In Germany, 76% of the long-distance business trips (>100 km) are made by car, 12% by rail, 9% by plane (INVERMO 2005).
A state of the art review of transport research concerning business trips found, at least for Germany, only little empirically based knowledge (Sauter-Servaes 2007).

[12]The European Commission launched e.g. the Rail Air Intermodality Facilitation Forum (RAIFF). One of many studies on this modal combination: Bozzani/L'Hostis 2006.

[13]In Germany, a study by DLR examined in-depth the circumstances and constraints and revealed that the car-use is higher the smaller the company is in terms of numbers of employees (Menge/Hebes 2008).

[14]Car policy is the according instrument reflecting the narrow perspective, determining company car use e.g., the car category for each level of hierarchy or level of incentive. An example for special journals showing the technical way of thinking in this sector is the German journal "Flottenmanagement" (www.flottenmanagement-verlag.de).

[15]In Germany, 90% of all companies have a company travel directive; the average in Europe is 75% (VDR 2008).

[16]In Germany, 18 % of the long distance business trips are resulting on considering other modes than the one chosen on a reporting day (average: 13 %; INVERMO study – Zumkeller et al. 2005).

[17]Numerous projects have been fostering MM; one of the most recent projects on European level was the project "MAX Successful Travel Awareness Campaigns and Mobility Management Strategies" (www.max-success.eu).

[18] > 50% of the costs for business trips are those for transport (example Germany, data 2006/2007, VDR 2008).

[19]Referring to the concept of CSR which is often embedded in Eco-Management and Audit Schemes (EMAS). The toolkit of the alternative German transport association VCD has been developed with this background.

[20]The relevance of improving services including their reputation is shown by the result of a survey assessing the quality of business trips >100 km in Germany (Nordlight research 2007; N=500) which rates rail worst in contrast to car and airlines (excellent & very good: rail 23%, car 45%, air 51%).

relevance of improving services including their reputation is also shown by the result of a survey assessing the quality of business trips >100 km in Germany (Nordlight research 2007; N=500) which rates rail worst in contrast to car and airlines (excellent & very good: rail 23%, car 45%, air 51%).

[N=2500]	commuting, education	business	leisure	vacation	shopping
within city	69%	59%	67%	-	70%
within region <100 km	62%	58%	62%	59%	62%
domestic >100 km	47%	50%	62%	59%	-
abroad	42%	43%	56%	58%	-

Table 2: share of respondents assessing usage of transport services good or very good (regardless mode) (Eck/Starck 2007)

Approaching transport services for business trips must not exclude car-based services. Car-sharing fills the gap between owning and occasionally using a car, but further efforts to meet the needs of business travellers are required in order to gain momentum[21]. Various offers have been developed targeting business travellers such as lounges at major railway stations, WLAN hot spots in stations and on board of trains, corporate portals of national railways, special advertisement. This shows that the needs of this target group are reflected by different operators and vendors. However, a wider thinking is required in order to adapt and improve suitable transport services that offer alternatives to monomodal car-use[22]. Mobility management for business trips can only enfold its potential if the relevant players are involved, i.e. particularly the national railway companies and suitable transport service providers. Associations like chambers of commerce, business associations, but also user associations, which are influencing companies by expertise and advice, can be involved in implementation[23].

A particular segment are business trips to business related events. Numerous events take place in cities, different in size (number of visitors), timing and duration, location, frequency, etc. A large number is dedicated to business purpose (e.g. fairs, conferences), some for both the public and businesses. For many visitors an event is often related to travelling to an unkown or only little known environment with a high demand for information, usually combined with high time constraints. The objective thus is to offer integrated low-thresholds services, which are perceived by visitors as pleasant, easy, fast, cheap and door-to-door and best appear as an integral part of event information and not as a separate information channel. Incentives for the intermodal journey should be included (e.g. receptions for businesses as “add-on” to the event), same personalised profiles of the traveller. It seems too early to predict the impacts of ICT based social (peer) networking tools like facebook, XING, linkedin on the further development of business vents, but already now a trend can be observed towards more relevance of informal networking in contrast to formalised presentations. Furthermore, booking of integrated packages of travel services, including the long distance trip chain, access to the event and to local transport (vouchers for public transport, taxi, public bikes etc.) are to be seen as promising offers. On a non-transport related level it can be said that supporting long distance travellers improves the event’s image and can be part of city marketing strategies.

Integrated mobility and event offers can actually be found, but so far often include very only limited information (e.g. airport connections) and even less ticketing options. Event visitors still have to make remarkable effort (e.g. visit several websites) to work out intermodal options if they do not chose comfortable monomodal car journey.

It is necessary to create forms of cooperation between the relavent stakeholders, from both the local and the long distance transport sector as well as from the side of event providers and additional parties (tourism industry). Expanding existing approaches of mobility management on the long distance target group of

[21]The Swiss car-sharing provider Mobility offers a variety of car types by a broad network of about 1200 terminals all over the country. The close cooperation with public transport associations (e.g. Zurich Region) results in appealing tariffs for users and raises the awareness for the offers vices versa.

[22]Flexible choice for business trips is offered in the Netherlands by the mobility card ‘Mobility Mixx’, which can be used for train, parking space at the railway station, ‘OV-fiets’ rental and the ‘train-taxi’. Private use is possible, but has to be taxed (employer has to monitor this). www.mobilitymixx.nl is a daughter company of a large car lease company, offering also comprehensive and tailor-made travel management.

[23]A good example in this respect is the toolkit of the transport user association VCD in Germany (VCD 2008).

business events seems promising as it requires "just" much more organisational effort than investment in technical issues. However, the question of purchasing remains open; different sales points (e.g. for long distance "leg", local transport, accommodation) may reduce the impact of joint information provision.

2.2.2 Push-factor taxation

On the "push-side", taxation concerning company cars can be a strong lever contributing on the one hand to multi- and intermodality and on the other hand to environmental objectives such as reducing CO2 emissions in the transport sector. The taxation of passenger cars should be re-designed in order to favour low emission cars, to treat all transport mode equally and to not support habitual car use. The rationale is that cars with (remarkably) less emissions and thus less fuel consumption compared to nowadays are a good chance to decouple prestige and incentive effects of (big) cars[24] and to introduce intermodal services according to the actual needs. This initiative includes essentially the free provision of fuel - often used also for trips for private purpose, and the according taxation. Often, provision of a company car and free fuel is more favourable for employees comparing to "normal" income (salary) in terms of taxation or contribution to social assurance.

National states governments elaborate and implement the push-factor taxation, as they are responsible for taxation. Nevertheless, the EU should try to influence national taxation to green company cars or a reform of car-related taxation. In terms of instruments it seems not appropriate to aim at launching a European directive with a long, difficult and open process without neglecting this strong instrument[25]. It is seen most promising to influence national policy-makers by clear recommendations on this complex issue. This includes highlighting the impacts of this lever, demonstrated by the forward-looking Member States.

2.2.3 Examples

The taxation of company cars in the UK is a role model for a change of the according policy: The benefit in money's worth for the private use of company cars is depending on the CO2 emission. The tax rate for petrol cars ranged from 15% of the list price for low emission cars (<140 g/ km) up to 35% for high emission cars (>240 g/ km). Diesel cars pay a 3% supplement to reflect local air quality emissions. This change of taxation policy resulted in the reduction of the number of company cars by 25% within 4 years[26]. Although an increase of use of private cars for business purpose has been observed, this is only partially compensation.

Additionally, in 2003 the company car tax fuel benefit charge was reformed. As consequence it can be observed that the proportion of company car drivers receiving free employer provided fuel for private use has also decreased significantly from 57% in 1997 to around 30% in 2005.

In contrast, the conditions in Germany are favourable for monomodal car-use: Taxation for private use of a company car does not take the actual fuel consumption or emission into account ("flat rate tax": 1% per month of the purchase price according to an official list, plus 0.03% of this value per km). This is similar to the company car tax system in the UK prior to April 2002 which encouraged employees to drive more business miles than they otherwise would have.

2.2.4 Discussion of implementation

The practical steps toward inter-/multimodality in companies and institutions need to be supported by "soft" measures which foster a modal shift from the monomodal car use.

Regulation concerning the usage of company cars is made on national level (legislation), but can and should be fostered by the EU by promoting convincing examples such as the British system and its financial and environmental benefits.

Within the LINK project, a consultation of stakeholders on LINK recommendations has been conducted. The overall agreement of about 200 stakeholders who took part resulted much more in agreement (79%) than disagreement (21%).

[24] In Germany, the average purchase cost of a company cars for CEOs is about 60 000 €, for the next management level about 44 000 € (Kienbaum 2008).
[25] Particularly the states with a strong lobby of car manufacturing industries (Germany, France) are very likely to oppose such an attempt.
[26] The number of company cars in UK was reduced to around 1.2 million in 2005 compared with around 1.6 million in 2001 (source: HMRC 2006).

Concnering the feasibility of this strategy it can be said that at the level of multiplicators strategic CSR and mobility management can rather easily be implemented, although it hast o be seen as a permanent task, which should be part of the corprate management.

The desired change of regulation should follow the existing examples of taxation like in UK, but will have to face political difficulties[27], i.e. strong counteract by car industry. A crucial open question is the application on existing fleets or just on new vehicles, which seems much more likley. The complexity of the recommendation is reflected in the results of the consultation, that the feasibility would be difficult (43%). Only a minority thought it could be done easily (18%).

The impact of this context condition is considered high due to the multiplier effect on companies and institutions. Changes need to be published (transparent reasons, easily to understand). In the consultation, a bit more than half of the stakeholders (55%) believed that this recommendation is crucial for enhancing intermodality (in contrast: 41% irrelevant or low, 4% counterproductive).

The timing for implementation depends on the political situation. The consultation resulted in almost equally 1/3 for short term implementation (<3 years), 1/3 medium term (3-5 years) and 1/3 longer term implementation (>5 years).

3 CONCLUSION

Intermodality is both a concept which receives too little attention by the stakeholders relevant for developing according services and by the travellers. The market segment of business trips and target group of business travellers respectively deserve being put more in the centre of reflections and efforts in order to serve by services offers which successfully tackle the inherent challenge to “get them out of the car”. But the market success depends on in how far these services are perceived suitable and convincing. Learing from decades of integrated transport planning (i.e. integrating all relevant field of intervention) it can be concluded that only a joint approach of “carrot and stick” can achieve the “old” objective of modal shift. Despite the concept of mobility management is well tested on local scale, also for the and together with companies and employers, it needs much effort in terms of organisation and powerful drivers (including figureheads) to enlarge it to long distance business travelling. The complex interrelation between car taxation and car use is perhaps outbalanced by the political implementation. But this lever is too strong to leave it out.

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🏆 *reviewed paper*

Innenstädte für alle: Visualisierung und Simulation zur Qualifizierung des innerstädtischen Entwurfs

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1 KURZFASSUNG

Die Revitalisierung der Innenstädte als den zentral gelegenen Teilräumen im städtischen Gesamtgefüge stellt eine der wesentlichen Zukunftsaufgaben der Stadtplanung dar. In den vergangenen Jahrzehnten fand ein tiefgreifender Bedeutungsverlust der Innenstädte als Zentren des Handels, der Kultur sowie des gesellschaftlichen Lebens statt, wodurch diese nicht mehr als Orte der Identifikation erkennbar sind, die eine Stadt nach Innen und Außen prägen und die das Image einer ganzen Stadt maßgeblich beeinflussen.

Die Herausforderung, die Innenstädte im Sinne der nachhaltigen europäischen Stadt als identitätsstiftende, urbane Zentren mit einem hohen Grad an Nutzungsmischung zu Revitalisieren, bringt eine große Zahl an zu berücksichtigenden Variablen mit sich, die untereinander in engen Wechselbeziehungen stehen. Vor diesem Hintergrund muss sich der Planende zur besseren Beurteilung und Einschätzung der gegebenen Rahmenbedingungen sowie der zu erwartenden Entwicklungen ein umfassendes Bild der Situation in den jeweiligen innerstädtischen Bereichen machen können. Hieraus ergibt sich neben der Notwendigkeit zur Darstellung der Rahmenbedingungen auch die Notwendigkeit zur fortlaufenden Visualisierung räumlicher Prozesse durch Simulation der städtischen Dynamik.

Auf dem Weg zu neuen Innenstädten als den Herzen von lebenswerten, gesunden und prosperierenden Städten liegen die Chancen im optimalen Einsatz sowie der zielführenden Weiterentwicklung bestehender Methoden und Anwendungen zur Darstellung der komplexen Rahmenbedingungen sowie zur Simulation räumlicher Prozesse und zukünftiger Entwicklungszustände im Kontext des innerstädtischen Entwurfsprozesses. Hierbei ist es zunächst von wesentlicher Bedeutung, die Ansatzpunkte zur Qualifizierung des Entwurfsprozesses zu identifizieren und daraus Handlungsfelder zum Einsatz von Techniken der Visualisierung und Simulation zu definieren.

2 EINLEITUNG

Im Rahmen der Schaffung von lebenswerten, gesunden und prosperierenden STÄDTEN FÜR ALLE sowie der Erhaltung deren Funktion als Zentren von Wirtschaft, Kultur, Kreativität, Wissenschaft und Innovation müssen die innerstädtischen Bereiche im Mittelpunkt allen planerischen Handelns stehen.

Innenstädte bilden seit jeher den räumlichen und funktionalen Kern der Städte aus, sind Konzentrationspunkte des gesellschaftlichen Lebens sowie hochrangiger zentraler Funktionen, deren Bedeutungsüberhang sich auch baulich durch hohe Dichten sowie prägende Stadtstrukturen, Gebäude und öffentliche Räume manifestiert (Ministerium des Innern und für Sport RLP [2006a]; S.10ff). In den vergangenen 30 Jahren haben jedoch tiefgreifende Veränderungen stattgefunden, die diesem Bild von der Innenstadt als unverwechselbarem und unersetzbarem urbanen Zentrum der Stadt entgegenstehen. Anhaltende Abwanderung von Wohnbevölkerung sowie weiterer charakteristisch innerstädtischer Nutzungen einhergehend mit der einseitigen Konzentration auf die Ansiedlung von Einzelhandelsbetrieben brachte eine Austauschbarkeit und Beliebigkeit der innerstädtischen Bereiche mit sich, das urbane Leben verschwand. Besonders stark vollzog sich die Abwanderung der Wohnbevölkerung in den Fußgängerzonen sowie den unmittelbar angrenzenden Bereichen, was zu starker Monofunktionalität und dadurch besonderer Krisenanfälligkeit dieser zentralen Lagen geführt hat. Diese Bereiche drohen, die innerstädtischen Brachen von morgen zu werden (Steinebach [2002], S.43).

Vor diesen Hintergründen sind die Innenstädte nicht mehr als Orte der Identifikation erkennbar, die eine Stadt nach Innen und Außen prägen und die das Image einer ganzen Stadt maßgeblich beeinflussen. Somit bildet die Reaktivierung und die Revitalisierung der Innenstädte eines der zentralen Aufgabenfelder der zukünftigen Stadtentwicklung (BMVBS [2007b]; S.3). Das Ziel, die Innenstädte im Sinne der nachhaltigen europäischen Stadt als identitätsstiftende, urbane Zentren mit einem hohen Grad an Nutzungsmischung zu Revitalisieren bringt eine große Zahl an zu berücksichtigenden Variablen mit sich, die untereinander in engen Wechselbeziehungen stehen. Gleichzeitig werden an keinen Raum der Stadt mehr Ansprüche von

unterschiedlichsten Akteuren und Akteursgruppen gestellt als an die Innenstadt. Somit bedarf die Umsetzung der oben genannten Handlungsansätze in jedem Fall einer individuellen, den Rahmenbedingungen vor Ort Rechnung tragenden ganzheitlichen, integrierten und partizipativen Strategie.

3 STADTPLANERISCHE HERAUSFORDERUNGEN AUF DEM WEG ZU INNENSTÄDTEN FÜR ALLE

Diesen Anforderungen muss auf der Ebene der Stadtplanung im Sinne der baulich- räumlichen Ordnung der Stadt entsprochen werden. Ausgehend von ihrer zentralen Aufgabe der zweckmäßigen räumlichen Verteilung sowie der wechselseitigen Zuordnung für die unterschiedlichen Nutzungsbereiche (Albers [2007]; S.31) steht die Stadtplanung der Herausforderung gegenüber, in einer zunehmend pluralisierten Gesellschaft mit verschiedensten, teilweise konkurrierenden oder sogar gegenläufigen, Ansprüchen und Bedürfnissen den Rahmen für eine in sozialer, ökonomischer und ökologischer Hinsicht ausgewogene Entwicklung der Gesellschaft zu schaffen (Albers/ Wékel [2008]; S.176). Somit liegt die Hauptaufgabe der Stadtplanung nicht mehr nur in der räumlichen Entwicklung der Stadt und im Umgang mit den Methoden und Instrumenten zu deren Steuerung sondern weiterführend auch in der Bewertung und Abwägung aller relevanter Ansprüche und Bedürfnisse. Die beabsichtigten und unbeabsichtigten Wirkungen geplanter Maßnahmen müssen im Idealfall bereits im Vorfeld abgeschätzt werden können, was insbesondere vor dem Hintergrund der immer komplexeren Rahmenbedingungen sehr große Schwierigkeiten mit sich bringt.

Basierend auf den vielfältigen Entwicklungslinien, unter denen sich die innerstädtischen Bereiche im Zuge individueller Differenzierungsprozesse in ihrer heutigen Prägung herausgebildet haben, wird die weitere Entwicklung der Innenstädte hierbei vom Umgang mit den Konsequenzen der aktuellen Rahmenbedingungen und zukünftigen Entwicklungstrends

- demographischer Wandel,
- gesellschaftlicher Wandel,
- Globalisierung und Ökonomischer Wandel,
- sowie Technologischer Wandel und Entwicklung zur Informationsgesellschaft

bestimmt werden (BMVBS [2009a]; S.11).

Ausgehend von diesen Entwicklungstrends lassen sich die wesentlichen Aufgabenfelder und Planungserfordernisse ableiten, denen die Stadtplanung im innerstädtischen Bereich gegenübersteht. Diese sind geprägt vom kleinteiligen und flexiblen Arbeiten mit dem Bestand, das unter Berücksichtigung der teilweise gegenläufigen Entwicklungstrends die integrierte Betrachtung und den Ausgleich aller Ansprüche an den innerstädtischen Raum sowie deren vielfältige Wechselbeziehungen zum Gegenstand haben muss.

- Wohnstandort Innenstadt stärken

Aufgrund des anhaltenden Bedeutungsverlustes der Innenstadt als Wohnstandort leben aktuell „nur noch 15% der Stadtbevölkerung mit Hauptwohnsitz in Stadtteilen der Innenstadt, 33% in Stadtteilen des Innenstadtrandes und 52% in Stadtrandbezirken“ (BMVBS [2009b]; S.18).

Um die Wohnfunktion der Innenstadt vor dem Hintergrund der aktuellen Entwicklungstrends und Herausforderungen zu stärken, ist es neben der zusätzlichen Anpassung und Erweiterung des Wohnangebots für die bereits schwerpunktmäßig in den Innenstädten vertretenen Lebensstilgruppen von wesentlicher Bedeutung, das Angebot an Wohnformen für Familienhaushalte sowie die wachsende Zahl älterer Menschen zu Diversifizieren und hinsichtlich Nutzungsverteilung, -dimensionierung und -zuordnung auf die Bedürfnisse dieser Bevölkerungsgruppen anzupassen. Neben der Anpassung an das gewandelte Nachfragerverhalten bildet der Erhalt sozialer Vielfalt und Kohäsion angesichts der zunehmenden Segregationsrisiken (BMVBS [2009a]; S.8) ebenfalls ein wichtiges Aufgabenfeld der Innenstadtplanung.

Vor den genannten Hintergründen insbesondere die Berücksichtigung der Wohnumfeldqualität und somit der weichen Standortqualitäten durch das Angebot möglichst vielfältig und abwechslungsreich gestalteter und strukturierter Quartiere sowie eines ausdifferenzierten Infrastrukturangebotes (Steinebach/ Feser/ Müller [2004]; S.63) ein wesentliches Handlungsfeld zur Stärkung der Innenstädte als Wohnstandort dar.

- Innenstädte als Zentren des Handels, der Dienstleistung und der Kultur reaktivieren und sichern

„Das Zusammenspiel von Dienstleistung, Handel, Kultur und Wohnen macht die Vitalität und Funktionsfähigkeit der zentralen Stadträume aus“ (BMVBS [2009b]; S.8). Vor diesem Hintergrund gilt es, die aus den innerstädtischen Ausdünnungsprozessen hervorgehenden Entwicklungspotentiale zum einen zur Aufhebung der Monostrukturierung zu nutzen und somit zum anderen durch die Schaffung neuer Umwelt-, Freiraum- und Erlebnisqualitäten die Städte als Zentren des Handels und der Dienstleistung zu sichern und zu attraktivieren. Hierbei muss das Angebot und die räumliche Verteilung der Handels- und Dienstleistungseinrichtungen stets die Versorgungsbedürfnisse einer pluralisierten und alternden Gesellschaft im Blick haben (Steinebach/ Feser/ Müller S.51).

Angesichts des Trends zu großflächigen Zentren des Fach- und Einzelhandels ist es hierbei von vorrangiger Bedeutung, diese Einkaufszentren anhand der Stellschrauben „Baukubatur und Dimensionierung der Einkaufszentren, Umfang der Verkaufsflächen, Branchen- und Mietermix sowie Einbindung in den Stadtraum“ (BMVBS [2009a]; S.8) verträglich in das innerstädtische Umfeld zu integrieren.

- Stadtstrukturen urbaner Dichte und Nutzungsmischung schaffen

Im Rahmen der Innenstadtplanung muss der mit den stattfindenden Entdichtungs- und Ausdünnungsprozessen einhergehenden Tendenz zur weiteren Funktionstrennung (Jessen [2007]; S.57) beispielsweise durch die Schaffung von Entwicklungsmöglichkeiten für Nutzungen, die aufgrund der Bodenpreisbedingten Monostrukturierungsprozesse der Vergangenheit aus den innerstädtischen Bereichen verdrängt wurden, entgegengewirkt werden. Die Entwicklungspotentiale müssen durch das „Zusammenführen von Wohnen, Arbeit, Handel, Bildung, Freizeit und ÖPNV“ (Kiepe [2007]; S.4) zur Schaffung urbaner, mischgenutzter innerstädtischer Bereiche im Sinne der europäischen Stadt genutzt werden, denn nur „Vielfältige und vitale Innenstädte stiften Identität, entfalten Attraktivität und Ausstrahlung für die Gesamtstadt“ (BMVBS [2009b]; S.8). Wesentliches Ziel bei der Etablierung urbaner Stadtstrukturen ist die Reduzierung der Verkehrsbelastungen in den Innenstädten, insbesondere des hohen Verkehrsaufkommens des Motorisierten Individualverkehrs. Die kompakte, nutzungsgemischte Stadt muss durch stadtverträgliche Verkehrs- und Mobilitätskonzepte unter „Aufwertung des Fuß- und Radverkehrs und die verstärkte Förderung des ÖPNV“ (BMVBS [2009b]; S.8) unterstützt werden.

Die zentrale planerische Aufgabe liegt somit im Erhalt und in der Schaffung von Multifunktionalität (Sander [2006]; S.11), wobei vor dem Hintergrund der demographischen und sozialen Rahmenbedingungen insbesondere den Bedürfnissen älterer Menschen sowie der Bevölkerungsgruppen mit Migrationshintergrund Rechnung getragen werden muss (Kiepe [2007]; S.4).

- Entwicklung und Bewahrung nachhaltiger, schöner Innenstädte

Angesichts des zunehmenden Standortwettbewerbs zwischen den Städten sowie der sozialen und ökologischen Herausforderungen, denen die Städte gegenüberstehen, muss im Rahmen des Stadtumbaus nach Wegen gesucht werden, die „räumliche Vielfalt durch Erhalt und behutsame Anpassung kleinteiliger Raumstrukturen sowie durch Aktivierung und stadtverträgliche Integration freier Räume und Flächen“ (BMVBS [2009a]; S.11) bei gleichzeitiger Bewahrung des Stadtbildes und der Identität stiftenden innerstädtischen Strukturen, zu gewährleisten.

Neben der Chance zur Schaffung von mehr Lebensqualität in den Innenstädten stellen die nutzungsgemischten, kompakten Kerne im Sinne der nachhaltigen europäischen Stadt aufgrund einen wichtigen Beitrag zum Ressourcen- und Klimaschutz dar, da sie nicht zuletzt dem flächenhaften Wachstum der Städte entgegenwirken und aufgrund des hohen Grades an Nutzungsmischung und Dichte einen erheblichen Einfluss auf die Reduzierung der Verkehrsbelastungen haben.

- Chancen der Entwicklung zur Informationsgesellschaft nutzen

Mit dem Wandel zur Informationsgesellschaft geht neben den technischen Neuerungen auch ein tiefgreifender Wandel hinsichtlich des Standortwettbewerbs einher, der durch die wachsende räumliche Flexibilität von Haushalten und Unternehmen geprägt ist. Gleichzeitig wird der Standort Innenstadt zunehmend für, meist solvente, Akteure aus den Bereichen Forschung und Entwicklung sowie der Kulturwirtschaft, was einerseits die Gefahr sich verschärfender sozialer Verdrängung mit sich bringt, (BMVBS [2009a]; S.11), gleichzeitig aber viele Chancen hinsichtlich der Revitalisierung und Profilierung

innerstädtischer Bereiche eröffnet. Aufgabe der Innenstadtplanung ist es hierbei, durch Schaffung flexibler Büro- und Gewerbeflächenangebote (Steinebach/ Feser/ Müller [2004]; S.55) optimale Entwicklungsmöglichkeiten bei gleichzeitig weitestmöglicher Konfliktminimierung zu gewährleisten.

Für den Wohnstandort Innenstadt ergeben sich ebenfalls vielfältige Entwicklungspotentiale bei-spielsweise als Wohnstandort für ältere Bevölkerungsschichten durch den verstärkten Einsatz von I&K- Technologien in den eigenen vier Wänden bei gleichzeitiger bedarfsgerechter Vernetzung mit Infrastruktur- und Versorgungseinrichtungen in unmittelbarer räumlicher Nähe zu allen relevanten Infrastruktur- und Versorgungseinrichtungen (Steinebach [2007]; S.22).

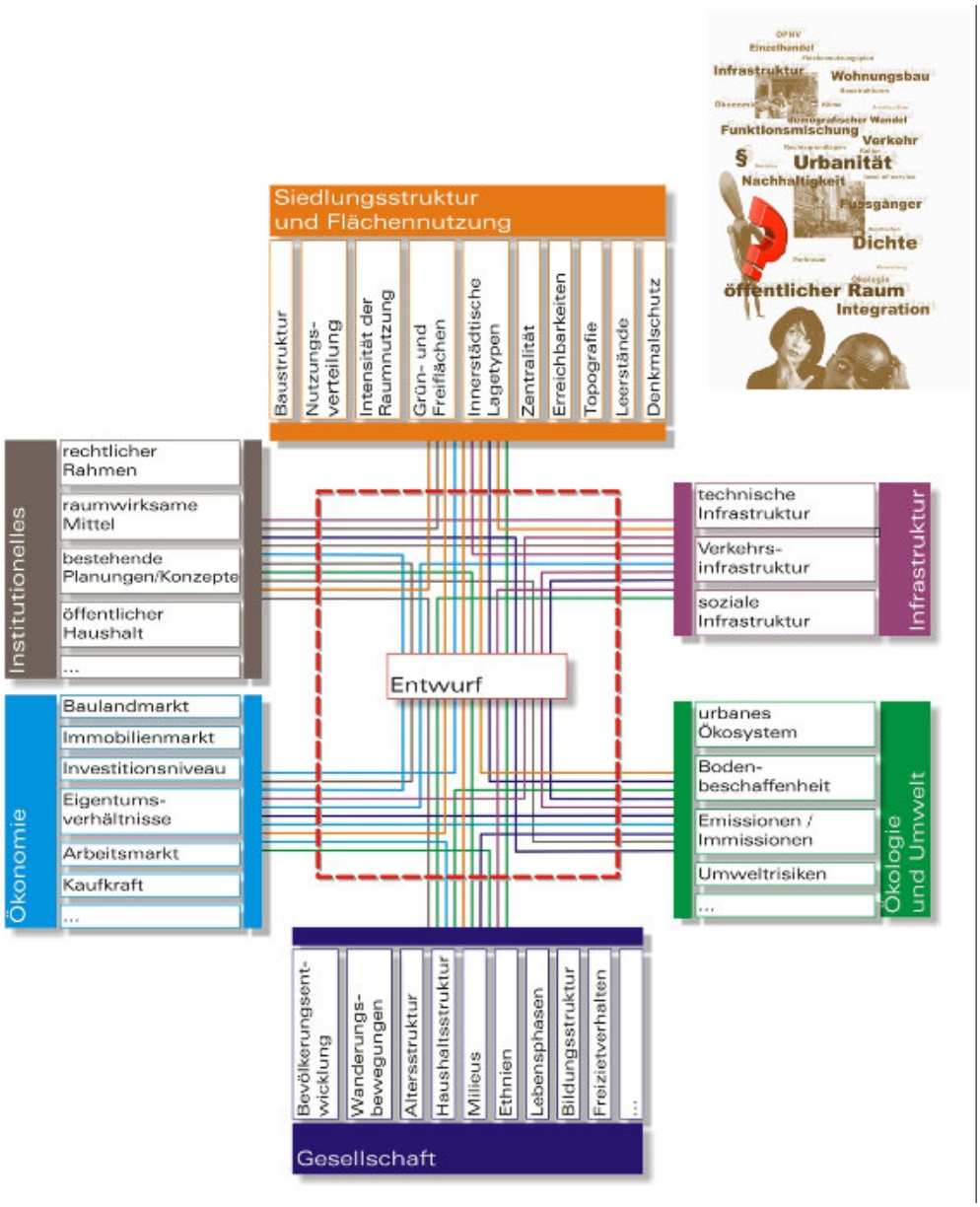

Abb.1: Einflussfaktoren im Rahmen des innerstädtischen Entwurfs (Quelle: eigene Darstellung)

4 STADTPLANERISCHES ENTWERFEN IM INNERSTÄDTISCHEN KONTEXT

Neben den Auswirkungen auf den gesamten Planungsprozess mit seinen formellen und informellen Planungs- und Entscheidungsabläufen beeinflussen die Handlungserfordernisse, bezogen auf die Innenstadt als zentralem Aufgabenfeld, insbesondere den konkreten Entwurfsprozess auf der Ebene der Organisation räumlicher Strukturen und deren Wechselwirkungen mit gesellschaftlichen Prozessen (Koenig [2006]; S.1). Das Erreichen eines bestmöglichen zukünftigen Zustandes stellt den Entwerfenden vor große Herausforderungen, die angesichts der zu bewältigenden Aufgaben nicht allein der „Unzahl koordinierter oder auch nur lose kontrollierter Einzelmaßnahmen in individuellen Entwurfsentscheidungen“ (Schalhorn/ Schmalscheidt [1997]; S.10) überlassen werden kann.

Im Rahmen des stadtplanerischen Entwurfs wird die Qualität der geplanten Räume anhand ihrer Eignung für die beabsichtigte Nutzung gemessen. Dies geschieht dadurch, dass typische Situationen mit dem Ziel eines schlüssigen und möglichst konfliktfreien zukünftigen Zustandes in Gedanken durchgespielt werden (Schalhorn/ Schmalscheidt [1997]; S.10). Gleichzeitig ist der Entwurf als die gedankliche / konzeptionelle Vorwegnahme noch nicht existierender Zustände nur sehr schwer in systematisierte Bahnen oder typologisierte Abläufe zu bringen (Bielefeld/ El Khouli [2007]; S.7), da ein Entwurf immer auch ein Ergebnis aus Abwägung und Gewichtung sein muss, die auf individuellen Entscheidungen und Einschätzungen basieren. Dies liegt an der Vielfalt an Lösungsmöglichkeiten, die sich im Entwurf für jede Problemstellung bieten und bei der es keine ideale oder beste Lösung gibt, die sich nach rein objektiven Maßstäben herleiten ließe, wodurch man vom Entwerfen als „bösartigem Problem" sprechen kann (Rittel [1969]; S.20). Während die Handhabung dieses „bösartigen Problems" beispielsweise bei der Realisierung neuer Siedlungen unter Wachstums-bedingungen noch verhältnismäßig einfach vonstatten ging, stellt sich die Situation angesichts der hochkomplexen Zusammenhänge in den innerstädtischen Bereichen grundsätzlich anders dar.

Somit ist es vor diesem Hintergrund von zunehmender Bedeutung, dem Entwerfenden bereits im Vorfeld ein möglichst umfassendes und alle Rahmenbedingungen berücksichtigendes Gerüst vorzugeben, in dessen Grenzen er sich bewegen kann. Vornehmliche Aufgabe dieses Orientierungsrahmens ist es, schon zu Beginn Handlungsspielräume zu erschließen und Lösungsräume aufzuspannen (Engelke [2002]; S.183), die sich aus der Vielzahl an feststehenden Parametern und Bestimmungsfaktoren ergeben, die den Entwurf beeinflussen und deren Vernachlässigung die Qualität des Entwurfes einschränken würde. Somit setzt ein tragfähiger stadtplanerischer Entwurf die eingehende Analyse der für die städtische Entwicklung relevanten Zusammenhänge sowie einen bewussten Umgang mit der Dynamik und den zeitlichen Eigenschaften von Prozessen voraus (Koenig [2006]; S.1).

5 VISUALISIERUNG UND SIMULATION DYNAMISCHER PROZESSE IM RAHMEN DES INNERSTÄDTISCHEN ENTWERFENS

Spricht man angesichts der sich wandelnden Rahmenbedingungen und den zukünftigen Herausforderungen von der Anpassung und Qualifizierung der Stadtplanung im innerstädtischen Kontext, so spielt der Einsatz von Informations- und Kommunikationssystemen, welcher die binäre Abbildung von physisch realen Prozessen zum Gegenstand hat (Steinebach [2005]; S.3), eine zunehmend tragende Rolle. Hierbei kommen die kommunikationstechnischen Anwendungsmöglichkeiten auf der prozessualen Seite, beispielsweise durch den ergänzenden Einsatz des Internets in Planungs- und Beteiligungsverfahren der Bauleitplanung (Steinebach/ Müller [2006]; S.7), zum Einsatz, während auf der materiellen Seite der Planverfahren die informationstechnische Komponente greift (Engelke [2002]; S.183).

Ausgehend von der zuvor genannten Notwendigkeit zur zielgerichteten Bewertung und Abwägung aller relevanten Ansprüche und Bedürfnisse sowie zur Abschätzung der möglichen Auswirkungen geplanter Maßnahmen stehen die informationstechnischen Möglichkeiten und Einsatzfelder zur Visualisierung und Simulation im Vordergrund.

Einhergehend mit den rasanten technologischen Entwicklungen ergibt sich eine nahezu unüberschaubare Menge an neuen Einsatzmöglichkeiten im Rahmen der Stadtplanung, zu deren Umsetzung eine Vielzahl an Methoden und Techniken zur Verfügung steht, die sich im Rahmen der Visualisierung vor allem durch weiterentwickelte Geografische Informationssysteme auszeichnet, durch die sich neben den herkömmlichen Anwendungsbereichen der raumbezogenen Datenverarbeitung in großem Umfang neue Einsatzfelder ergeben. In einer Web 2.0 basierten Welt mit einer ganzen Generation neuer Softwareprodukte und Anwendungen bei gleichzeitig unbegrenzter Daten- und Informationsverfügbarkeit wurde der Umgang mit raumbezogenen Daten, deren Analyse sowie deren Visualisierung revolutioniert (Hudson-Smith [2008]; S.8) was sich neben der wachsenden Bedeutung von dreidimensionalen Raum- bzw. Stadtmodellen, einer Vielzahl an Webmapping-Tools vor allem im Rahmen der Etablierung der so genannten „Neogeographie" (Eisnor [2006]) zeigt. Der unter dem Begriff Neogeografie stattfindende Wandel im Umgang mit räumlichen Daten abseits der herkömmlichen Methoden wird auch die Anwendungen zur Simulation städtischer Prozesse auf verschiedenen räumlichen Ebenen nachhaltig beeinflussen und zu deren Weiterentwicklung und/oder zur Synthese bestehender Methoden und Anwendungen beitragen.

Bezogen auf das Entwerfen im innerstädtischen Kontext ist es zunächst von großer Bedeutung, diese neuen Technologien und Anwendungen kritisch auf ihre planungsrelevanten Einsatzmöglichkeiten hin zu analysieren und daraus aus Planersicht Bedürfnisse abzuleiten (Berchtold/ Krass in: SRL [2009]; S.8), die den optimalen Einsatz sowie der zielgerichteten Weiterentwicklung bestehender Methoden und Anwendungen zur Darstellung der komplexen Rahmenbedingungen sowie zur Simulation räumlicher Prozesse und zukünftiger Entwicklungszustände ermöglichen.

So ist es beispielsweise durch den verstärkten Einsatz der Agumented Reality-Technik möglich, im Sinne einer Ergebnisvisualisierung sowohl Handlungsbedarfe in der Bestandssituation zu identifizieren als auch die visuellen Ein- und Auswirkungen von Vorhaben originalmaßstäblich, dreidimensional und in Echtzeit zu simulieren. Die baulich-räumlichen Auswirkungen eines Entwurfs im innerstädtischen Gefüge können durch den Einsatz der Augmented Reality-Technik visuell wahrnehmbar in der realen Umgebung vorab originalmaßstäblich abgebildet werden. Darüber hinaus ist es auch möglich, originär nicht visuell wahrnehmbare Informationen visuell abzubilden, beispielsweise Kaltluftströme oder Lärmimmissionen. Der Einsatz der Augmented Reality-Technik unterstützt als Alternative bzw. Ergänzung zum klassischen Zeichnen dementsprechend das Entwerfen an sich und darüber hinaus erfährt die Alternativendiskussion mit unterschiedlichen Akteuren eine entsprechende Qualifizierung. Neben den technischen Ausstattungen ist für den Einsatz der Augmented Reality-Technik ein virtueller, generischer Datenschatten notwendig, der ein digitales Abbild der Realität und der geplanten Vorhaben darstellt (Wietzel [2007]).

Diese und weitere Einsatzmöglichkeiten im Rahmen des innerstädtischen Entwurfsprozesses ergeben sich neben der Notwendigkeit zur Darstellung der Rahmenbedingungen und der Vorgabe eines Orientierungsrahmens auch aus dem Erfordernis zur fortlaufenden Visualisierung räumlicher Prozesse durch Simulation der städtischen Dynamik im Laufe des gesamten Entwurfsprozesses. Dies dient zum einen zur besseren Beurteilung und Einschätzung der getroffenen Entwurfsentscheidung und erlaubt zum anderen das kontinuierliche Qualitätsmanagement im Entwurfsprozess sowie im Ergebnis die bessere Beurteilungsmöglichkeit und Nachvollziehbarkeit der auf den verschiedenen Stufen des Entwurfsprozesses getroffenen Entwurfsentscheidungen.

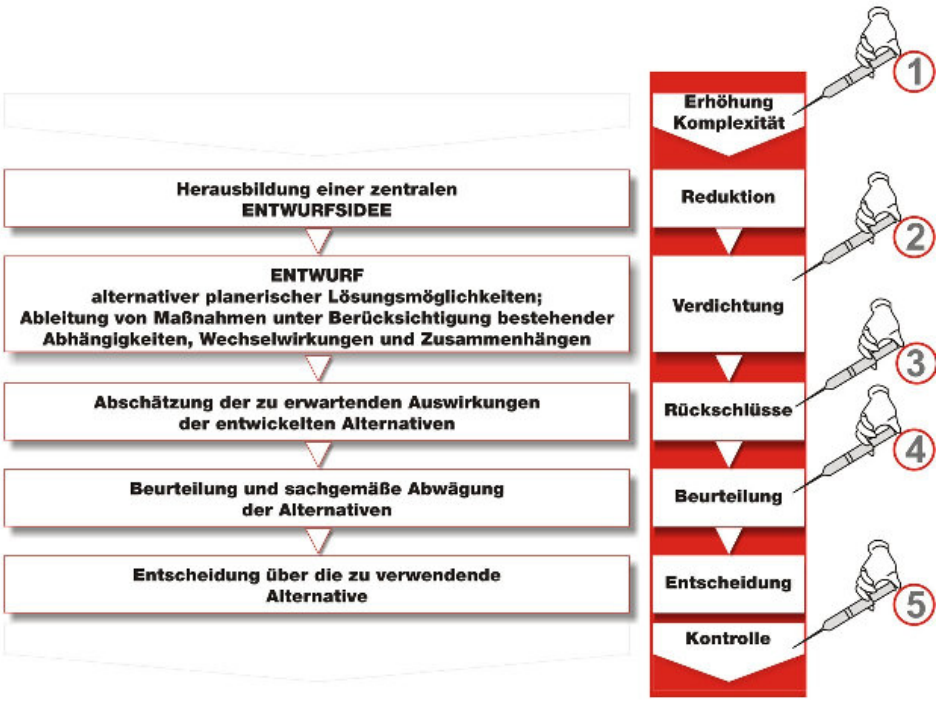

Abb.2: Qualifikationspunkte des stadtplanerischen Entwurfsprozesses durch Visualisierung und Simulation (Quelle: eigene Darstellung)

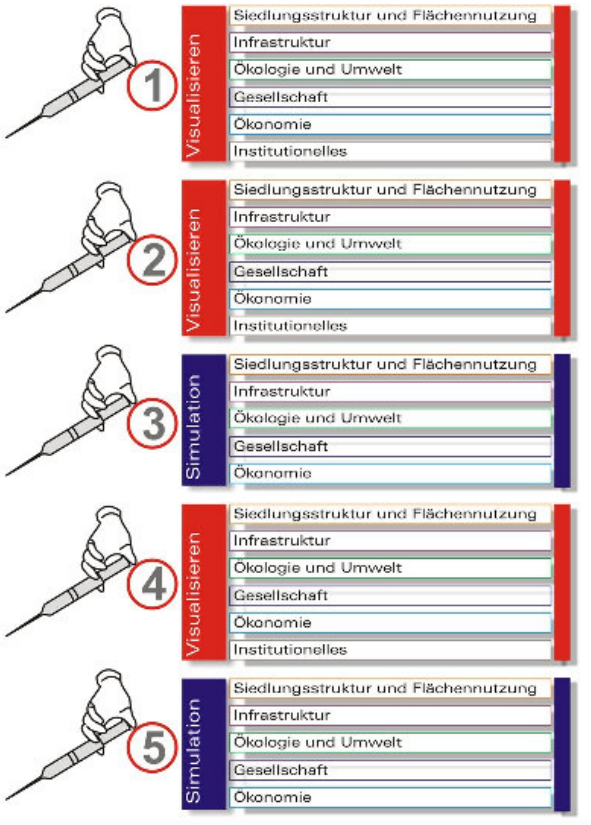

Abb.3: Einsatzfelder von Techniken der Visualisierung und Simulation anhand der identifizierten Qualifikationspunkte (Quelle: eigene Darstellung)

Zusammenfassend liegen die Möglichkeiten und Potentiale zur Qualifizierung des stadtplanerischen Entwurfsprozesses weniger im Finden abschließender Antworten oder im Aufzeigen konkreter Lösungen für ein gegebenes Entwurfsproblem als vielmehr im Angebot qualifizierter Instrumente zur Entscheidungsunterstützung sowie zur besseren Abschätzung und Beurteilung getroffener Entwurfsentscheidungen. Ausgehend von der grundsätzlich nicht objektivierbaren Entwurfsarbeit steht somit die Schaffung einer „objektiveren Subjektivität“ (Bielefeld/ El Khouli [2007]; S.32) im Vordergrund, zu deren Erreichen die informationstechnischen Möglichkeiten der I&K- Technologien in Form von Visualisierung und Simulation einen wesentlichen Beitrag leisten können.

Zentrale Fragestellungen, denen in diesem Zusammenhang nachgegangen werden soll, sind:

- Inwieweit können Methoden und Anwendungen der Visualisierung und Simulation die Qualität eines stadtplanerischen Entwurfs beeinflussen?
- Welchen Anforderungen müssen Methoden und Anwendungen der Visualisierung und Simulation zukünftig gerecht werden?
- Wo liegen Potentiale zur Weiterentwicklung und/oder zur Synthese bestehender Methoden und Anwendungen?

6 FAZIT

Auf dem Wege zur Schaffung von lebenswerten, gesunden und prosperierenden STÄDTEN FÜR ALLE sowie deren Erhaltung als räumliche und funktionale Zentren von Wirtschaft, Kultur, Kreativität, Wissenschaft und Innovation steht die Stadtplanung großen Herausforderungen gegenüber, die sich in den zentralen Handlungsfeldern der Innenstadtplanung widerspiegeln, die sich wie folgt darstellen:

- Wohnstandort Innenstadt stärken.
- Innenstädte als Zentren des Handels, der Dienstleistung und der Kultur reaktivieren und sichern.
- Stadtstrukturen hoher Dichte und Nutzungsmischung schaffen.
- Entwicklung und Bewahrung nachhaltiger, schöner Innenstädte.

- Chancen der Entwicklung zur Informationsgesellschaft nutzen.

Neben den Auswirkungen auf den gesamten Planungsprozess mit seinen formellen und informellen Planungs- und Entscheidungsabläufen beeinflussen genannte Handlungsfelder insbesondere den konkreten Entwurfsprozess auf der Ebene der Organisation räumlicher Strukturen und deren Wechselwirkungen.

Vor dem Hintergrund der Notwendigkeit zur Anpassung und Qualifizierung der Stadtplanung im innerstädtischen Kontext spielt der Einsatz von Informations- und Kommunikationssystemen zur zielgerichteten Bewertung und Abwägung aller relevanten Ansprüche und Bedürfnisse sowie zur Abschätzung der möglichen Auswirkungen geplanter Maßnahmen eine zunehmend tragende Rolle. Die Erarbeitung von Ansätzen zur Qualifizierung des stadtplanerischen Entwurfsprozesses durch Visualisierung und Simulation muss hierbei auf folgenden Ebenen des Entwurfsprozesses erfolgen:

- Visualisierung der gegebenen Rahmenbedingungen
- fortlaufende Visualisierung räumlicher Prozesse durch Simulation der städtischen Dynamik zur besseren Beurteilung und Einschätzung der getroffenen Entwurfsentscheidung
- kontinuierliche Qualitätskontrolle/ Qualitätsmanagement im Entwurfsprozess.

Bezogen auf die zur Verfügung stehenden Methoden und Techniken haben in den vergangenen Jahren tiefgreifende Veränderungen stattgefunden, welche die Möglichkeiten und Einsatzfelder zur Visualisierung räumlicher Informationen sowie zur Simulation städtischer Prozesse revolutioniert haben.

Hierbei ist es von besonderer Bedeutung, die Eignung der zur Verfügung stehenden Methoden und Anwendungen hinsichtlich ihrer Potentiale zur Qualifizierung des innerstädtischen Entwurfsprozesses zu analysieren und weiterführend nach Wegen zu deren Weiterentwicklung und/oder zu deren Synthese zu suchen.

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Innovating Multidimensional Urban Visions

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1 ABSTRACT

MUVIS (Multidimensional Urban Visions) is an applied research project aimed to create an extensible platform for online participatory urban planning and multidimensional visualization. MUVIS will offer the people, local authorities, and investors a dialogue of all participants. In the Virtual Petrzalka case study we facilitate model creation and visualization as well as support discussion of urban visions and plans. MUVIS offers a recent technology solution, transfers the ideas from academy to practice and attempts to affect – in the best possible way – the future of our cities. Our ongoing project is supported from an EU structural grant scheme OPVaV-2008/4.2/01-SORO; with ITMS code 26240220009. In this paper we overview the methodology, technology, and digital content creation and presentation. We describe selected problems in Bratislava urban planning in the past and we discuss our approach.

Keywords: 4D visualization, urban planning, online presentation, virtual environment

Figure 1: Historic urban area visualizations: (a) left, a painted veduta of Bratislava, (b) right, a screenshot from Virtual Bratislava Navigation Tool by Stanislav Stanek. Aerial photo courtesy of Eurosense Slovakia, terrestrial photos by Matej Zeman. The popular painting from 18th century serves as a symbol for the old city, e.g. at http://www.bratislava.sk/.

2 INTRODUCTION

Bratislava (Pressburg, Posonium, Istropolis) belongs to those places in Central Europe where the urban development and phenomenon of genius loci [Norb00] suffered a lot from multiple historical and ideological discontinuities. One of the victims of urban deformations was the Bratislava Castle, visible in Fig. 1 in its old shape and from the aerial photo, dated 2003. In the year 2009, the archaeological research discovered an old Celtic castle underneath the current Bratislava Castle, probably – according to Austrian professor Werner Jobst - the lost Carnuntum [Mus10], the capital of the Noricum province, mentioned by Tiberius mission in written history - in the year 6. The castle building with its four towers, among others the favorite place of Mary Therese was destructed by fire in 1811. Considered as a symbol of feudalism, this ruined memorial without a roof and surrounding prominent urban area was not renovated until about 150 years later the fire. Next to the castle we can find probably the top anti-cultural damage of a historic old town – a highway between the Castle and the Coronation Church. The valuable historic urban area, an original place of history and local atmosphere, was cut by modern transport route built as a prolongation of a postmodern bridge. Despite these urbanistic atrocities, the biggest urban area under permanent public discussion is Petrzalka, illustrated in Figure 2. Petrzalka is a giant habitat built from the cheapest housing alternative – panel buildings. Its 150 000 population makes Petrzalka, so to say, the third biggest city in Slovakia. As the current urban disaster cannot simply be replaced, we hope to open a new communication channel for public

participation in its current and future urban development and improvement. The abovementioned context motivated our decision to choose Petrzalka as the study for the MUVIS project. Virtual model of Petrzalka will extend the existing virtual model of historic Bratislava southwards and MUVIS will be verified, tested, and evaluated using this urban database.

The alienation of modern architecture and urbanism is identified by many authors and public participation is often proposed as a promising alternative. MUVIS is an extensible platform for online participatory urban planning and multidimensional visualization. Exploiting a layered multidimensional content structure, aware of time and space in the virtual city, MUVIS users will share and co-author "The City as a Process in Time and Space" [Fers02]. At the CORP 2010 conference we present the current version of our solution.

The rest of the paper is structured as follows. We introduce the previous work, methodology and technology. In more detail, we present the project achievements and decisions. Finally, we conclude and discuss the future work.

Figure 2: Bratislava historic center is separated from Petrzalka by the Danube river. Petrzalka is a controversial urban area with many unsolved problems. The biggest and longest blocks of panel houses are nicknamed the Chinese Wall. One of the general solutions for the future urban development seems to be the public participation in decision making processes. (The whole area was subdivided into smaller areas for the purpose of model creation. Building our urban database starts with aerial images, rooflines and building footprints from Cadaster Portal of Slovak Republic. Aerial photo courtesy of Eurosense Slovakia.

3 PREVIOUS WORK

The planners of urban solutions search for shapes and functions on multiple scales, forming a new version of "urban text". However, there is no complex vocabulary of scales, shapes and functions, they are discovered and created ad hoc. There are lucky cases – as for example Graz, which is described by the UNESCO's World Cultural and Natural Heritage List: "The urban complex forming the historic centre of the city of Graz is an exceptional example of a harmonious integration of architectural styles from successive periods. Each age is represented by typical buildings, which are often masterpieces. The urban physiognomy faithfully tells the story of its historic development. Graz is a particularly fine example of the living heritage of a central European urban complex that was under Habsburg rule for many centuries. The old city is a harmonious blend of the architectural styles and artistic movements that have succeeded each other since the Middle Ages, together with cultural influences from the neighbouring regions." And there are unlucky case, one of which is Petrzalka, where the change causes alienation, anonymity, missing infrastructure and another entries on the long list of multidimensional damages.

The organicity of change and proportionality of shapes can be approximately measured using fractal geometry [Sali03]. We estimate the Waterfall by Wright induces a largely different measure compared to the Bratislava highway cut through the heart of the old town – placing the Coronation Church facade right next to everyday pressure of trucks, cars, and buses. The collective imagination in this case is not formed, but deformed. The first experiments with Bratislava fractal measurements arise in a PhD research project [Mesz10] at the Faculty of Architecture, Slovak University of Technology.

The city has, among other places (squares, riversides, streets, quarters), the city verticals, given by towers, memorials, silhouettes, rivers and wells (old water sources). The oldest known ancient algorithm for founding a new city has been preserved in Latin books. The founders of Rome were the Etruscans – "engineers" invited by the rural Romans who had no knowledge in the field. The Etruscans computed the city location, ploughed the city border around, erected the city tower to transcend the city to the sky and – nearby – they dug a mundus. The mundus was not necessarily a well. It was the root of the city, transcending the city downwards, into the earth and into the depth. (One can see in erecting and rooting the male and female principles.) The Etruscan language, being isolated from Indo-European languages, has been not preserved up to now. Despite the fact that we do not know the language, we have two fundamental Etruscan words in the international language – urbs (the city) and mundus (the world, the meaning was changed by the Latin users).

There are several well-known urban thinking milestones, for city creation [Vitr09], for its perception Lynch's Image of the City [Lync60]. His perceptual notions – especially imageability – express the readability, areas, squares, borders. Individual perception of a particular place, genius loci, has phenomenological explanation in [Norb81]. The place is, after Forte, the author of virtual museum definition [Qvor01], the opposite of an alienated space (e.g. hypermarket). The architectural alienation is discussed e.g. in [Bang07], the alienation of architecture and urbanism was studied e.g. by Rem Koolhaas, and socio-psychological problems of urbanism in [Mits69]. Bangs judges that the architecture missed classic craft in mastering proportions and preserving archetypes like cave, glade. The habitat (flat, house) should balance the needs for privacy and public space, which is not possible in noisy panel houses. Nowadays, nobody has a legal way to coordinate investors egoisms, which would lead [Mits69] to unthinkable limitation of private property rights. Therefore, long-term public participation (PP) is one of the experiments to overcome the alienation. The Aarhus Convention [Aarh98] is a new sort of an environmental deal, trying to harmonize both human and environmental rights [Jokl07, p. 73]. PP can be characterized as a forum for exchange of opinions, experiences, knowledge, organized to support communication of all segments, solving the specific problems in given area [Renn95]. PP can support social inclusion, better concurrency, social cohesion, environmental balance and public feed-back for decision making [Gave98]. PP classification and its computerized support is offered in [Jokl07, p. 73n] and PP is mandatory in Germany by law [Jokl07, p. 79]. The risky aspect of PP is that the public is not prepared for it. Therefore, MUVIS mission includes the technology enlightenment/evangelization part, as well. We distinguish GIS as a professional planning tool used for decision-making [Jokl07] from PPGIS (Public Participation Geographical System), combining methods and technologies, conveying interactive presentation of various alternatives of geospatial data, based on problem-oriented selection. A recent survey of PPGIS projects and dilemmas has [Kyem09]. Another alternatives represent geobrowsers (Google Earth [GooE09], MS Virtual Earth [MSVE09]), compared e.g. in [Lebe07], and VEPS (Virtual Environment Planning Systems) [Jokl07]. The functionality of each of the above alternatives necessarily covers file and database management, search and navigation in space, time, or semantics, calibrating, filtering and storage, versioning, urban database editing, multimedia presentation of ideas, feedback, comments, forum and voting subsystems. As they are VR systems, their architecture can be broadly subdivided into four categories scene graph, semantic database, generic system or distributed system [Guti07]

3.1 Cyber Cities

The vision of future internet outlines the Semantic Web [Bern01], requiring autonomous agents and globally built ontologies like CIDOC CRM [Crof05] for cultural heritage and [Jan09] for geodata. The cyber cities [VirC09] methodology started with a few chapters in [Leon00]. Work Flow Issues for automation analyzes F. Leberl et al. [Lebe00] in three parts 1. Aerial photogrammetry, 2. Digital canopy elevation model, and 3. Building geometry extraction. The Model Building Pipeline) is characterized by G. Roth [Roth00]: 1.

Callibration, 2. Acquisition, 3. Registration, 4. Point Creation, 5. Model Creation, 6. Model (Mesh) Compression, 7. Texture creation. Multiple modifications elaborated [Ferk04], [Lebe07], [Klei09], where even „ontologic scales " appear and from where the evaluation [Mose08] for virtual Berlin [VirB09] is inspired. MS Virtual Earth workflow is described in [Lebe07] as: 1. Surface Point Cloud, 2. Orthorectified Image, 3. Classification Map, 4. Bare Earth Topography, 5. 2.5D Textured Buildings. There are also experiments with procedural cyber city creation which can be used for less important city parts or in computer games where the exact model is not necessary. The goal of virtualization can be formulated as converting space into places, where place is defined by Christian Norberg-Schulz as "dynamic unity of architecture, population, and iteractions among them" [Came07, s. 337]. There are three levels of quality for virtual places 1. Visualization virtual places, 2. Activity-based virtual places, and 3. Hermeneutic virtual places – culturally coded places where one can hide himself, identify with, own or collect cultural objects (in our case visions, presentations, opinions). The fundamental double-book on semiotics for virtual reality is Virtual Space [Qvor01] and Virtual Interaction [Qvor02], whereas the VR technology seems to be best taught in [Guti08]. The alternative for W3C Semantic Web initiative are represented by digital libraries, e.g. Europeana [Euro09]. The quality measure for virtual museums can be found in [Came07], but a specialized cyber city reference and a generally accepted measure of the quality of virtual museums is stil missing. Obviously, the (low-level) geometric and radiometric errors in subspaces of 8D (x,y,z,t,r,g,b,alpha) state space can be evaluated using standard measurement or estimation methods. The complexity in the field is discussed in [Zara02].

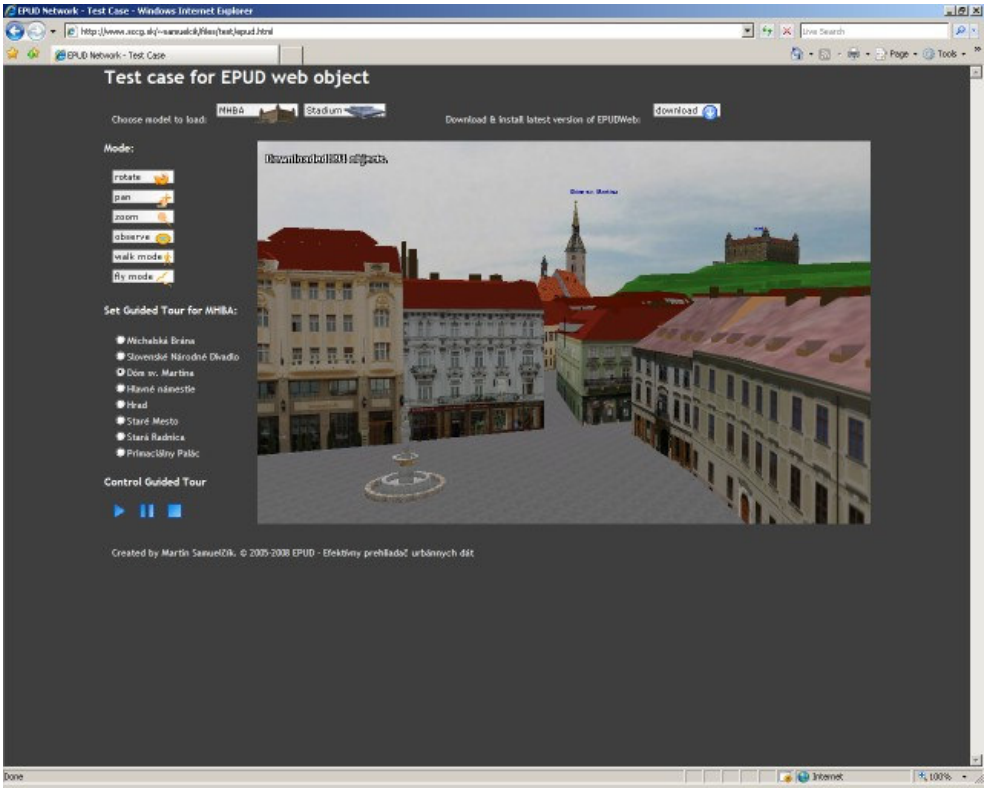

Figure 3: Historically, one of the first experiments to fly over virtual Bratislava using Microsoft Internet Explorer. The screenshot displays Bratislava Castle without vegetation and the Coronation Church tower as seen from the Old City Hall through Main Square. EPUD software tool used as web object here.

3.2 Virtual Bratislava

Chronologically, the development of Virtual Bratislava model and related methods can be traced back in time through multiple academic projects over a time span of about 10 years: MUVIS, Multidimensional urban visions (OPVaV-2008/4.2/01-SORO; 26240220009), Geometry Processing for Virtual Reality (VEGA 1/0763/09), Complexity of Geometric Algorithms for Realtime Rendering in VR (VEGA 1/3083/06), PM3Donline (AV 4/0023/05), EPUD (APVT-20-P05105), Natural Phenomena Visualization using Unstructured Grid (ASO SK-04-BA-010), STRAPAMO 18: MetropoVis, Virtual Heart of Central Europe (www.vhce.info, Culture 2000 n. 2003 - 1467/001/001 CLT CA12), Virtual Environments for WWW (VEGA 1/0174/03), Navigation and Cooperation in Virtual Environments - Virtual Bratislava (APVT 20-

025502), Advanced Methods for Virtual Habitat (Aktion AT-SK No. 323-6/2003), Computer Graphics and Image Processing Applications (VEGA 1/7666/20), and Multimedia Historic Bratislava DVD (MDPT 456/131/2005). These group projects were solved in accordance with tens of dissertations, master and bachelor theses [Beha08], [Dušk09], [Feki07], [Majo09], [Varh09]. The complete list of all coauthors includes up to 200 names.

In this paragraph we mention selected experience and/or results from the above projects, described more in [AMVH03], [Ftac07], [PMZA08], [Ferk09]. The first online 3D Bratislava models were cultural heritage highlights at [VHCE09], optimalized for IE (2004) [Ferk04], namely the Bratislava Castle, a National Cultural Monument and the well-known landmark (Figure 4), or St. Martin's Cathedral (also know as Coronation Church), a three-ships gothic church where 11 kings and 8 queens (including Mary Therese) were crowned between 1563-1830. The first Slovak virtual museum is specified in [Mrva07], [Ferk09] and published online [PMZA09]. As the real museum is in an old castle surrounded by a historic park, we also developed a method of park reconstruction using, to a certain extent, dendrological data [SmHe08], [Ferk09]. Laser measurements were needed for the Bratislava castle well reconstruction. Combining real data and hypothetic lighting scenario, we reconstructed the interior of Chatam Sofer Memorial, presented at [VHCE09]. For Multimedia Historic Bratislava DVD [Ftac07], [Boro08] we experimented with sound gallery for presenting the emotional history highlights and with a matrix-like organization of digital content – in one direction the memorials, city sights or themes and in the second direction, orthogonally to the first ione, the output media – photographs, videos, 3d models. The navigation thus becomes intuitive and idiomatic in sense of [Coop95] and even elderly people our novel multimedia kiosks can navigate quickly. The ideas from applied research project were combined with basic research findings – geometry processing using data-dependency [Toth06], mesh refinement [Noci07], specialized triangulations, false fundamental matrices for speeding-up epipolar reconstruction, extracting semantics from pictorial data [Šiku03],[Šiku06a], [Šiku06b], information visualization [Novo07], encrypting mutimedia data, video segmentation [Cern06], image-based and real-time rendering methods, reconstruction quality [Samu08], [Lack09], streaming, guided tours planning and empathic avatars [Stan09]. For presenting the past, we experimented with digital storytelling, which resulted into the discovery of LOD-stories [Pat10]. However, some problems remain open and the vision of a 3D xerox, i.e. an automatic conversion of input data into a cyber city or museum, requires much more efforts, ideas, and future work. For cybercity internet presentation the real-time rendering in an online environment seems to be the crucial one.

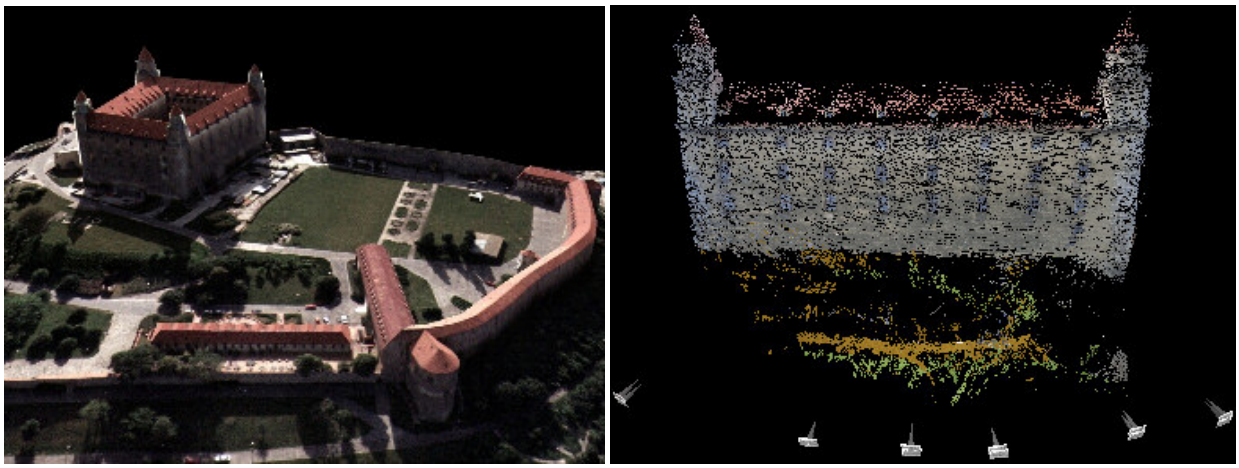

Figure 4: The first 3D urban models: (a) Castle reconstruction with the kind help of Eurosense Slovakia, provided by Peter Borovsky, and (b) the first MetropoGIS reconstructed castle façade by Stanislav Stanek. Input camera positions and the ghosts before their elimination are shown. By the way, the grass area in (a) covered the lost Celtic palace (Carnuntum?).

4 OUR APPROACH

We define our approach as a cooperative creation and evaluation of possibilities in geometric-semantic domain. It might seem natural to just adopt one of the existing PP GIS solutions, but the financial and legal situation in transforming countries differs heavily from established market economies. For short, there is neither legislative nor market prepared for cyber cities, virtual cultural heritage, digital libraries, or digitization of museum collections. The complete initiative in this segment comes from academy and EU

funding. This is the reason behind the obvious gap between functional virtual Berlin, Graz, or Vienna, already possible as everyday professional tool of respective divisions at city municipalities, and the striving virtual Prague, Bratislava, Budapest, Warsaw, Peterburg or Moscow, depending on academic projects and their (usually underfed) budget.

We identify three major target groups in the MUVIS project – authors, specialists, and public. Each of these groups comes with a different motivation, different skills and different information technology available. For example the latter are not well prepared for using modern information technology tools (e.g. we had to develop special urban reconstruction tutorials in Slovak for our own students [Ona07]). Wide public audience will share the MUVIS visualization and in given cases it will participate on urban planning forum. No special education is assumed and we can't count on a powerful hardware being used on their side either. These factors limit the amount of their active participation on creating or modifying the virtual space. The authors, on the other side, have the full access (passive and active) to the digital content and provide both the virtual working ground for the other two target groups and the administration of the project itself. They also maintain the database and develop future MUVIS version. The last group – the specialists – represent a force in the urban planning, coming either from the municipal administration domain or from the professional domain, such as e.g. architects, real estate developers etc. This group has a presumably higher level of experience than the general public yet still has not a limited access to the underlying digital content.

MUVIS cross-platform functionality necessarily covers file and database management, search and navigation in space, time, or semantics, calibrating, filtering and storage, versioning, urban database editing, multimedia presentation of ideas, feedback, comments, forum and voting subsystems for given localities. We combine two architectures - scene graph and semantic database to certain extent. Scene graph architecture supports the geometric criterion for visualization part. On the other hand, the urban database has to be constructed with respect to semantics. For possibly distributed memory system for preservation and storage of enormous datasets we take into account Bigtable [Chan06], proven in multiple similar projects, e.g. web indexing or Google Earth [GooE09].

The project development is subdivided into the design and development of three conceptually separate fields of functionality – a server-side application handling the storage, index and retrieval of digital content, an active-access providing client application (editor), and a passive-access client application (viewer).

The digital content used in our project is rooted in a 4D domain and extended by semantic relations between objects, by multidimensional object attributes and by multimedia content documenting the modeled places from an empathic point of view. The created database offers creating arbitrary and abstract relations through semantic triplets, thus supporting a higher-level knowledge built above the raw city model. The client-server protocol is open and platform-independent which creates opportunities for future extensions and involvement of other domain experts, such as statisticians, sociologists, ecologists and many others.

The editor is partly built upon our previous works on effective presentation of urban data and is being extended to facilitate both technological improvement, e.g. in the form of forming relations and higher-level semantics, and technical improvement, e.g. by introducing vegetation or variable lighting conditions.

The viewer development forks into producing a high-quality viewer oriented on the specialists and technically experienced public and a medium-quality viewer offering less options in both interaction and visualization but being more accessible to the wide audience. Thus, in the end, each of the user groups will be provided with tools to satisfy their needs without being bothered with excessive or overwhelming options or requirements. Each of them uses its own conveying technology, the high-quality viewer is based around our Effective Presenter for Urban Data [Samu08] and uses a GPU-accelerated client-side web object, while the medium-quality viewer uses Adobe FLASH technology which is available to the wider audience for the price of simpler and less detailed visualization.

As the specification of these modules is not open for public yet, we hope to present them in detail in one of our future publications.

We cooperate with EUROSENSE Slovakia, contributing with preprocessed aerial photos in the urban area shown in Figure 2. The detailed project requirements and functional specification take into account recent findings and they will be tested both with the full urban model and respective target groups within the case study Petrzalka.

5 RESULTS

Since the project start in September 2009, we continue to build the geometric model first. Data, tools, and methods from previous projects [Ferk04], [Boro07], [Boro08] are either adopted or under development to meet new requirements. Thinking about MUVIS in terms of cooperative creation and evaluation of possibilities in geometric-semantic domain, neither geometric nor semantic aspect can be reduced in given application area. This is why we require multidimensional attributes or metadata beyond the 3D/4D spatial domain. Current version of Virtual Bratislava model represents a cyber city heavy model, available on DVD. Microsoft® Virtual Earth™ is a geospatial mapping platform for layered data for given location [MSVE08], [WiVE08]. Google Maps is both service and technology [WiGM08], related to the virtual globe of Google Earth [GooE08], [WiGE08] and even extending to the outer space. Both global projects have limited use and precision and they simulate mainly flyover options and exploit satelite and aerial photos of Earth. Our previous project [Ftac07] can be considered as an analogy to Google Earth. The challenging task of online browsing or even editing higher precision urban models is done in Virtual Old Prague [VirP09] or Virtual Berlin [VirB09] by downloading data and/or viewer. MUVIS aims to offer an acceptable online solution. The result of the first experiments – with smaller dataset, part of Petrzalka - is illustrated in Figure 5. The model already includes the virtual vegetation and an inserted urban vision – visualization of one of the many alternatives of the ice hockey stadium for the forthcoming World Hockey Championship in Bratislava 2011.

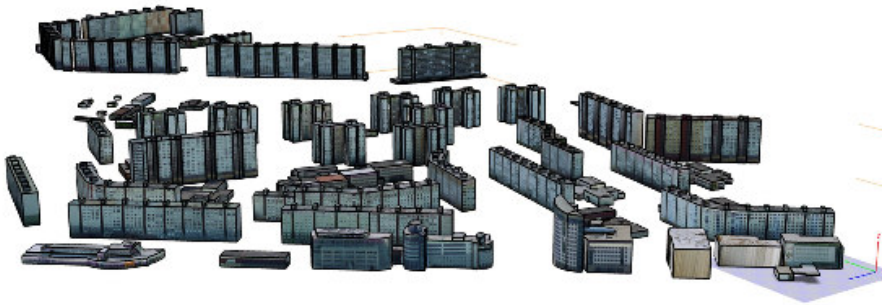

Figure 4: Initial Petrzalka dataset without terrain and vegetation. Data from EUROSENSE company.

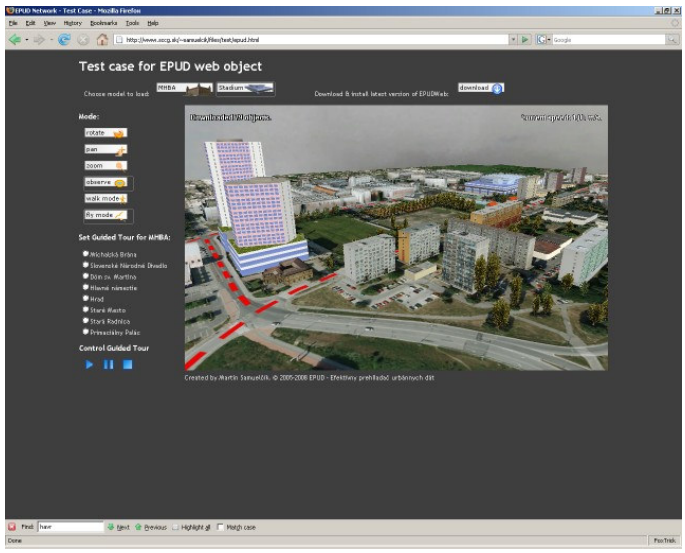

Figure 5: A model of a part of Petržalka in Mozilla Firefox using our EPUDWeb object.

The first piece of the final model and the parameters of the given experiment do not allow for interpretations. The design of the final interface will certainly differ from the prototype examples above. Last, but not least, the inserted urban vision was not included there by a member of the wide target group, but by an expert in the field. This is just the first view of Petrzalka part over internet. Our work is in progress and at the CORP conference we will present a more matured report.

6 CONCLUSION AND FUTURE WORK

MUVIS (Multidimensional Urban Visions) is an three-years applied research project for creating an extensible platform that will support online participatory urban planning and related multidimensional

visualization. MUVIS will support and initiate public discussion and dialogue between the people, the local authorities, and the real estate investors. We use Virtual Petrzalka as a place to demonstrate our efforts in a real-world case study, a place to support creation and visualization of the current state and the future visions. MUVIS offers a state-of-the-art technology solution, transfers the ideas from academy to practice and attempts to influence the future development of our cities in the best was possible.

From the point of view of the widest target group, our intention is to enable people not only in poor Petrzalka to be consciously and interactively participating with their contribution to the future of their own environment. We hope that our model of cooperation, our workflow, and project results might be inspiring within the arising information society.

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🏆 *reviewed paper*

Instruments for sustainable urban development in Eastern Germany – the example of the "Wächterhäuser" (warden houses) in Leipzig

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1 ABSTRACT

Since the collapse of the GDR, Leipzig, a middle-sized city in Saxony, is characterised by a dualistic process: on the one hand the reconstruction of around 80 per cent of its old dwelling houses. On the other hand the loss of more than 100 000 inhabitants since 1989. Although the number of inhabitants has increased since 2001, Leipzig still had around 38 000 empty dwellings in 2008[1]. Economic and demographic forecasts predict that it would need several decades to reconstruct and use all these empty buildings.

Especially the handling of around 2 500 buildings of the Gründerzeit is an urgent issue for the city. These dwelling houses are often located at central main roads and therefore important for the urban structure. But due to their unattractive location they often remain empty which leads to a constant decay. This has negative consequences for the image and infrastructure of the surrounding neighbourhood and city quarters (Heck and Will 2007 p. 24-25).

One self-governed instrument which was developed against this urban deterioration is the concept of the so called „Wächterhäuser"(warden houses). The principle of this instrument is the preservation of houses through usage.

On the one hand, the "wardens" receive a house for little money, which they can shape following their needs and ideas. On the other hand they only have to pay the running costs and are responsible for keeping the house in good condition and for removing damages. Especially social, cultural, and commercial users, who exercise a certain appeal on the quarter, are potential wardens[2].

The paper asks which type of users can be found, whether this instrument for urban development is a sustainable self-governance strategy for a city like Leipzig. And it asks whether this concept is also fruitful for other contexts.

2 INTRODUCING THE CONTEXT

2.1 Demographic- and Urban Development in Leipzig since 1989

Since the collapse of the GDR, Leipzig is characterised by a deep demographic transformation. The following table gives an overview of the demographic development of Leipzig since 1989 until 2008, in relation to the live birthrate and the number of people moving in and out of Leipzig.

	1989	**1994**	**1999**	**2004**	**2006**	**2008**[3]
Inhabitants	530 010	481 121	489 532	498 491	506 578	515 469
Live birthrate	5 961	2 531	3 582	4 274	4 410	5 096
People moving in	11 390	13 097	21 015	23 306	23 969	25 640
People moving out	27 191	19 102	20 700	21 463	19 030	20 419

Source: Land Statistical Office, Department for Statistics and Elections Leipzig

After a harsh decrease of inhabitants, due to unemployment, suburbanisation, and decreasing birth rates, the number of inhabitants has increased since 2001 and has reached around 515 469 by the end of 2008 (Stadt-Leipzig 2009d p. 3). At the level of urban development, Leipzig faces the problem of a high vacancy rate – in 2008 Leipzig had around 38 000 empty dwellings[4]. Especially the handling of around 2 500 buildings of the Gründerzeit is an urgent issue for the city. These dwelling houses are often located at central main roads and are important for the urban structure. Due to their unattractive location they often remain empty which

[1] LVZ article: „Weniger Wohnungen stehen leer", 18.02.2010, p. 17.
[2] See http://www.haushalten.org/de/waechterhaeuser_modell.asp, last visited: 11.12.2009.
[3] In 2009 the number of inhabitants for the city of Leipzig reached 519 300, LVZ article: „Leipzig wächst gegen den Trend", 17.03.2010, p. 21.
[4] LVZ article: „Weniger Wohnungen stehen leer", 18.02.2010, p. 17.

leads to a constant decay. One of the main problems the city faces is the fact that most of these empty Gründerzeit buildings are private property and the city does not have the financial resources to buy all these houses (Heck and Will 2007 p. 27).

Generally speaking Leipzig is marked by two developments:

First, the urban landscape of Leipzig is characterised by parallel shrinking, especially in western and eastern quarters, and growth, especially in the south of Leipzig (Heck 2005 p. 8-9). Especially the shrinking process has implications for almost every field of the city, concerning urban structure, functioning neighbourhoods, or social and cultural offers. The city has identified the problem and adapted several instruments for the revitalisation of empty areas and dwellings. One example are programs like URBAN II or EFRE with different funding focus. The aim of these programs is the development of disadvantaged city quarters through different instruments like urban rebuilding or interim usage (Heck 2005 p. 10).

Second, the predictions for the urban development of Leipzig are marked by a demographic obsolescence of its inhabitants.

Therefore it is necessary to develope further innovative ideas in order to cope with the problems that result from this ongoing demographic and urban transformation process (Heck and Will 2007 p. 24-26).

2.2 Self-governance strategy: HausHalten e.V.

An example for such an innovative idea is the private association HausHalten e.V. Since October 2004 HausHalten e.V. is concerned with the activation of empty (Gründerzeit) dwellings in Leipzig. The association functions as mediator between the owners, the potential wardens (users) of the houses, and the City administration. The latter has a promoting role in this project - the Department for Urban Regeneration provides the start-up financing (HafenCity 2008 p. 44).

An important precondition for the realisation of the warden house concept was the implementation of a regulation in 1999 that allows the temporary public use of empty private properties. Hereby the building law remains legal and HausHalten e.V. receives the usage right for five years. After this period the property owners shall negotiate directly with the wardens about the further usage of their houses (Heck and Will 2007 p. 29).

The strategy of HausHalten e.V. can be put in a simple phrase: preservation through usage. The association searches for suitable wardens who are willing to preserve a house even under difficult conditions (Heck 2005 p. 47). But the association is not only seeking for a simple preservation; it wants to reach a cultural, unconventional, and innovative usage of the houses because it wants to increase the local, national, and international attention, attract new investors and by that revitalise city quarters. The stabilisation of structural disadvantaged city quarters shall be realised through usage (Heck 2005 p. 41-47).

The advantages of the warden house project are amongst others the compatibility with the financial problems of the city and the attractiveness for the owners and wardens of the houses. The owners are responsible to provide functioning electronic and water connections and the restorage of the buildings for usage. Here, public fundings are available. The wardens receive information from HausHalten e.V. and the tools they need for the restoration of the houses. Additionally the wardens pay a membershipfee which is used for the activation of other empty houses. And they sign a contract with the association about their engagement in the restorage and usage of the house. These contracts present a commitment of the wardens and secure the alienability of the concpet into other contexts (HafenCity 2008 p. 44-45).

HausHalten e.V. pursues different goals with its warden house project: It wants to safe cultural monuments (Gründerzeit houses), advise the owners of the houses, find users who are willing to keep the houses in condition, revitalise city quarters through social and cultural offers, retrieve from the contracts between the owners and the wardens, so that both sides can contract directly, promote employment through integration of unemployed in the process of restoration of the houses, and spread their concept in other municipalities with similar problems like Leipzig (Heck, Pantzer et al. 2006 p. 36).

Although HausHalten e.V. is successful - until now they take care of about thirteen warden houses in Leipzig and they have more wardens than houses - the project cannot be continued abundantly due to the difficult financial situation of the municipality and the strict obligations for the signing of the contracts. That is why

self-governance strategies like this have to be strengthened and promoted in this field (Heck and Will 2007 p. 34).

3 THE WARDENS

HausHalten e.V. is looking for wardens that will exert positive effects on the quarter of the warden houses. Therefore especially social and cultural agents are potential wardens, because with their projects and initatives they help to revitalise disadvantaged quarters and integrate the citizens of the quarters (Heck, Pantzer et al. 2006 p. 36). The usage of the houses for living is not intended because then HausHalten e.V. would turn into a competitor on the housing market of Leipzig.

At the moment Leipzig has thirteen warden houses; the (potential) wardens are diverse, among them are artists, entrepreneurs (start-ups), and associations with a social focus (Friemel 2009 p. 98-99). In 2009 HausHalten e.V. had 700 potential wardens. Due to this huge interest, the potential wardens have to present a concept for the usage of a house[5].

Below, three examples of warden houses and their wardens are presented:

[5] http://www.haushalten.org/, last visited: 4th February 2010.

Warden house	Wardens	Profile
Lützner Str. 30 (western quarter)	- project- and audiogallery "A and V"	- a platform for exhibitions; the program is organised by graduates of the Academy of Visual Arts Leipzig and University Hildesheim; they show photographies, videos, drawings, and sculptures
	- two studios for artists	- studio Kathrin von Ow - studio Windisch/Schimkat/Weber
	- copy- and printing service	- first start-up in a warden house
	- warden community	- provides the wardens with information and tools for the restauration
	- cultural platform "Purpur"	- cultural platform and open stage for different theatre events
Kuhturmstr. 4 (western quarter): first released warden house – the wardens have signed directly a contract with the owner)	- KUHTURM	- room for exhibitions with focus on media art
	- studios for students of the Academy of Visual Arts Leipzig	
	- studio Winterhagen/ Schinkel/Kowalski	- three students of the Academy of Visual Arts Leipzig founded this studio
	- social association	- self-initative from migrants from eastern Europe, they offer language courses and cultural events
Eisenbahnstr. 109 (eastern quarter)	- Leipzig office of network operator MAXX on Air	
	- DSP – democracy and social work	- association provides people with food, books, clothes, and household stuff, legal advices; people can use the library, participate in cultural events and advanced training courses
	- gal.lery for digital culture e.V.	- gallery for digital gallery and installations; platform for exhibitions, events from the digital world (blog-lounges, spam-slams), and workshops
	- warden community	- participates in/organises events in the quarter

Source: http://www.haushalten.org/de/realisierte_objekte.asp (last visited: 21th February 2009)

The warden houses are not only seeking for start-ups or entrepreneurs from cultural, creative, or social fields. In the process of the restoration of the warden houses, HausHalten e.V. also integrates long-term unemployed who are living in the quarters in order to intensify the identification with their quarter and give

them the possibility to be active participants in the process of revitalising their neighbourhood (HafenCity 2008 p. 45).

4 OPEN QUESTIONS

The warden house project of HausHalten e.V. presents a self-governed strategy from below and deals with the revitalisation of disadvantaged quarters in Leipzig. The private association took over responsibility for an existing urban and social problem. The city of Leipzig depends on self-governed initatives mainly due to financial problems. At the same time the City administration promotes the project when it comes to the start-up finance.

Still, two questions remain: Is the instrument of the warden houses a sustainable self-governance strategy for a city like Leipzig or is it a convenient way for the City administration to shuffle off responsibility? And is this concept transferable into other municipalities?

4.1 Warden houses – sustainable self-governance strategy?

Like already mentioned above, the municipality Leipzig cannot restore all empty Gründerzeit buildings due to financial shortages. Therefore HausHalten e.V. plays a decisive role for the revitalisation of these buildings and the surrounding quarters. In order to realise their plan the associtation benefits from several structural decisions: in 1999 a regulation was implemented that allows the temporary public usage of unused private properties. Hereby the building law remains legal (Heck and Will 2007 p. 29). Furthermore the wardens sign a contract with the association about their engagement in the restorage of the house. These contracts present a commitment of the wardens and secure the alienability of the concpet into other contexts (HafenCity 2008 p. 44-45). And owners can rely on public funds in order to fulfil their duty to supply water and electronic connections and a basic restauration.

Karsten Gerkens from the Leipzig Department for Urban Regeneration describes the warden house project as a realistic economic solution for social and urban decay and derotation. The increased attractiveness of city quarters by restored Gründerzeit building might, in the long term, attract new investors and bring capital to the city[6].

The warden house idea is under further development: future plans include a program for owner-occupiers. Here, interested individuals form a building owners group and restore together Gründerzeit buildings and use them jointly[7].

All these facts show that the associtation has developed a sustainable strategy in order to cope with present and future problems of urban spaces, in relation to specific developments like the demographic shrinkage, vacancy, and municipalities with less money for social and urban issues. HausHalten e.V. integrates different issues into its project: it is not only concerned with a simple restoration of empty and decayed buildings, with its concept HausHalten e.V. also tries to overcome social and cultural deficits – it integrates long-term unemployed and neighbours of the warden houses, offers graduates and other entrepreneurs cheap space and development opportunities and gives mainly social associtations the chance to improve the coexistence of people living in disadvantaged quarters with high unemployment, and vacancy.

Especially when municipalities and states retreat more from social, cultural, and urban issues, like it is happening in the recent years, self-governed strategies will become even more important. The active participation of private associations and groups is an important instrument to overcome social and cultural divides – the warden house project is a good example for this concern.

4.2 Transferability into other cities?

Several examples show that the idea of the warden houses from Leipzig has become a role model for other cities with similar demographic and urban problems. Warden houses have opened in other Eastern German cities like Görlitz, Dresden, Halle, and Chemnitz; now also Western German municipalities like Bremerhaven and Wuppertal are interested in this idea.

[6] http://www.haushalten.org/de/haushalten_pressearchiv.asp#2007, last visited: 3rd February 2010

[7] http://mephisto976.uni-leipzig.de/sendungen/direkt/beitrag/artikel/waechterhaeuser-ruine-oder-raum-fuer-ideen.html, last visited: 3rd February 2010.

In order to advise other cities, HausHalten e.V. is funded by the Federal Ministry of Transport, Building, and Urban Development. The association advises other municipalities how to find new users for historical buildings in order to preserve these buildings.

5 CONCLUSION

In the middle of 2006, HausHalten e.V. made up a first balance of its project: it revealed that the basic restoration of the Gründerzeit buildings keeps them on a level for further preservation; the warden houses present new knots for identification of the people living in these quarters; networks are builded through the revitalisation of former stores in the warden houses by artistic projects and associtations; by that, new residents move to these quarters (Heck, Pantzer et al. 2006 p. 37).

The financial shortages of the municipalities bring self-governed strategies like the warden house project into the focus of the City administration. HausHalten e.V. works closely together with the municipality in order to realise sustainable urban development in disadvantaged city quarters. Additionaly the association is funded by the Federal Ministry for Education and Research in the frame of the project "Citizens initiate sustainability". HausHalten e.V. is also engaged in cooperations with different educational providers in order to promote local employment (Heck, Pantzer et al. 2006 p. 37).

The associtation hopes that the further development of the warden house idea might lead to more engagement of citizens in their city and their active participation in the shaping of a city image. That would be an alternative to expensive sanitation or, even worse, demolition.

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Integrating Socio-Economic Data in Spatial Analysis: An Exposure Analysis Method for Planning Urban Risk Mitigation

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1 ABSTRACT

For disaster risk management and risk-based urban planning, time-dependent knowledge on the spatial distribution of various social groups is of critical importance. However, in a highly dynamic urbanizing world data are mostly outdated, generalized, not area-wide, not reliable or even not existing. This paper explores the potential of interdisciplinary integration of social science and remote sensing to deal with the problem of area-wide and up-to-date information derivation of the spatial distribution of population, and especially the vulnerable groups. The integration of conventional socio-economic data (census and household survey data) with the structural information of the urban landscape extracted from remotely sensed data aims at assessing dynamic exposure of various social groups. The analysis was done for the case study in the tsunami and earthquake prone coastal city of Padang, West Sumatra, Indonesia. The information generated is particularly useful for giving an additional insight for urban planners, how land use and urban development shape the exposure of various social groups to natural hazards.

2 BACKGROUND AND RATIONALE OF THE STUDY

In light of global environmental change, building a safe environment for urban areas should be more emphasized. Two decades ago, an analysis of the world´s 100 most populous cities found that 78% were exposed to one of four major natural hazards-earthquakes, tsunamis, volcanoes, and windstorms (not including flooding)- and 45% faced being struck by more than one. In developing countries alone, 86% face more than one threat (Degg, 1992). For development of effective disaster risk reduction measures, vulnerability assessment is crucial. It should consider exposed, susceptible elements (e.g. population or various social groups) and coping capacities, which determine the expected harm resulting from a given hazardous event (Birkmann, 2006).

An exposure analysis that provides accurate and detailed information about distribution of population and various social groups in relation to the existing hazards is an important initial phase in vulnerability assessment. It serves as a basis for planning disaster risk mitigation, e.g. evacuation planning (short- to medium-term) or exposure reduction by means of land use planning (medium- to long-term). Due to the dynamic in urban activity pattern, spatiotemporal variation of population is a crucial component regarding vulnerability. A time-geography approach to spatial behaviour has long been developed by researchers (Hägerstrand, 1970; Pred, 1981). Presently, it has already been operationalized using various highly developed GIS-tools and methodologies and used in planning, e.g. development of transportation network, access to public services and infrastructures.

Since the 1970s, remote sensing estimation of residential population has been applied more frequently, as an increasing amount of spaceborne satellite data have become available (Elvidge et al. 1997; Lo, 2001; Sutton et al., 1997, Harvey, 2002; Li & Weng 2005; Taubenböck, Roth & Dech, 2007; Liu & Herold 2007; Lo, 1986; Lu et al., 2006; Schneiderbauer & Ehrlich, 2007; Mesev, 2003). The most recent study of Khomaruddin et al. (2008) shows the potential of Census data to derive weights for population distribution day and night by land use type, which is suitable for broadscale analysis (e.g. nation-wide). On the other hand, Taubenböck et al. (2008) presents capabilities of high resolution satellite data (Ikonos) to assess day and night urban population on building level which is suitable for the small-scale and heterogenous urban context. The method used is an object-oriented, hierarchical classification methodology, on very fine resolution. However, the result has not yet indicated the spatial distribution of the vulnerable social groups.

The study presented in this paper attempts to further develop the methodology used by Taubenböck et al. (2008) and Khomaruddin et al. (2008), emphasizing more on the socio-economic characteristics and daily activity pattern of the individuals / households. Analysis of conventional census data and household survey is conducted to build a model of population distribution that is combined with spatial data. In doing so, the identification of vulnerable social groups in various building - land use types is made possible.

3 STUDY AREA AND DATASETS

The study area is the coastal city of Padang, West Sumatra, Indonesia. Padang city with almost one million inhabitants is highly exposed to various natural hazards, especially earthquake and tsunami (Borrero et al., 2006; McCloskey et al., 2010). This city represents coastal urban areas in developing countries, which was initially developed through historical intensive trading activities at the coast during colonial times, and therefore, remains having central activities and densely populated areas at the coastal region. The recent strong earthquake events, of which the most recent one occurred in September 2009 with a magnitude of 7.5M (USGS, 2009), and their potential in generating tsunamis have triggered the city to revise their current urban plan and develop the city towards less-exposed areas, moving away from the coast. As one of the baseline information, it is important to show how the current urban structure has influenced the exposure of the population and various social groups to tsunamis. The required information should encompass the quantity of population and its spatiotemporal dynamic, as well as identification of vulnerable social groups, such as women, elderly and children. Presently, spatial data on population are only available at village level and contains no information on the temporal aspect. Therefore, analysis of ancillary data from remote sensing as well as additional surveys are conducted.

High resolution remotely sensed data from the Ikonos sensor, a Digital Surface Model (DSM) and a Digital Terrain Model (DTM) were used to provide area-wide, up-to-date and accurate information on the urban land cover and its spatial structural pattern in a 3-D city model. Additionally, data derived from field work on urban land use are available (Taubenböck et al., 2009a). The information on daily activity pattern obtained from household survey data 2008 (UNU-EHS Household Survey in Padang, 2008) cover an activity diary of about 800 respondents representing different gender groups, main activities and occupations. Additionally, data from the last population Census (BPS, 2000), and additional statistical data of year 2005 from Padang in Figures (BPS, 2006a), Padang`s Sub-Districts in Figures and Village Potential Survey (BPS, 2006b) are available for calculation of population number by social groups as well as concentration of economic activities and public facilities within the study areas, from which the weights for various land use types are derived.

4 CONCEPTUAL FRAMEWORK & METHODOLOGY

An analysis framework was developed to enable estimation of spatial distribution of exposed social groups and was applied for the case study. The starting point of the analysis is the assumption that exposure of social groups to tsunamis varies and influenced by the urban land use. Based on this assumption, the parameters were defined and analysed:

- classification of social groups with regard to vulnerability to tsunamis
- main activities that compose daily activity pattern & particular time of the day to show the temporal dynamic
- linkage between building-land use and daily activity

4.1 Vulnerable Social Groups and Daily Activity Pattern

With regard to tsunamis, the following social groups have been revealed as more vulnerable: women, elderly and children (See e.g. Birkmann et al., 2007). This particularly relate to lower physical capability of these groups to evacuate themselves during an emergency or tsunami events, i.e. low running (evacuation) velocity and stamina. It is important to analyse the population distribution disaggregated for these social groups. Aside from demographic characteristics, there are other parameters to be considered in assessing vulnerability, e.g. households with lower income and marginalized social groups are most likely to have lower access to disaster preparedness interventions such as early warning and training activities, as well as to face more difficulties during recovery process after a disaster event. In this case study, however, the linkage

between such parameters with the dynamic spatial distribution have not been explored sufficiently, thus, not integrated yet.

The time geographic model of society potrays individuals and households as following a series of daily paths through time and across space, with their movement at such settings as home, office, school, shops, and sites of discretionary activities such as the church or community center (Pred, 1981). Time-budget studies, in which respondents are asked to keep an activity diary specifying the duration and location of activities, are permitting to emerge a fine-grained picture of the temporal and spatial use of the city (Anderson 1971, Chapin 1974).

In this study, the daily activity was derived from an activity diary from the household survey. It was summarized in three main categories: working activities (occupation in built areas: service, trade, industry), education (school and higher eduction), and other activities (care and social activities). The daily activity pattern was found to be different particularly between women and men, with main activity of working and non-working (Figure 1).

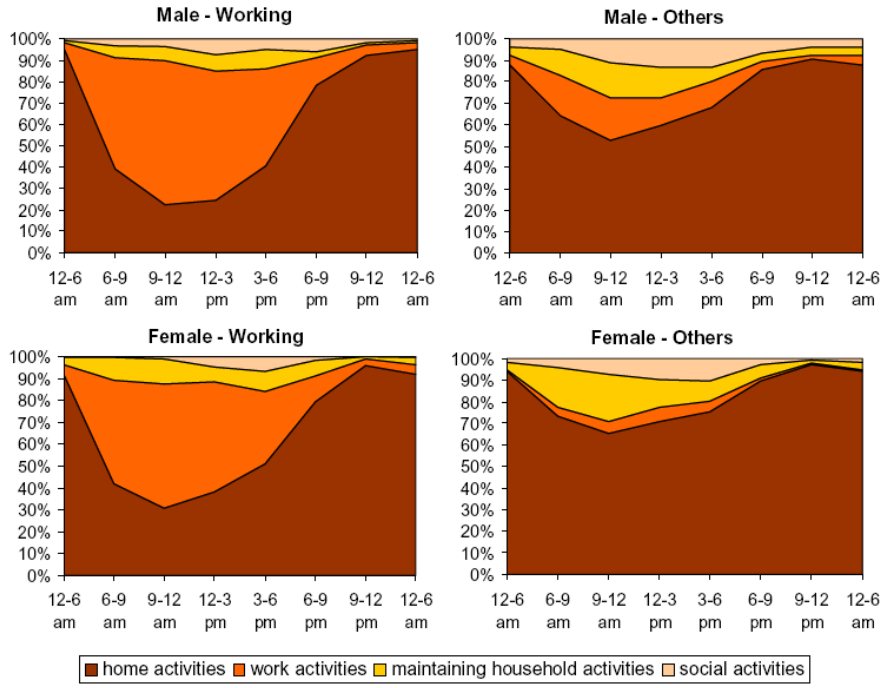

Fig. 1: Daily Activity Pattern of Various Social Groups

For the exposure analysis, three different times over the course of a day were selected to show the temporal dynamic of the daily activities: 9-12 am (morning), 3-6 pm (afternoon), and 12-6 (night).

4.2 Urban Morphology and Daily Activity

Urban morphological analysis seeks to identify distinctive regions in the city according to the functions of tangible land use types and to some extent show the social urban segregation. For the detailed extraction of the small-scale and heterogeneous urban morphology, Ikonos imagery with 4 spectral bands (blue, green, red, nir) and a geometric quality of 1 meter were used. The Digital Surface Model (DSM) and the Digital Terrain Model (DTM) are also available. Additionally, data derived from field work on urban land use were surveyed. The combination of the various data sets provides information on the physical urban morphology of the city, building use and available space for living and working (Figure 2).

Regionalisation is performed to classify areas that contain homogeneous urban morphology parameters (See Taubenböck et al., 2009b). Areas with similar built-up density, building sizes, building heights and building usage are combined citywide as homogeneous sectors (Figure 3). Particularly areas with low built-up density, big building sizes, and high height are mostly representing public buildings.

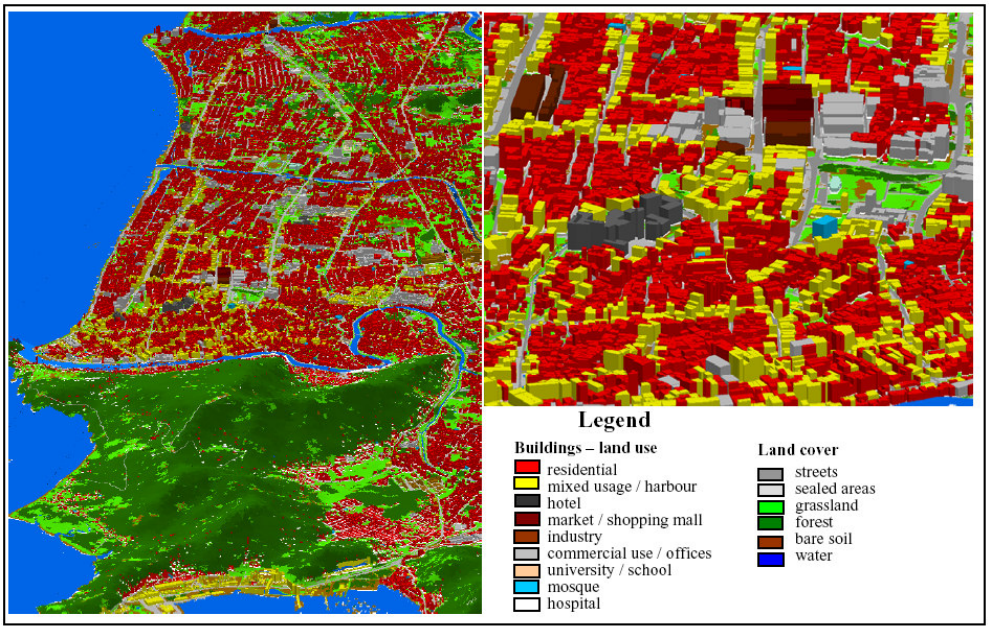

Fig. 2: Building - Land Use of the Study Area in Padang City

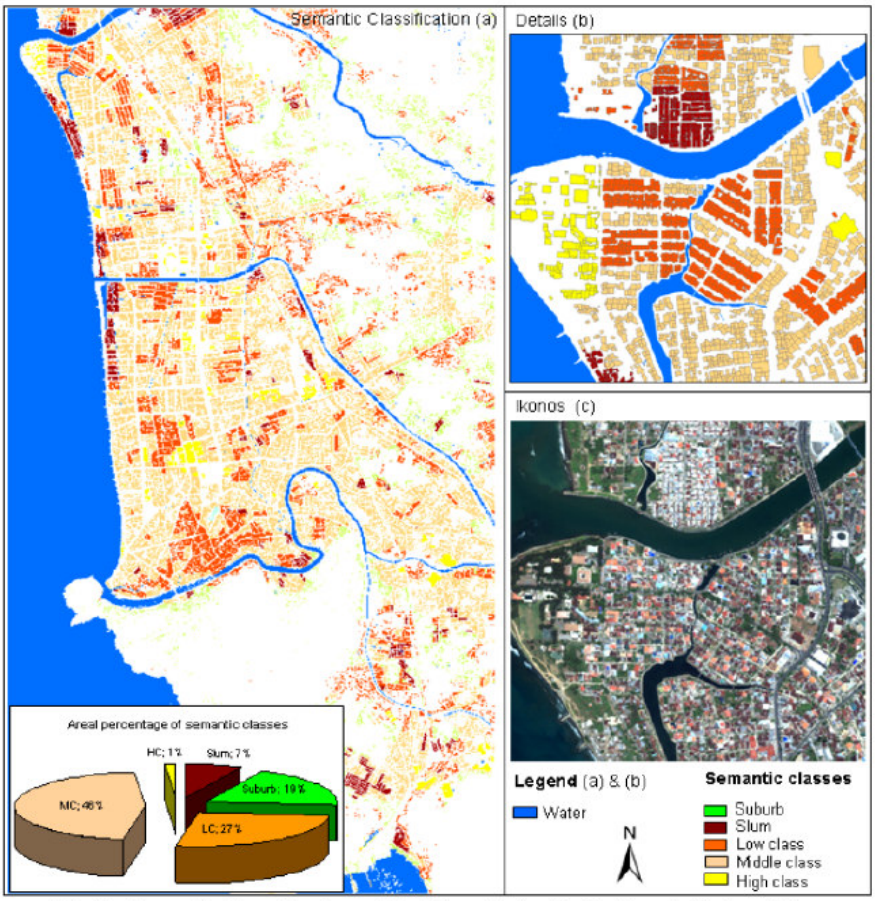

Fig. 3: Semantic Classification of Buildings in the Study Area in Padang City

The correlation between the static elements of physical urban structures with the socio-economic parameters of the people was tested. The findings proved that socio-economic characteristics like household income level and price of housing correlate to some extent with physical urban patterns and thus enable extrapolation on the complete urban landscape (See Taubenböck et al, 2009b). The classification of the physical urban structures are particularly used for the residential buildings. For the working activities, the building-land use is summarized in several main categories which match the activities of the population from the Population Census and Household survey data, namely office, commercial, and industrial buildings.

4.3 Development of weighting

Similar with the methodology used by Khomaruddin et al. (2008), weights are derived from the available socio-economic data to calculate population distribution in the study area, but putting more emphasize on the social groups and their daily activity pattern. The important parameters are the main activity, occupation of the social groups and their mobility (to what extent the individuals travel to conduct their daily activities). For the purpose of our analysis, mobility is defined as whether or not the daily activities are performed at home/neighbourhood (in the residential buildings) or in public facilities and buildings where economic and business activities are concentrated in the city. The overall analysis framework is presented in a simplified manner in the following figure (Figure 4), showing the example of the activities of female population.

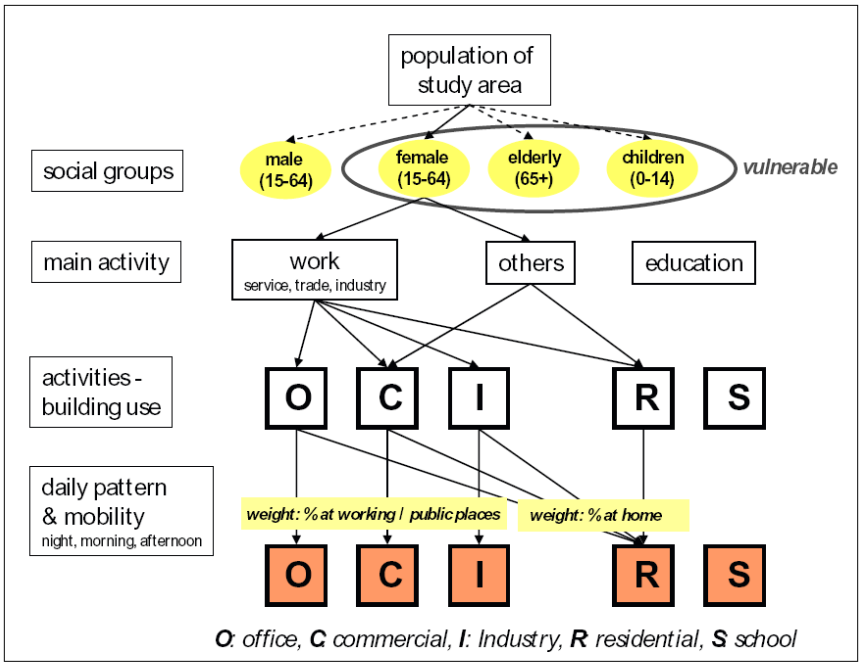

Fig. 4: Analyis Framework

During the analysis, some additional assumptions for the weights had to be made due to inexistence of information e.g. activities in the mosques and in public facilities. However, this involved relatively small part of the total population and did not change the results significantly.

5 RESULTS

Basically we observe and quantify high concentration of people in the urban center during morning and afternoon, while at nighttime the people are more equally distributed. During daytime we measure higher exposure of the total population due to the fact that more people linger in the urban core near the coastline. The analysis results of population distribution show that there is an immense spatial shift in population distribution for non residential areas between day- and nighttime, and slightly less during the afternoon time (Figure 5). The non-residential areas are mostly located in the city center and along the main roads, where the economic and business activities are concentrated. Thus, the spatial pattern of vulnerability transforms significantly over the course of a day and e. g. with immense impact on the situation for evacuation in case of tsunami events (Lämmel et al., 2008).

Disaggregated analysis on vulnerable social groups show in general similar pattern with the total population, nevertheless different weighting in activities of various social groups show noticable variation. Overall, the activities outside house (residential buildings) of the vulnerable groups is lower due to the fact that the proportion of working female (29.4%) and working elderly population (40.3%) is much less than the working male population (63.9%). Additionally, the household survey showed that the proportion of working activities of the working vulnerable population that are conducted at home is higher compared to of the male population. This variation has implication on the population shift during the day of vulnerable and male population, as well as difficulties that these social groups would face in evacuation during emergency events. More vulnerable population stay in residential areas during the morning and afternoon time, while increasing male population are concentrated in the non-residential areas during the day. In terms of evacuation, it

indicates difficulties lower access of the vulnerable population to the main roads (evacuation routes) in the dense residential areas with mostly narrow street networks, while the concentrated population in the city center and along the main roads might already initiate traffic jam Moreover, some punctual variations in different building – land use types are also visible for the vulnerable groups as can be seen in Figure 6 below. In this example, the low proportion of vulnerable groups working in the industrial sector (20.5%) show variation in changes during the day, compared to changes in university, where participation of vulnerable groups is higher (55.1%). Such disaggregated information of vulnerable groups is also significant in e.g. hospital buildings, that consist of almost 90% vulnerable people.

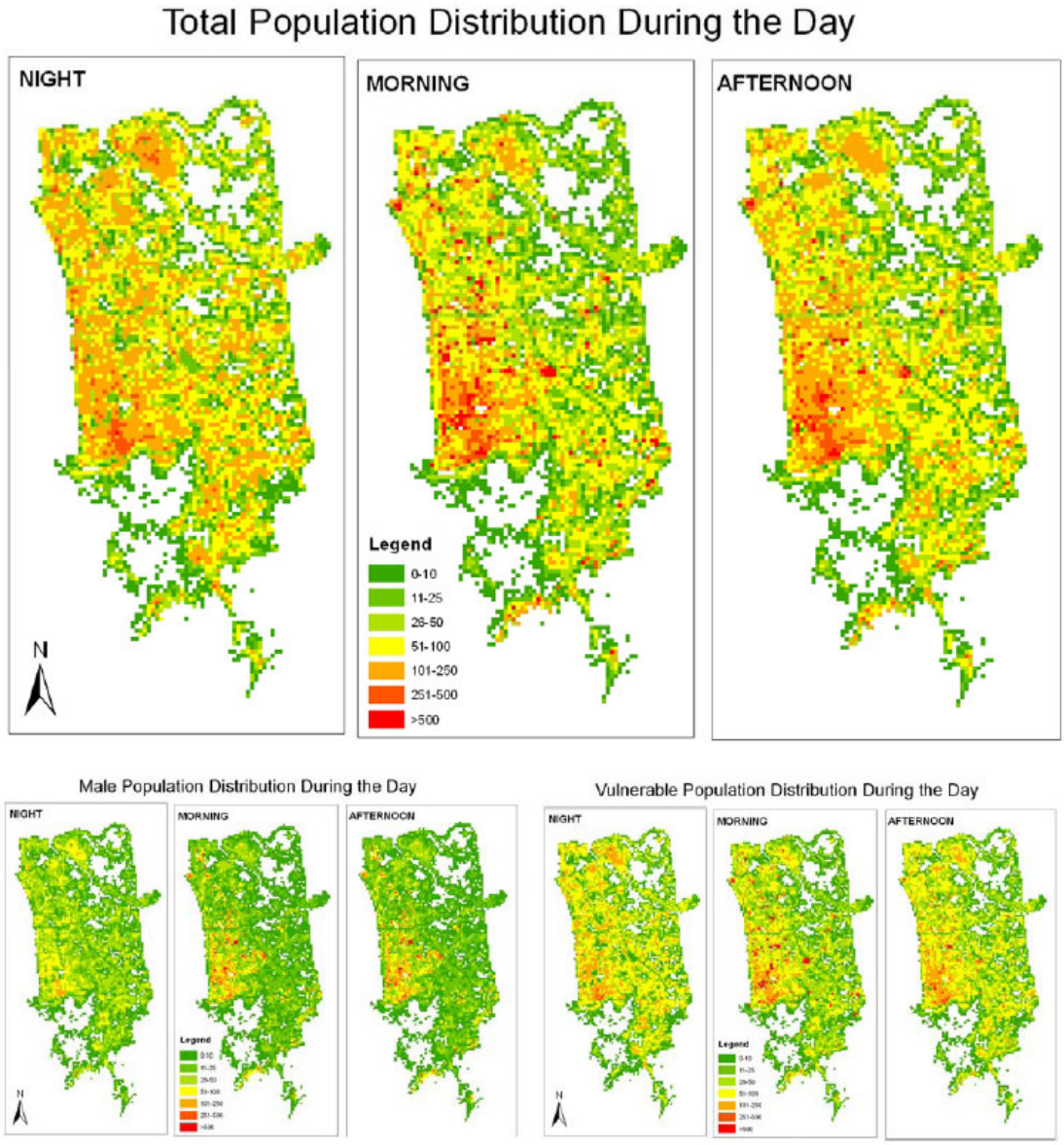

Fig. 5: Distribution of Population by Daytime (Visualization of Summary in Grids 100mx100m)

To check the accuracy of the basis population (night population in the residential areas) of our calculation, the results were compared with the available population data of year 2005 in the villages, where the study area is located (BPS, 2006b). The total population in the study area coverage within the selected villages is summed up to 428,452, including 275,845 vulnerable population, while the total population in the residential buildings based on our calculation is 387,450, of which 257,682 are vulnerable population. The comparison shows that a difference of about 10%, nevertheless, our calculation generated the same magnitude of population as well as vulnerable population. Comparison was also done using single household data from the household survey, showing that the proportion of vulnerable population at building level is on average similar, but vary at the building level with the standard deviation of 20%. This also conforms to variations at the household level from the analysis of Census Population Data (BPS, 2000). Accuracy analysis of the

population distribution in the morning and afternoon time at the building level was not possible, since there is no validation data available.

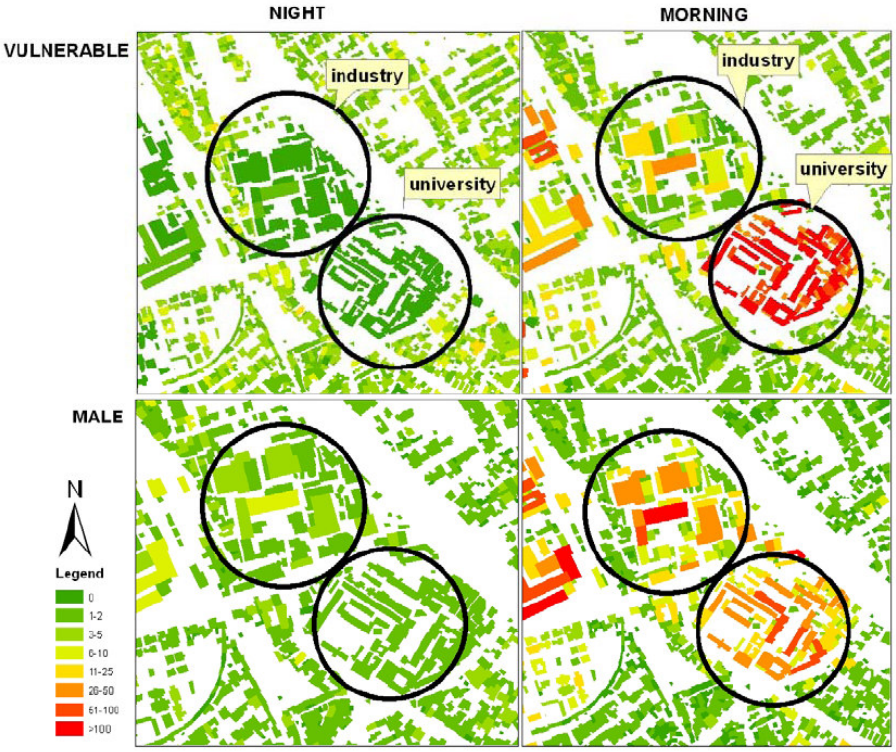

Fig. 6: Variation in Distribution Different Building-Land Use by Daytime and Social Groups

6 CONCLUSION AND OUTLOOK

The study presented above shows that detailed analysis on population distribution for high resolution exposure analysis is made possible through the combination of remote sensing analysis and conventional socio-economic data of census and household surveys. In spite of high level of details of the information, the analysis method can be easily understood and implemented for continuous updating by the local risk managers and urban planners, in contrast to complex modelling analysis. It provides an overview of "who", "when", "where", as a basis information for risk managers and urban planners to develop effective mitigation strategies such as evacuation planning. Moreover, the analysis results can easily be linked and overlayed with data on tsunami as well as other hazards to assess exposure. For longer-term urban development planning, it would also be interesting to develop a set of scenarios for the analysis, e.g. how the population distribution would change if urban activities would be intensified in areas away from the coast. In case more comprehensive and detailed data on mobility or transportation pattern would be available, such analysis can be further developed and include more complexity. However, this also implies assessment on how much added-value it would bring and its applicability.

7 ACKNOWLEDGEMENT

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Konzepte länderspezifischer Erweiterungen standardisierter Objektmodelle am Beispiel des Standards XPlanung in der Freien und Hansestadt Hamburg

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1 ABSTRACT

Im Rahmen des Deutschland – Online E-Government Standardisierungsvorhabens XPlanung (Benner, Krause 2009) werden ein semantisches Datenmodell und ein objektorientiertes Datenaustauschformat XPlanGML für raumbezogene Planwerke (Bauleitpläne, Raumordnungspläne, Landschaftspläne) erarbeitet. Die Zielrichtung des Projektes XPlanung lag zu Beginn des Vorhabens zunächst auf der Etablierung eines verlustfreien Datenaustauschs von Planwerken des Baugesetzbuches (BBauG: 1960 – 1987 / BauGB seit 1987) wie dem Flächennutzungsplan (FPlan) oder dem Bebauungsplan (BPlan) zwischen unterschiedlichen CAD / GIS Programmen über Verwaltungs- und Akteursgrenzen hinweg. Im Laufe der Modellierung und eingehender Analyse bestehender Planwerke der Bauleitplanung hat sich herausgestellt, dass der Fokus auf FPlan und BPlan zu eng gesetzt war. In den Flächennutzungsplänen der Stadtstaaten wie der Freien und Hansestadt Hamburg (FHH) werden ebenso Festlegungen der Raumordnung getroffen, die Plan-Art „regionaler Flächennutzungsplan“ ermöglicht es, Darstellungen der Flächennutzungsplanung und der Festlegungen der Raumordnung in einem gemeinsamen Planwerk zu visualisieren. In Bebauungsplänen finden sich Huckepackfest-setzungen aus der Landschaftsplanung.

Auf Grundlage dieser Erkenntnisse wurden Kernmodelle der Raumordnung und der Landschaftsplanung im Objektmodell XPlanung modelliert. Diese Modelle geben jedoch „nur“ die gesetzlichen Möglichkeiten der aktuellen Gesetzgebung wieder. In der FHH existieren sehr viele Planwerke der Bauleitplanung, die auf alten, nicht mehr rechtsgültigen Gesetzeswerken basieren, aber immer noch ihre Gültigkeit besitzen. Um durchgängige E-Government Lösungen in der Bau- und Planungsverwaltung (z.B. elektronisch gestützte Baugenehmigungsverfahren) etablieren zu können, ist es notwendig, das gesamte gültige Planungsrecht digital abbilden zu können. Von daher besteht die Notwendigkeit, neben aktuellen Bauleitplänen auf Basis des BauGB ebenso die Altpläne in dem Objektmodell XPlanGML abbilden zu können. Damit ergibt sich die Notwendigkeit, dies Objektmodell länderspezifisch zu erweitern.

Ziel des Beitrags ist es, nach einer kurzen Einführung in den Entwicklungsstand des Austauschformats XPlanGML (Kap. 2) und einer Analyse des aktuell in Hamburg gültigen Planungsrechts (Kap. 3) verschiedene technischen Möglichkeiten zur Erweiterung des Objektmodells XPlanung zu erörtern, durch die Interoperabilität bei Austausch digitaler Planwerke nicht gefährdet wird (Kap. 4). Dabei wird u.a. diskutiert, in wie weit sich der Application Domain Extension (ADE) Erweiterungsmechanismus im Objektmodell CityGML auf das Objektmodell XPlanGML übertragen lässt. Als Grundlage der Analyse dient das vorhandene Digitale Informationssystem Planrecht (DIP), in dem alle in der FHH gültigen Bebauungspläne – derzeit in einem proprietären Datenformat und inhaltlich nicht vollständig - erfasst sind. Ein Vorschlag zur Erweiterung des XPlanGML Datenmodells wird im Kap. 5 formuliert.

2 EINLEITUNG

Im Rahmen des Deutschland – Online E-Government Standardisierungsvorhabens XPlanung werden seit dem Jahr 2004 ein semantisches Datenmodell und ein objektorientiertes Datenaustauschformat XPlanGML für raumbezogene Planwerke (Bauleitpläne, Raumordnungspläne, Landschaftspläne) erarbeitet. Für die Ableitung des XPlanGML Modells (Krause, Benner 2006) wurden die Regelungen des BauGB, der BauNVO, der PlanzV sowie des ROG und des BNatSchG analysiert und umgesetzt. Alle nach diesen Bestimmungen möglichen Darstellungen, Festsetzungen, Kennzeichnungen, Hinweise und nachrichtliche Übernahmen der vorbereitenden und verbindlichen Bauleitplanung werden im Objektmodell als Klassen mit zugeordneten Attributen abgebildet. XPlanung ermöglicht bei Aufstellung oder Änderung von Plänen einen einfachen und verlustfreien Datenaustausch zwischen den verschiedenen Verwaltungsebenen und den unterschiedlichen öffentlichen und privaten Planungsakteuren. Dies erhöht Schnelligkeit und Sicherheit des

Planungsprozesses und senkt langfris-tig die Softwarekosten. Ein standardisiertes Datenformat ermöglicht weiterhin die einfache und verlustfreie Übernahme der Pläne in Fachinformationssysteme (z.B. Raumordnungskataster, Umweltinformationssysteme).

Im Zuge der Einführung von E-Government Verfahren werden immer mehr Dienstleistungen der Verwaltung auf elektronischem Wege, mit Unterstützung durch das Internet, angeboten. Durch die neue EU-Dienstleistungsrichtlinie wird sich dieser Trend in den nächsten Jahren noch erheblich verstärken. Im Bereich der kommunalen Bauleitplanung sowie in der Raumordnung sind E-Government Lösungen nur auf Basis eines standardisierten, semantischen Datenmodells von Bauleitplänen sinnvoll einsetzbar. Einheitlich strukturierte digitale Bauleitpläne bzw. Planwerke der Raumordnung erleichtern im Rahmen des Aufbaus von Geodateninfrastrukturen die Bereitstellung elektronischer Beteiligungsplattformen für die Öffentlichkeit, Behörden und Träger öffentlicher Belange. Weiterhin ermöglichen einheitlich strukturierte Bauleitpläne die Etablierung unterschiedlicher Recherche-Dienste über die Inhalte von Bauleitplänen und deren anwendungsspezifische Visualisie-rung.

Um weiterreichende durchgängige E-Government Lösungen in der Bau- und Planungsverwaltung (z.B. elektronisch gestützte Baugenehmigungsverfahren) etablieren zu können, ist es notwendig, das gesamte gültige kommunale Planungsrecht digital abbilden zu können. Von daher besteht die Notwendigkeit, neben aktuellen Bebauungsplänen ebenso die sonstigen Planwerke des besonderen Städtebaurechtes auf Basis des BauGB sowie Altpläne, die nicht nach den Regelungen des BauGB erstellt wurden, im Objektmodell XPlanung abbilden zu können. Da bislang das Objektmodell von XPlanung auf die Abbildung der Bauleitpläne gemäß BauGB beschränkt ist, ergibt sich die Notwendigkeit, das Objektmodell zu erweitern.

Das Objektmodell XPlanGML 4.0 wurde deshalb um die Möglichkeit erweitert, Planwerke des besonderen Städtebaurechtes abzubilden. Dazu gehören gemäß BauGB Planwerke, die städtebauliche Sanierungsmaßnahmen (§§ 136 ff. BauGB), städtebauliche Entwicklungsgebiete (§§ 165 ff. BauGB), Stadtumbaumaßnahmen (§§ 171a-d BauGB), Maßnahmen der sozialen Stadt (§ 171e BauGB) sowie private Initiativen zur Stadtentwicklung (§171f BauGB) beschreiben. In Bauleitplänen werden eine Vielzahl nach anderen gesetzlichen Vorschriften getroffene Festsetzungen in Flächennutzungsplänen (§ 5 Abs. 4 BauGB) und Bebauungsplänen (§ 9 Abs. 6 BauGB) nachrichtlich übernommen. Die Bundesländer können ferner durch Rechtsvorschriften bestimmen, dass auf Landesrecht beruhende Regelungen in den Bebauungsplan als Festsetzungen aufgenommen (§ 9 Abs. 4 BauGB). Bislang wurde versucht, diese Vielzahl von möglichen Festsetzungen auf Basis andere gesetzlichen Vorschriften (in der Regel Fachplanungsrecht) in den Fachschemata Bebauungsplanung und Flä-chennutzungsplanung des Objektmodells XPlanung abzubilden. Mit diesem Vorgehen wurde der ursprüngliche Ansatz, die Regelungen des BauGB, der BauNVO, der PlanzV im Objektmodell XPlanung abbilden zu können, stark ausgeweitet. Dieses Vorgehen führte zu einer Vielzahl von Problemen. Zum einen ist es nicht immer gewährleitet, dass der Sachverstand hinsichtlich der Modellierung eines Fachplanungsthemas in den Arbeitsgruppen ausreichend besetzt ist. Zum anderen ergeben sich hinsichtlich einer vollständigen Implementierung des Standards XPlanung für Softwarefirmen Probleme, die auf die Bauleitplanung spezialisiert sind, da diese ebenso die Objektklassen, die Fachplanungsrecht abbilden, in ihren Softwareprodukten implementieren müssten. Das Objektmodell XPlanung XPlanGML 4.0 beschränkt sich in den Fachschemata Bebauungsplanung und Flächennutzungsplanung wieder auf die Abbildung der Regelungen des BauGB, der BauNVO, der PlanzV. Nachrichtliche Übernahmen, Festsetzungen des besonderen Städtebaurechtes sowie weitere Schutzgebiete werden in einem eigenen Fachschema zusammengefasst. Bei Bedarf können diese Modellierungen auch gegen Modellierungen aus der Community des jeweiligen Fachplanungsrechts ersetzt werden.

Mit diesen beschriebenen Konzepten können zwar das aktuelle Planungsrecht nach BauGB sowie die Inhalte von Bauleitplänen inkl. der Abbildung von Festsetzungen des Fachplanungsrechts abgebildet werden. Der Anspruch, das gesamte gültige kommunale Planungsrecht zur Unterstützung von E-Government Anwendungen digital gemäß einem einheitlichen Objektmodell abzubilden zu können, kann noch nicht vollständig erfüllt werden. In vielen deutschen Kommunen gibt es Gebiete (z.B. Berlin, Hamburg, Stuttgart), die auf Basis heute nicht mehr gültigen Planungsrechts beplant worden sind. In diesen Bereichen gilt das historische Planrecht faktisch weiter. Um das in diesen Bereichen gültige Planungsrecht als Basis für E-Government Anwendungen abbilden zu können, muss das Datenmodell XPlanGML individuell erweitert werden können. Da dieses historische Planungsrecht in der Regel nur Gültigkeit für bestimmte Länder (z. B. Gesetz über den Aufbau der Hansestadt Hamburg von 1950) oder Kommunen hatte, ist eine Erweiterung des

XPlanGML-Kerns nicht sinnvoll. Stattdessen müssten auf Ebene einzelner Länder oder Kommunen spezifische Erweiterungen definiert werden. Dafür gibt es verschiedene Möglichkeiten und technische Konzepte, die jeweils Vor- und Nachteile haben.

Ziel des Beitrags ist es, diese Konzepte am konkreten Beispiel der Freien und Hansestadt Hamburg aufzuzeigen und zu vergleichen. Dazu werden, nach einem Exkurs in die historische Entwicklung des Hamburger Planungsrechts, verschiedene Erweiterungsmöglichkeiten innerhalb und außerhalb des Standards XPlanGML beschrieben und in ihren Vor- und Nachteilen verglichen. Am besten geeignet erscheint die Definition spezifischer Codelisten in Verbindung mit einer Adaption des Application Domain Extension (ADE) Mechanismus, der im Rahmen des OGC-Standards CityGML (OGC 2008) erstmals beschrieben wurde, Eine mögliche XPlanGML ADE für das historische Hamburger Planungsrecht wird abschließend in diesem Beitrag skizziert.

3 DAS HAMBURGER PLANRECHT NACH 1945

Ab 1950 begannen auf Grundlage des Aufbauplans von 1950 die städtebaulichen Planungen für einen Neuaufbau der FHH mit dem Ziel, für alle Flächen der Stadt verbindliches Planrecht zu schaffen. Die Umsetzung erfolge in erster Linie über die Baustufenpläne. Gesetzesgrundlage für die Baustufenpläne war die Baupolizeiverordnung für die Hansestadt Hamburg (BPVO) vom 8. Juni 1938, die nach der Etablierung von „Groß-Hamburg“ am 1. April 1938 das zersplitterte und veraltete Planrecht vereinheitlichen sollte. Baustufenpläne wurden für größere Teilbereiche wie z.B. Ortsteile im Maßstab 1:5.000 aufgestellt. Inhalte waren die zulässigen Nutzungsarten entsprechend § 11 BPVO (Kleinsiedlungsgebiet, Wohngebiet, Mischgebiet, Geschäftsgebiet, Industriegebiet), die Geschosszahl von Gebäuden sowie die Abgrenzung der Baugebiete von den Außengebieten und die Bauweise. Der allgemeine Rahmen für die bauliche Nutzung der Stadtgebiete wurde durch die Baustufenpläne gegeben. Die endgültige Festsetzung der baulichen Nutzbarkeit von Grundstücken sowie Straßen- und Baulinien erfolgte anhand der Teilbebauungs- und Durchführungspläne. Insgesamt wurde Hamburg mit 62 Baustufenplänen fast vollständig überplant.

In der Zeit des Aufbaus ab 1950 bedurfte die städtebauliche Planungsarbeit einer gesetzlichen Handhabe vor allem für die Verkehrsplanung in Wiederaufbaugebieten, um nicht durch andere Bauvorhaben verhindert zu werden. Daher wurden private Flächen für öffentliche Zwecke mittels Teilbebauungsplänen nach dem Bebauungsplangesetz (BPlanG) vom 31. Oktober 1923 gesichert. Dies umfasst die Flächen für den Straßenverkehr, den Gemeinbedarf und Grünflächen. Wichtigstes Kriterium war dabei das im Vergleich zum Verfahren für Durchführungspläne kurze Verfahren zur Aufstellung von Teilbebauungsplänen. Nach § 3 Abs. 1 BPlanG von 1923 gelten die Pläne über einzelne Straßen- und Baulinien als Teilpläne. Die rechtliche Grundlage zur Feststellung eines Teilbebauungsplans stellten die §§ 2 (Beschränkungen der Grundstücke) und 4 (Feststellung des Bebauungsplan) des BPlanG von 1923 dar.

Aufgabe der Durchführungspläne nach dem Aufbaugesetz war der Wiederaufbau von Teilgebieten in Hamburg. Rechtliche Grundlage für die Durchführungspläne waren die §§ 10 bis 14 des AufbauG vom 11. April 1949. Da die zum Teil sehr detaillierten Festsetzungen in den Durchführungsplänen nicht immer vollständig zum Ausdruck gebracht werden konnten, wurde diese regelmäßig durch die weiterhin geltenden Bestimmungen der BPVO von 1938 ergänzt. Die Durchführungspläne wurden für einzelne oder mehrere Baublöcke erstellt und beinhalteten eine detaillierte Darstellung als Baustufenpläne. In der Regel wurden diese Pläne in einem Maßstab von 1:1000 erstellt und umfassten daher nur kleinere Gebiete wie z.B. einen Baublock. Inhalt der Pläne waren alle Festsetzungen, die für die Bebauung der Grundstücke nach Fläche und Höhe notwendig waren. Weitere Inhalte der Pläne waren die Aufteilung der Gebiete in Flächen öffentlicher und privater Nutzung, die Verkehrseinrichtungen, die Versorgungsleitungen, die Mindestgröße sowie die Nutzungsart und der Nutzungsgrad des Grundstücks.

Mit dem Inkrafttreten des BBauG im Jahre 1960 verloren das BPlanG von 1923, die Baupolizeiverordnung von 1938 sowie das AufbauG von 1949 seine Rechtskraft, dennoch gelten die Festsetzungen der Altpläne entsprechend § 173 Abs. 3 Satz 1 BBauG von 1960 fort.

4 ERWEITERUNGSMÖGLICHKEITEN DES STANDARDS XPLANGML

Die im Kap. 3 durchgeführte Analyse des historischen, aber dennoch in vielen Gebieten der Stadt weiterhin gültigen Hambuger Planungsrechts hat deutlich gemacht, dass eine vollständige Überführung der Inhalte des DIP in das XPlanGML-Format nicht möglich ist. Da die zusätzlichen, durch das XPlanGML-Datenmodell

nicht abgedeckten Planinhalte sehr spezifisch für die FHH sind und in dieser Form wohl nirgendwo anders in Deutschland auftreten ist es nicht sinnvoll, sie im bundesweit gültigen Standard zu berücksichtigen. Es muss vielmehr eine technische Möglichkeit geschaffen werden, den Standard für die Abbildung derartiger kommunal- oder landesspezifischer Inhalte flexibel erweitern zu können. Dabei sollte die Erweiterung konsistent mit dem Basis-Datenmodell sein und ihre Auswirkungen auf den interoperablen Austausch digitaler Planinformationen minimiert werden.

4.1 Intrinsische Erweiterungsmöglichkeiten des XPlanGML Standards

Dass XPlanGML mit seinen spezifischen, auf ganz bestimmte Inhalte der gesetzlichen Rahmenbedingungen bezogenen Klassen und Attributen nicht jeden existierenden oder gesetzlich zulässigen Plan wiedergeben kann war den Entwicklern des Datenmodells von Anfang an klar (Krause, Benner 2006). Deshalb wurden bereits innerhalb des Standards Möglichkeiten zur Öffnung des Datenmodells definiert. So kann

- der diskreten Wertebereich vieler zur Klassifikation genutzter Attribute durch sog. Codelisten kontrolliert erweitert werden;
- jede Klasse um zusätzliche generische Attribute mit einfachem Datentyp (Text, Ganzzahl, Dezimalzahl, Datum, URL) ergänzt werden;
- ein durch den Standard semantisch nicht abgebildeter Planinhalt mit punkt-, linien- oder flächenhaftem Raumbezug durch eine generische Objektklasse erfasst werden.

Attribute mit diskretem Wertebereich spielen in einem semantischen Datenmodell wie XPlanGML eine wichtige Rolle. Die zulässigen Werte dieser Enumerations-Attribute („Schlüsselnummern“) sind über das XML-Schema des Standards definiert, und den Schlüsselnummern werden über externe Wörterbücher auch für den Anwender verständliche Bedeutungen zugeordnet. Die korrekte Verwendung der Schlüsselnummern kann deshalb in einem XPlanGML Instanzdokument softwaregestützt überprüft werden. Damit können Enumerations-Attribute für spezifische Klassifikationen (z.B. „Art der baulichen Nutzung“ oder „Zweckbestimmung einer Gemeinbedarfsfläche“) benutzt werden. Eine automatische Auswertung und Interpretation von Schlüsselnummern, z.B. zur Flächenbilanzierung oder graphischen Darstellung des Plans ist möglich.

Die explizite Festlegung der zulässigen Werte eines Enumerations-Attributs durch das XML-Schema hat aber auch Nachteile, da sie die möglichen semantischen Bedeutungen dieses Attributs abschlie-ßend festlegt. So kennt der Standard XPlanGML in der Version 4.0 insgesamt 10 „allgemeine Zweckbestimmungen“ einer Gemeinbedarfsfläche (z.B. „Öffentliche Verwaltung“ oder „Soziale Zwecke“), die mit 32 „besonderen Zweckbestimmungen“ (wie „kommunale Einrichtung“ oder „Einrichtung für Kinder“) spezialisiert werden können. Insbesondere auf der Ebene der speziellen Zweckbestimmungen können aber nicht alle Begriffe berücksichtigt werden, die eventuell in einem Plan vorkommen können und bei der Plandarstellung durch spezielle Symbole wiedergeben werden sollen. In diesem und vielen anderen Fällen gibt es deshalb ein Attribut „detaillierte Zweckbestimmung“, dessen Wertebereich außerhalb des Standards durch eine Codeliste frei definiert werden kann.

Mit Codelisten wird aber nur der Wertebereich schon vorhandener Attribute erweitert, es können keine zusätzlichen Attribute definiert werden. Dies ist aber notwendig, wenn für eine im Standard definierte Klasse zusätzliche Informationen wie z.B. neue Maßzahlen, Datumsangaben oder Texte erfasst werden müssen. Für diesen Zweck definiert XPlanGML generische Attribute, mit denen jede vorhandene Klasse erweitert werden kann. Bei der praktischen Anwendung gibt es aber eine Reihe von Einschränkungen:

- Die semantische Bedeutung eines generischen Attributs ist nur durch den Attributnamen definiert. Da dieser nur ein freier Text ist kann die korrekte Verwendung nicht softwaregestützt überprüft werden.
- Es können keine zusätzlichen Enumerations- oder Codelisten-Attribute definiert werden.
- Es können nur Attribute mit einfachen Datentypen definiert werden, aber z.B. keine Attribute mit (physikalischen) Maßeinheiten.

Die dritte Möglichkeit zur Erweiterung des XPlanGML-Standards sind generische Objekte. Für jede in Standard berücksichtigte Plan-Art (BPlan, FPlan, ..) gibt es eine entsprechende Klasse für generische

Objekte. Sie kann verwendet werden, wenn keine vorhandene Klasse mit explizit festgelegter semantischer Bedeutung zur Abbildung eines bestimmten Planinhalts in Frage kommt. Jede generische Objektklasse hat ein Attribut „zweckbestimmung“, dessen Wertebereich durch eine Codeliste definiert wird. Damit können generische Objekte auch zur Wiedergabe unterschiedlicher Planinhalte klassifiziert werden. Wenn neben der reinen Klassifikation noch eine zusätzliche Attributierung notwendig ist kann dies über die schon erwähnten generischen Attribute - mit allen beschriebenen Einschränkungen - realisiert werden.

4.2 Erweiterung durch Spezialisierung von XPlanGML-Klassen

Der zentrale Schwachpunkt der innerhalb des Standards XPlanGML vorgesehenen Erweiterungsmöglichkeiten ist, dass keine zusätzlichen komplexen Attribute definiert werden, deren Syntax durch ein XML-Schema definiert ist. Dies ist aber zur objektorientierten Modellierung komplexer Sachverhalte unverzichtbar.

Bei der Erweiterung der auf bundesweit gültigen Rahmengesetzten beruhenden „Kernmodelle“ der Regional- und Landschaftsplanung ist man deshalb anders vorgegangen (Benner et al. 2008). Für die Entwicklung der landesspezifischen Datenmodelle wurden die Klassen des jeweiligen Kernmodells mit dem objektorientierten Mechanismus der Vererbung bzw. Spezialisierung erweitert. Diese Erweiterung wird durch ein eigenes UML-Diagramm und daraus abgeleitetes XML-Schema definiert, so dass die syntaktische Korrektheit von Instanzen des erweiterten Datenmodells automatisch geprüft werden kann.

Diese Erweiterungsmethode durch objektorientierte Spezialisierung kann im Prinzip auch außerhalb des Standards zur Modellierung landesspezifischer Inhalte von Bauleitplänen oder zur Abbildung historischem Planrechts benutzt werden. Als Ausgangsklassen für die Spezialisierung können entweder Basisklassen des XPlanGML Objektmodells wie BP_Flaechenobjekt oder fachspezifische Klassen wie BP_BaugebietsTeilFlaeche benutzt werden. Abb. 1 zeigt zwei Beispiele, wie auf diese Art und Weise Baugebiete modelliert werden, die nach der Hamburger BPVO von 1938 festgesetzt sind (BP_BaugebietsTeilFlaeche_FHH), sowie Flächen ausgewiesen werden, die keine Nutzung haben oder von jeder Bebauung freizuhalten sind (BP_SonstigeFestsetzung_FHH).

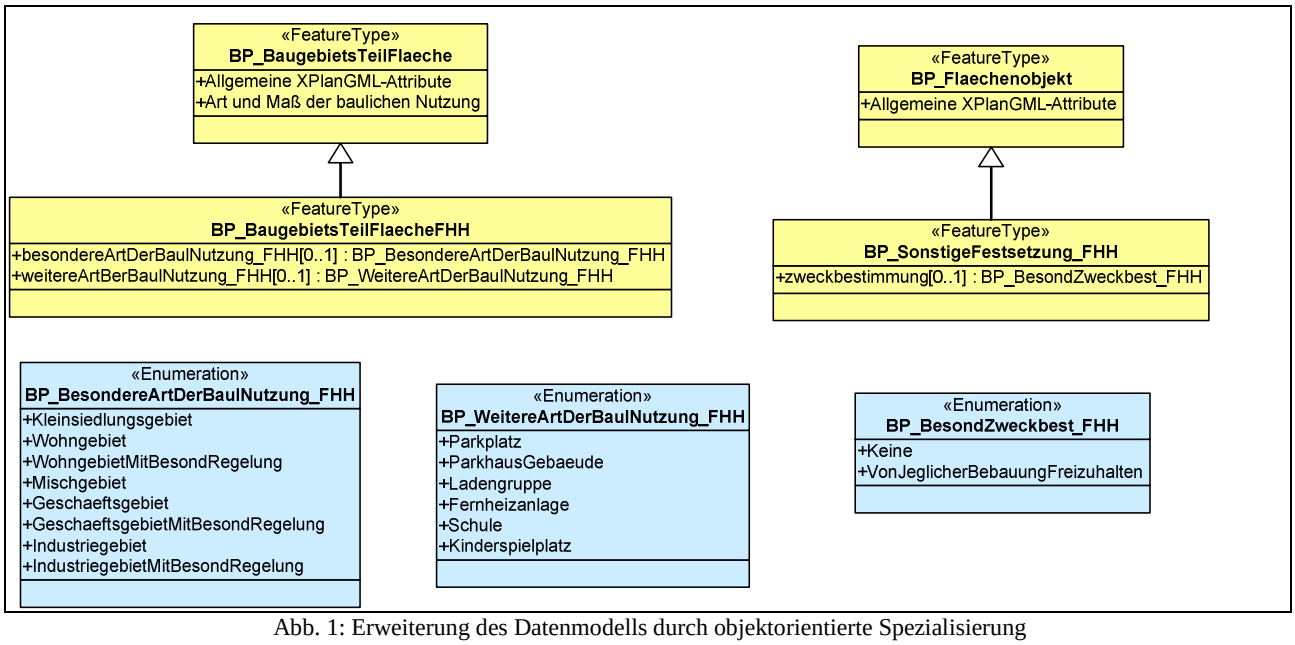

Abb. 1: Erweiterung des Datenmodells durch objektorientierte Spezialisierung

In den abgeleiteten Klassen stehen alle Attribute der Basisklasse (Raumbezug, Höhenangaben, Referenzen auf externe Dokumente, Maß der baulichen Nutzung, …) zur Verfügung, sowie zusätzlich die spezifischen Attribute der Erweiterung. Der zentrale Nachteil des Vererbungsmechanismus ist, dass die abgeleitete Klasse immer einen anderen Namen als die benutzte Basisklasse hat. Beim Datenaustausch mit Systemen, die nur den Basisstandard XPlanGML implementiert haben, werden Objekte der Klasse BP_BaugebietsTeilFlaeche_FHH deshalb im Regelfall nicht als spezielle, nur auf anderer gesetzlicher Grundlage ausgewiesene Bauflächen erkannt. Die Objekte dieser Klasse können von Standardsystemen nicht interpretiert werden und gehen beim Datenaustausch eventuell verloren.

4.3 Erweiterung durch eine Application Domain Extension (ADE)

Der Mechanismus der Application Domain Extension (ADE) wurde für das CityGML-Datenmodell (CityGML 2008) entwickelt und ist Bestandteil des OGC-Standards CityGML 1.0. Er dient dazu, den Basisstandard mit möglichst geringen Einschränkungen der Interoperabilität applikationsspezifisch erweitern zu können. Unter anderem existieren ADEs zur Lärmschutzkartierung (Czerwinski 2007) sowie zur Modellierung von unterirdischen Objekten oder Brücken. Einige dieser Erweiterungen sollen in der nächsten Version CityGML 1.1 in den Basisstandard aufgenommen werden.

Jede ADE wird durch ein eigenes XML-Schema spezifiziert, so dass die Gültigkeit von Instanzdokumenten einer ADE automatisch geprüft werden kann. Eine ADE gestattet es, neue semantische Klassen durch Spezialisierung von Klassen des Basisstandards (siehe Kap. 4.2) zu bilden. Zusätzlich ist es aber auch möglich, eine existierende Klasse des Basisstandards durch zusätzliche Attribute zu ergänzen. Die ADE Erweiterung des XPlanGML-Datenmodells zur Abbildung von Baugebieten nach der Hamburger BPVO zeigt Abb. 2. Entscheidend ist, dass auch in der Erweiterung der Klassenname „BP_BaugebietsTeilFlaeche“ verwendet wird. Damit kann jede Software, die den Standard XPlanGML unterstützt, die zugehörigen Objekte und die verwendeten Standard-Attribute verarbeiten. Die ADE erweitert die Attributierung von BP_BaugebietsTeilFlaeche um zwei spezifische, nur innerhalb der FHH relevante Attribute, die von Standard-Implementierungen überlesen werden.

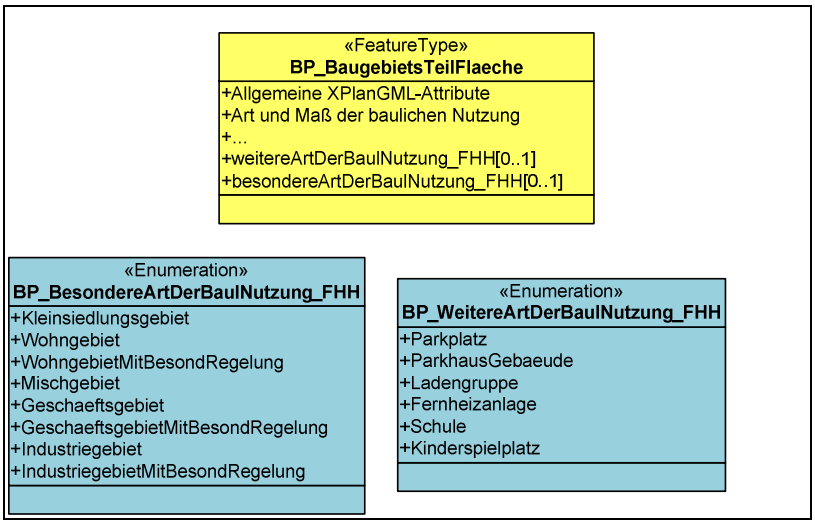

Abb. 2: Erweiterung mit Hilfe einer ADE

Damit ein Standard wie XPlanGML mit einer ADE erweitert werden kann, muss das zugehörige XML-Schema modifiziert werden (CityGML 2008). Die Modifikation beschränkt sich aber darauf, die vorhandenen Klassen um zusätzliche abstrakte Attribute zu ergänzen, die dann der ADE als Ansatzpunkte für die Erweiterung dienen. Damit hat die Modifikation keinerlei Auswirkungen auf Instanzdokumente des Basisstandards.

5 XPLANGML ERWEITERUNG „HISTORISCHES HAMBURGER PLANRECHT“

Wie schon erwähnt muss das XPlanGML Datenmodell zur vollständigen Abbildung des Hamburger „Digitalen Informationssystem Planung“ erweitert werden. Dies geschieht am zweckmäßigsten durch eine problemgerechte Kombination der standardinternen Öffnungsmechanismen (Codelisten, Generische Objektklasse, s. Kap. 4.1) mit einer speziellen ADE (s. Kap. 4.3). Im Einzelnen sind die folgenden aufgeführten Erweiterungen bzw. Anpassungen notwendig.

- Zur Unterscheidung der Festsetzungen nach aktuell gültigem Planrecht von Planinhalten, die auf historischem Planrecht beruhen ist es notwendig, zumindest bei letzteren die rechtliche Grundlage zu spezifizieren. XPlanGML hat dafür das Attribut „gesetzlicheGrundlage“ der Basisklasse „XP_Objekt“ vorgesehen, das in allen Fachobjekten spezifiziert werden kann. In XPlanGML 4.0 wird der Wertebereich dieses Attributs durch eine Codeliste spezifiziert, die um die Einträge „BPlanG 1923“, „BPVO 1938“ und „AufbauG 1949“ zu ergänzen ist.

- Der spezielle Typ eines Bebauungsplans wird im Datenmodell durch die beiden Attribute „planArt“ (Enumeration) und „sonstPlanArt“ (Codeliste) der Klasse „BP_Plan“ spezifiziert. Die Enumeration umfasst nur BPlan-Typen nach heutigem BauGB, zur Abbildung eines auf älterem Planrechts beruhendem Plans ist die Plan-Art „Sonstiges“ zu verwenden. Die Codeliste muss um die Einträge „Fluchtlinienplan“, „Durchführungsplan“, „Teilbebauungsplan“ und „Baustufenplan“ ergänzt werden.
- In Hamburger Bebauungsplänen bis 1970 wurde teilweise nicht zwischen den Nutzungen „Landwirtschaft“ und „Forstwirtschaft“ unterschieden (Kirchenbauer 2009). Deshalb können diese Festsetzungen nicht durch die XPlanGML Klassen „BP_Landwirtschaft“ bzw. „BP_WaldFlaeche“ modelliert werden. Die historischen Ausweisungen haben im DIP keine weiteren Attribute und können damit prinzipiell durch die generische Klasse „BP_GenerischesObjekt“ abgebildet werden, wenn die Codeliste „BP_ZweckbestimmungGenerischeObjekte“ um einen Eintrag „Land- und Forstwirtschaft“ er-weitert wird.
- Die Modellierung von Baugebieten nach BPVO kann durch eine ADE-Erweiterung der Klasse „BP_BaugebietsTeilFlaeche“ erreicht werden (s. Kap. 4.3).
- Zur Abbildung der restlichen Inhalte des DIP sind noch drei neue Klassen notwendig, die durch eine ADE-Erweiterung des Basisklasse „BP_Flaechenobjekt“ gebildet werden können:
    - „BP_Aussengebiet_FHH“ zur Abbildung von Außengebieten nach BPVO; die spezielle Nutzung der Außengebiete (Sportplatz, Kinderspielplatz, …) wird durch ein Enumerations-Attribut abgebildet;
    - „BP_SonstigeFestsetzung_FHH“ zur Abbildung der Festsetzungen „Keine Nutzung“ sowie „Von jeglicher Bebauung freizuhalten“ (s. Kap. 4.2);
    - „BP_BesondereZweckbestimmung_FHH“ für nicht näher differenzierte Flächen in Altplänen, die verschiedenste Nutzungen aus dem Bereich Gemeinbedarf und Ver- / Entsorgung haben.

6 ZUSAMMENFASSUNG UND AUSBLICK

Die vollständige Erfassung aller Inhalte des Hamburger „Digitalen Informationssystem Planung (DIP)“ ist mit dem XPlanGML Datenmodell, das auf den Inhalten der aktuellen, bundesweit gültigen Planungsgesetzgebung basiert, nicht möglich. Viele Inhalte des DIP geben Planfestsetzungen nach älteren Landesgesetzen wieder. Diese Festsetzungen sind weiterhin rechtlich gültig, auch wenn die zugrunde liegenden Gesetzeswerke inzwischen durch Bundesgesetze abgelöst wurden. Die zugehörigen Inhalte des DIP können deshalb im Datenformat XPlanGML nicht adäquat wiedergegeben werden.

Der Beitrag hat deshalb verschiedene technische Möglichkeiten zur Erweiterung des Standards aufgezeigt. Neben den im Standard bereits angelegten Erweiterungsmechanismen von Codelisten, generischen Objekten und generischen Attributen wurde dabei vor allem auf Application Domain Extensions (ADE) eingegangen. Diese Technik wurde für den OGC-Standard CityGML entwickelt und lässt sich leicht auf XPlanGML übertragen. Die vollständige Modellierung des historischen Hamburger Planungsrechts ist am besten mit einer Kombination standardinterner Erweiterungen mit einer geeigneten ADE zu verwirklichen.

Der ADE Erweiterungsmechanismus bietet im XPlanung Kontext noch vielfältige weitere Anwendungsmöglichkeiten. So bräuchten zukünftige landesspezifische Datenmodelle für die Regional- oder Landschaftsplanung nicht mehr im Rahmen des bundesweit gültigen Standards XPlanung definiert und gepflegt werden, sondern dezentral als ADE-Erweiterung der jeweiligen Kernmodelle. Auch zur Erweiterung des Standards auf andere Fachplanungen bietet es sich an, diese zunächst außerhalb des Standards als ADE zu definieren, die bei Bedarf leicht in eine neue Version des XPlanGML-Basisstandards überführt werden kann.

7 REFERENZEN

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KornetCity: An Operational Model for Belgrade, Serbia

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1 ABSTRACT

KornetCity is a conceptual model that focuses on reducing start up and operational costs for small and medium enterprises by equipping office buildings in mostly residential areas. The conceptual model has the advantages of reducing the need for traditional transport investments, parking, and reduced GHG emissions. In this paper, the conceptual model is further elaborated for the specific case of Belgrade, Serbia. Here, the focus is on contextual economic conditions (described and analyzed in terms of economic cluster theory applied to tertiary sector), occupational characteristics (described and analyzed in terms of the local occupational structure and potential areas of strength), and the distribution of potential office buildings. Three typical "kornets" – based on a sector-occupational characterization – are described.

2 INTRODUCTION

The prospects for urban planning, particularly efforts that rely on urban technologies, on being able to help create liveable, healthy and prosperous cities for everyone require, at their core, some notion of economic processes. Economic opportunity is a fundamental principle of the current, market-oriented global economy. In the current world, economic opportunity ranges from global businesses to the local entrepreneur who "fills in the agglomeration effects" necessary for the global businesses to compete successfully. That is, global businesses rely on the existence of a local pool of small and medium size enterprises (SME) to fill in necessary pieces of their production function, ranging from idea creation, to idea visualization, to printing, advertising, and negotiation. A major problem facing these small and medium size firms is the entry cost into the market of firms and capital.

KornetCity is a conceptual model that focuses on reducing start up and operational costs for small and medium enterprises (Dimitrijevic, 2008; Grozdanic and Dimitrijevic, 2009). There are two key ideas. The first is to provide the office space in pedestrian distance for the people working in the tertiary sector that mostly perform their work using computers. There are two ways of doing that: by constructing new Kornet office buildings or by reconstructing the vacant and/or underutilized buildings located in or near residential areas. In virtually every medium sized city in Europe there is a ring of vacant and/or underutilized buildings around a revitalized core. These buildings create dark spaces between the revitalized core and the nearby residential districts. The second idea is to equip office suites in these buildings with the IT functionalities necessary to carry out the business aspects of small and medium size firms. Similar to the efforts of IBM and CISCO in promoting the use of technological innovations to solve urban and metropolitan issues, KornetCity is based on the idea of individual "kornets" – individual office suites appropriately equipped. The very first "kornet" is currently in the seed stage of development in Belgrade, Serbia.

The expected results of using the Kornet concept is to create a more balanced level of development in the whole territory of cities than it is the case today in most of them (i.e. "city" zones with concentrated office buildings). Such a scheme could reduce the number of passengers that participate in every day commuting in motor vehicle traffic in cities, the time and money people spend commuting, GHG&CO2 emission caused by motor vehicle traffic, re/construction costs of office buildings and last, but not least reducing the start up and operational costs for small and medium enterprises. The bottom line is that this concept offers a more efficient (public budget savings!) way to development.

The purpose of this paper is to demonstrate how the idea of KornetCity, originally created as an advocacy position by the firm CITYPLAN, is and can be further grounded within mainstream economic strategies and policies consistent with the workings of the contemporary global economy. The paper is organized as follows. In the next section, we review the major theoretical treatments of role of small and medium size enterprises in the overall competitiveness of urban areas, including considerations of economic cluster theory and the role of the IT sector. This is followed by a general discussion of the KornetCity concept. The research problem here is to develop an operational model of the KornetCity concept based on the characteristics of the Belgrade's economic status and potential. The penultimate section contains three

typical "kornets" – for a creative office, for a government-like service office, and for a producer service office. The final part of the paper presents an overview of results, our contribution to the literature, and suggestions for future research.

3 THE ROLE OF SME'S IN THE ECONOMIC "PRODUCTION FUNCTION"

Here, we do two things. First, we review prevailing literature regarding the creation of a sustainable economic structure for metropolitan regions, focusing on the role of small and medium size enterprises in economic processes. Second, we provide a brief overview of the economic characteristics of the Belgrade metropolitan region

3.1 Theory of Small and Medium Size Enterprises

The role of small and medium enterprises (SME) in the economic production function of a city region is often overlooked in an era that focuses on globalization and transnational corporations. The hard reality is that in most economies, small enterprises are major players. One recent estimate contains the following "parameters": globally, 99% of all businesses are small and medium size enterprises, they account for 40%-50% of GDP; in the EU, SME's comprise 99% of all firms and employ over 65M people (http://en.wikipedia.org/wiki/Small_and_medium_enterprises, accessed 5 February 2010).

The term SME, and its close associate SMB, is in common use throughout both the developed and developing world. As is a common problematic, the term has many definitions, depending on country or place. The EU has attempted standardization as follows: micro (fewer than 10 employees), small (those with fewer than 50 employees) and medium (those with fewer than 250 employees). Another interesting term is SOHO that describes "small offices" of fewer than 10 employees. Very little is really known about these SOHOs.

The importance and role of SMEs in the overall economic production function raises a number of important strategic and economic policy questions, one of which is the general economic issues of "ease of entry" into the marketplace" with its often-associated corollary "start-up costs" or "investment capital".

Finally, their role in the economic production function of metropolitan regions is related to principles of economic cluster theory, aspects of the occupational structure including attributes of the creative economy, and the potentials of the IT sector to promote urban growth.

3.1.1 Cluster Theory

The most important stream of strategic thinking and research is economic cluster theory. Two attributes of cluster theory are particularly important. First, that "clustering" is normatively the (only) mechanism that could guarantee economic success. Notice that a cluster does not necessarily guarantee economic success, but success cannot be achieved without clustering. Second, that there is NOT a direct correlation between "concentration of economic activity" and "economic cluster." Magnitude of employment in a specific place may or may not be for example a competitive arrangement but simply co-location of activities. The case of a declining shopping center is sufficient to make the point.

Three cluster theorists provide guidance for how to know and measure the existence and value of a set of economic activities. Porter's industrial cluster theory (2002) and its application to urban areas (1995) appear most appropriate for the design of new clusters. Yet clusters are more than unsubstantiated policy tools and can be empirically verified. At the evaluation level, Van den Berg et al. (2001) provides a clear set of intuitive criteria to assess existing and emerging clusters. Focusing on different sectors (cultural, electronics, telecommunications, health, media, and tourism), Van den Berg et al. lay out three broad potential criteria. They, and their components, include: (1) spatial economic conditions (strong local demand, intra- and inter-regional accessibility, quality of life, and 'cultware'); (2) cluster specific conditions (initial size and development, cluster engines, strategic interaction, and level of new firm formation); and (3) organizing capacity (strong shared vision, political/social support, and public-private partnerships). Finally, Mommaas (2004) is concerned with "place-based development." Mommaas' criteria to evaluate clusters include: horizontal aspects; vertical aspects; internal organization factors; external organizational factors; integration and/or openness; specific development paths; and spatial organization. These are all recognizable terms in the language of agglomeration and urbanization economics (cf. Bogart, 1998). Mommaas then examines these criteria in terms of five attributes of overall development practice including: (1) strengthening the

identity, attraction power and market position of places; (2) stimulating a more 'entrepreneurial approach, (3) stimulating innovation and creativity, (4) finding a new use for old buildings and derelict sites, and (5) stimulating cultural diversity and cultural democracy.

3.1.2 Creative Enterprises

Once again, there are three theorists that dominate this arena. First, Howkins' The Creative Economy: How People Make Money from Ideas (2001) focuses on industrial groups and employment categories deemed "creative." His fifteen industrial sectors are (quoting from Florida, 2002, p. 47): R&D, Publishing, Software, TV and Radio, Design, Music, Film, Toys and Games, Advertising, Architecture, Performing Arts, Crafts, Video Games, Fashion, and Art, listed in descending order of global expenditures. The message is clearly one of "creativity at work": those industrial sectors covered by intellectual property law – aspects of law that cover patents, copyrights, trademarks, and designs (Healy, 2002).

Landry's The Creative City (2004, in its fourth edition since 2000) is one of the mantras of local politicians and economic development practitioners. Landry's book and practice (www.comedia.org.uk) emphasize place. The descriptions and precedents are particularly useful in the UK and other European contexts where the planning of cultural quarters (one, but not the only, use of the word "creative") is an instrument of downtown revitalization. Any benefit to the economy is, at best, circumstantial. A number of scholars have described, evaluated and/or suggested improvements to this kind of practice (e.g., McCarthy, 2005).

Finally, Florida's Who's Your City (2008), based on concepts and ideas originally developed in Rise of the Creative Class (2002) focuses on occupations and characteristics of workers, particularly in the "creative" class. There are arguably three basic premises. First is that the economy can be broken down into four or five categories of workers, defined on the basis of occupations, some of which are called "creative." The creative group is composed of two groups – the super-creative and the (merely?) creative. Second, over the long term (roughly the 20th century) the proportion of the total working in these classes of occupations has been rising. Third, and perhaps most controversially, that this class is responsible for growth and that this class is "attracted" to places that are well endowed with talent, technology and tolerance (the 3 T's) of economic development.

Taking a somewhat broader and empirical approach, Prosperi (2005) examined the distribution of the set of creative firms in the South Florida context. The key point is that all creative firms do not have similar locational attributes. Some prefer the center city location; others more suburban locations. Among those preferring center city locations are lawyers, architects, and other firms that tend do business with governments.

3.1.3 THE IT DIMENSION

The literature on the role of the IT revolution (e.g., Castells, 1996) and sector on urban growth, form, and liveability accounts is voluminous. The trilogy of work by Audirac (2005, 2003, 2002) presents a general overview of the contours of the debate. The general literature points to two "opposite effects": the concentrating effect (agglomeration economics are still important and since IT is the new 'capital' of business operations it must be part of the urban-oriented business location decisions) and the deconcentrating (distance is irrelevant as long as the business is hooked up with the virtual world; people can work from anywhere). More specifically, the IT revolution points to both the "potential reconcentration of certain activities but also to the furtherance of exurban development, sociospatial segregation and traffic gridlock" (Audirac, 2005, p. 212).

Since there is no clear cut answer, the key is to uncover specific synergies in specific contexts – probably based in the principles of economic cluster theory, as above. Yet, a careful tracing of the types of firms that are likely to benefit from center city locations has not been attempted empirically, other than location studies like the empirical findings of Prosperi (2005) above.

In such an environment, it is not surprising that the real estate and IT infrastructure sectors have responded with the twin notions of "smart buildings" and "smart social consciousness". Smart buildings (capable of supporting high end computer systems as part of the building infrastructure) are not new. The clustering of smart buildings into advanced office park for creative, IT dependent, workers is a hallmark of contemporary economic development strategies. What is becoming newer is the notion that the IT providers are developing applications to direct "smarter" decisions. The IBM Smarter Planet campaign

(http://www.ibm.com/smarterplanet/us/en) seeks to work with clients to make the world "smarter" by working on systems to improve performance on roadways, health care, power grids, and food production, among others.

3.2 Belgrade and the Belgrade Region

As the EU expands, cities and regions in central and eastern Europe (CEE) are attracting increasing attention, both academically and professionally. For example, Hirt (2009) outlined the development path of Belgrade focusing on five periods of growth and change the most recent being communist, transitional, and contemporary and shows how its recent past is marked by abrupt shits in political status from a capital of a relatively small nation-state, to a center of larger and prosperous multi-national federation back to a capital of a nation-state. Arguably, economic development policies and strategies are context sensitive; the search for competitive and comparative advantage is at least partially determined by local territorial capital.

There is a Master Plan for the City of Belgrade 2001-2021 (Belgrade Land Development Public Agency, 2003). In the subsequent draft SMART PLAN – a transportation plan (Belgrade Land Development Public Agency, 2008), planners conducted a background analysis comparative study of "comparable" cities. Comparable means populations between .7M and 2.1M and include: Bucharest, Vienna, Glasgow, Copenhagen, Helsinki, Lyon, Munich, Prague, Stockholm, and Torino. The analysis was conducted for twelve other variables including: share of work places in city central zone, GDP per capita, motorization ratio, mobility rates, length of road network per 1000 inhabitants, parking lots per 1000 work places in the city central zone, public transit vehicles, modal split, average road speed, average public transit speed, and a ratio of speed on road v. transit. According to this report, Belgrade has the highest proportion of jobs in the central business district and the highest percentage of workers travelling by public transport (53%), and about average percentages of people walking to work. But Belgrade also has the lowest GDP per capita, motorization ratio, mobility rate, road network length, number of downtown parking lots, average travel speed on public transportation, and share of financial assistance to allocate to transport, and number of downtown parking lots. However, the ratio of road speed/public transport speed is second, lagging only behind Torino. Interestingly, only Munich has a negative number on this indicator, meaning that it is the only city among the comparables in which public transportation speeds are higher than road speeds.

3.2.1 Some General Population Characteristics

According to Wikipedia, the population recorded in the 2002 census revealed a population of 1.576M in the "larger-city" area and 1.273M in the "inner-city" area. Recent polls show that the "larger-city" area has increased by 400K in just five years, yielding an official estimate in 2007 of 1.63M. The "inner-city" area, which is consistent with the political boundaries of the City of Belgrade, has, according to Master Plan (2003, chap 1.3.2, table 1) a population of 1.352M in 2005. The official planning estimate by this agency predicts an "inner-city" population of 1.4M by 2021, an estimate that is probably too low.

The population is spread over 17 municipalities, ten of which belong to the "urban zone": Vracar, Stari Grad, Savski Venac, Novi Beograd, Cukarica, Zvezdara, Palilula, Zemun, Rakovica and Vozdovac. The largest in terms of population is Novi Beograd (218K); the smallest is Sopot (20K) in the suburban zone. The geographic extent of the metropolitan area is 3.22K sq km; the city is 396 sq km. Simple calculations reveal a population density of the "inner-city" area of approximately 3414 persons/sq km. This makes it equivalent to Vienna, and higher than Glasgow, Munich (3100), Glasgow, Budapest (2550), and Helsinki (2100), (source: http://www.citymayors.com/statistics/largest-cities-density-125.html).

3.2.2 Economic Sector Analysis

Belgrade is located in the center of South East Europe, at the intersection of the strategic Pan-European transportation corridors No 10 and No 7 linking western and central Europe with the Middle East. It lies at the confluence of the Sava and Danube rivers. The Belgrade airport contains direct connections to 43 European and Asian cities.

Belgrade was the winner of a competition for cities and regions of the future in 2006 and 2007 organized by the Financial Times magazine (other winners were: Paris, Western Europe; Brno, central Europe; Baku, Eastern Europe; and London, northern Europe). This award is based on criteria such as economic potential, operating costs, human resources, transport, IT/telecommunications, and quality of life for foreign investors.

Today, it is estimated that over 35% of Serbia's GDP is generated by the city, which also has 31.4% of the employed population. Belgrade is the most economically developed part of Serbia and is home to the country's National Bank. Other notable companies include Jat Airways, Telekom Srbija, Telenor Serbia, Delta Holding, Comtrade group. Belgrade is a regional center for Societe Generale, Asus, Intel, Motorola, MTV Adria, Draft Foods, Carlsberg, Microsoft, OMV, Unilever, Zepter, Japan Tobacco, P&G, and others (http://en.wikipedia.org/wiki/Economy_of_Belgrade).

Recent studies by Danos Consulting (2009) indicate a number of macroeconomic trends from 2006 through 2009; they are shown below in bullet form:

- GDP has grown by 25%.
- GDP/capita has risen from 3.278 to 4.186 Euros.
- Exports of goods have increased over 200%; imports have declined (but these numbers are particularly sensitive to an "end point" bias, reflecting unique activity in 2009).
- Foreign direct investment in the aggregate and as a percentage of GDP is declining, but not as fast as the "end point" bias would suggest).
- Unemployment has declined somewhat.
- Inflation is higher in the post 2007 fiscal environments.

Some other characteristics, culled from the Master Plan except where noted, are shown below in bullet form:

- The size of the consumer market is 1.7M (source: current market estimates provided by Danos International).
- The ratio of employed persons to total population is .403 (545K/1.352M).
- Of these workers, 73.55% work in the tertiary sector (so, approx 401K). The average monthly income per capita is 47,500 dinar (572 Euros, 903 dollars). Updated numbers suggest monthly grosses of 59,897 dinars (746 Euros, 1082 dollars) and nets of 42,901 (535 Euros, 774 dollars). The average GDP per capita is 10836 dollars in real terms and 18204 in terms of purchasing power parity (http://en.wikipedia.org/wiki/Economy_of_Belgrade).
- There are 62 university-level institutions. Belgrade boasts well educated, fast learning, multilingual and IT literate labor force. Over 8K students graduate from Belgrade University every year, with 1/3 of them adding to the traditionally strong engineering base. According to Gallup International, the percentage of English speakers is the highest in the CEE, and an increasing number of western business schools open their affiliates in Belgrade.
- There are 3.5M trips per day in Belgrade, of which 16% or 530K are for business purposes. The modal split for the journey to work is: 59.07% public transportation, 24.75% private care, 13.87% walking, and 2.31% other.
- According to the Eurostat methodology, and contrasting sharply to the Balkan region in general, 53% of the city's households own a computer and 39.1% of households have an internet connection. These figures are above those of the other regional capitals such as Sofia, Bucharest and Athens. (http://en.wikipedia.org/wiki/Belgrade).

According to Danos, the office market in Belgrade increased between 2008 and 2009 by 8% and now represents approximation 700,000 sq m. Most of this development is in Novi Beograd, with the notable exception of the B2 building in the traditional downtown. The B2 was developed in partnership with Cisco, a leader in the IT industry, has connected IT and real estate development in an attempt to reduce both operation and energy costs. In 2008, the intelligent building B2 was opened. B2 is an almost 24,728 sq m (approx 2.5M sq ft) complex that combines a shopping mall, offices, residential and business apartments with four levels of underground parking. The idea is to create a world-class living and working environment in a smart building that can be operated in a cost- and energy-efficient ways with high levels of physical security. At the heart of the approach is a service-oriented network architecture designed to reduce costs and complexity by replacing formerly disparate systems with one simplified, flexible and scalable Internet Protocol (IP) network. The estimate is that this approach can reduce capital costs by 20-25%, total operating costs by 30%, including a 40% reduction in energy consumption. With significant technological capacity,

this project is targeted at high end residential consumers and firms. However, the office space in this building is only 4K sq m. .

The following data come from the Economic Potential Report obtained from the City's website. They are also highlighted in bullet form:

- Among registered businesses, there are approx 53K businesses and 48K entrepreneurs
- Among the municipalities, Novi Beograd has the largest number of companies and entrepreneurs (9642 and 6689, respectively)
- Stari Grad has the second largest number of companies and the second lowest number of entrepreneurs; Zemun has the third least number of entrepreneurs.
- Among the municipalities in the urban zone, the municipalities with the largest number of entrepreneurs (and hence possible tenants for a KornetCity type activity are: Cukarica, Palilua (which has the second lowest number of "companies", Vozdovac, and Zvezdara.
- Among SME firms, the largest percentages are in "trade, including repair", real estate business and renting, and construction. Of these, only real estate is a tertiary sector activity. Government, health care and social protection, and personal and social services are other possibilities.

4 THE KORNETCITY CONCEPT

The KornetCity concept has several basic building blocks: work spaces, notions of a business plan, and when applied to a geographical locality a geographical distribution based on gravity flows of workers. Each is discussed in turn.

Regarding work spaces, the concept seems to connect the best characteristics of work in the office and work from home. It is especially appropriate for SOHO type businesses, particularly during their start up stage. These work spaces are particularly appropriate for firms and/or occupations that rely on the use of the computer as a principle source of work material. These work spaces are called and are equipped as a NetCell, that is, a place that has all necessary software, hardware, and internet connection as well as sufficient information flow for conference connections to be performed without interruption. These NetCells are aggregated into a specific "kornet" or specific office building.

Regarding the notion of business plans, the KornetCity concept relies on the idea that working in Kornet provides the possibility of renting software per usage, that is, "you pay exactly what you use". This enables the usage of any kind of software with a certain fee. This way software would become economical and legally more accessible which would improve the level of informatics literacy of the population.

Regarding the notion of geographic distribution based on the gravity flow of workers, the basic idea is that these buildings could be spread over the city at a distance of up to 1.6km from each other. This distance is equivalent to a maximum commuting distance of up to 800m, which represents a 10 minute walking distance.

4.1 A Proto-typical Kornet Building

"The schematic appearance of Kornet building exposes differences from traditional office building in the level of integrity of ICT installations. This is shown in Figure 1.

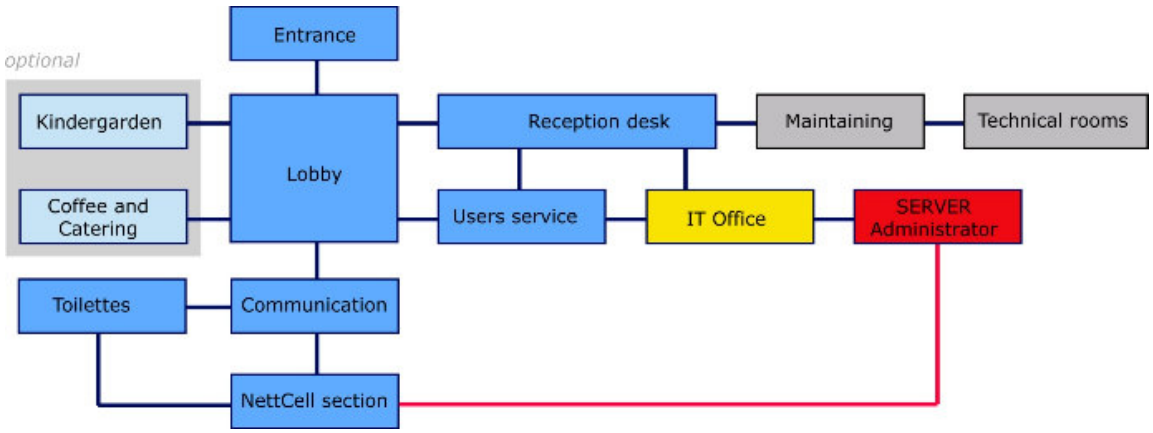

Figure 1: Schematic Presentation of Kornet Office Building Organization

4.2 Business Model

Grozdanic and Dimitrijevic (2009) have argued that KornetCity should be acceptable and convenient for SME and SMB, especially for startup investments.

At the beginning of an entrepreneurial activity, a fundamental idea is that the scope of work and the extent of business will expand. The entrepreneur needs to buy or rent work space. The typical tendency is to both: (1) find space that is usually bigger than current company currently needs, and, (2) buying more software and hardware.

In the Kornet City model, the company rents only what it currently needs, which provides a usage rate of 100%. No matter if the number of employees is increasing or decreasing, this does not require change of company's residency and increased investments in office space. Hardware and software is always 100% used and is most economically and ecologically justified.

4.3 A System of Kornets

Grozdanic and Dimitrijevic (2009) have shown that a system of fully occupied "kornet" buildings distributed at 1.6km apart would decrease traffic in Belgrade and reduce GHG by 8%. These results are based on the notion of capturing employees who would work near their residences. The value of the KornetCity model is based on the transfer of a large percentage of work trips from "mechanized" to "walking".

5 RESEARCH PROBLEM AND METHODOLOGY

What has been missing to date is some firm understanding of the types of firms, and the reasons why they would consider KornetCity considerations. To now, the assumptions are based on market share. To add meat to the overall proposal, this paper begins to focus on what kinds of firms, and what outfitting is needed. The previous work is extended by inclusion of graphic representations of what a Kornet NetCell might look like, and consideration of what the "outfitting" might look like for three proto-typical potential users.

6 RESULTS: AN OPERATIONAL MODEL FOR BELGRADE, SERBIA

There are two major results. The first is general design ideas for basic and advanced NetCells. The second is a description of how these could work for three proto-typical types of firms.

6.1 Designing Typical Kornets for Belgrade, Serbia

Here, we discuss the interior design of a kornet NetCell, and basic ICT considerations for these NetCells.

6.1.1 Basic Rendering of Basic and Advanced Net Cells

A kornet building is based, initially, on the idea that there are two basic types of potential users: basic and advanced. The Basic NetCell has minimal dimensions of 3.0x1.7m (5.1m2). Natural light is provided. The interior design would cost less than 450 Euro/m2 (current Belgrade Fit Out costs). Acoustic insulation between NetCells performed in the rank of sound-proofing as in the standard offices.

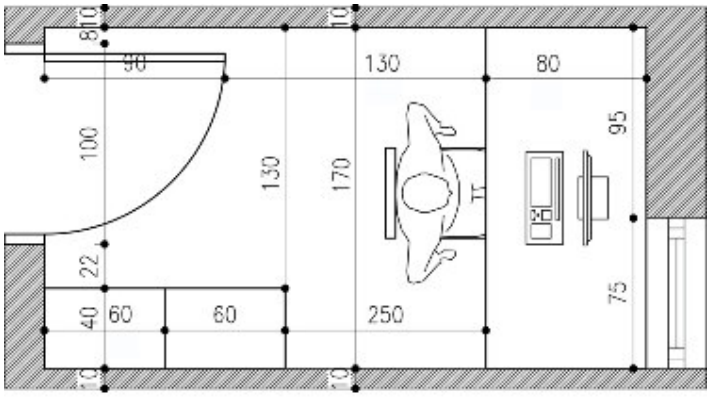

Figure 2: Basic NetCell Layout

The Advanced NetCell has minimal dimensions of 3.0x2.7m (8.1m2) with a window offering a good view. The interior design would cost between 600 and 800 (current Belgrade Fit Out costs), Euro/m2 areal and aesthetic higher quality of office space. A workstation chair that can be converted to a comfortable berth chair in a horizontal position for brief moments of rest or an area designed for coffee breaks. Acoustic insulation between NetCells provides better sound proof conditions (for the need of the specific occupations (radio DJ, musicians, necessity for higher confidentiality when the information needs to be exposed/delivered through talking).

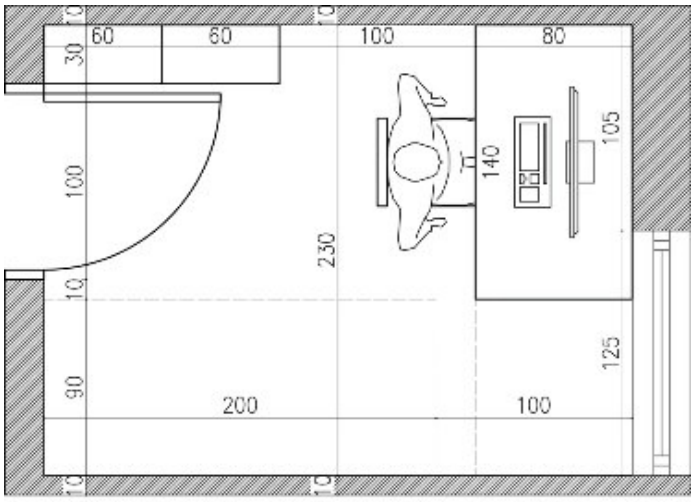

Figure 3: Layout of an Advanced NetCell

6.1.2 ICT parameters for Basic and Advanced Net Cells

The Basic NetCell would have standard network data flow capacity, including those normally used by public service employers (monitor, mouse, keyboard, and other peripherals). Expected users would be: employees of regular importance in companies as well as “additional workers” that could be called in for temporary spikes in workload. These users deal with information up to medium levels of importance.

The Advanced NetCell would have maximum data flow capacity, high level of data transfer security, high quality hardware (large monitors, exclusively latest hardware components, well-known and recognized brand manufacturer). Expected users would be: people running SME or people working as high positioned employees/consultants, etc. dealing with Information of medium to high level of importance.

6.2 Examples for Belgrade, Serbia

Both the theoretical discussions and the discussions of the Belgrade economic situation suggest that there are certain types of businesses that could benefit from a kornet type solution. The theoretical literature suggests very small, SOHO-scale firms in the creative, governmental, and some advanced producer services. Illustrative examples are provided for each.

6.2.1 Example 1: An Architectural or Similarly "Creative Office

The beginning of functioning of an architectural studio as a SOHO-SME considers for the start just one architect working in the studio (as the Owner). It requires the start up investment in Kornet service that includes office space (NetCell), IT support, fast Internet flow, certain level of data security, rent of software according the specific demands of user and usage of external services (printing of large format drawings, scanning, etc.).

During the start period of this architectural studio, the income is almost zero and the expenses in a classical office would demand the significant start up investment like renting a space for studio that would be appropriate for at least two more people for a period of at least twelve months (standard practice for rent agreement in Belgrade). In case of equipping this space with appropriate interior elements hardware and software (performed at the beginning of studio functioning), the risk of investment in an architectural studio is significantly higher than investment in same SME but located in Kornet.

In the first few months of functioning of architectural studio, the one who runs it will spend most of the time trying to get the business engagements. Possibility to work in Kornet as in business incubator provides many options that one SME at the beginning of functioning might experience as an advantage (gathering at the same place companies that might be seen as a potential partner rather than a potential competitor, sharing a "floor secretary", possibility to use meeting hall upon the necessity, IT services upon request and software renting etc.).

If or when the newly founded architectural studio obtains a job that requires the engagement of more than one architect, that creates the necessity to employ co-workers of a certain profile (additional architects, technicians, other engineers). The engagement of those people does not required that they need to be located in the same space, since almost all of their data exchange can be performed through the Internet. This kind of communication enables "additional workers" to work from Kornet that is closest to their home. Thus, the team could work on one project; communicate with no interruption but to be physically dispersed.

Since each of employees is working from his own cubicles, the investment in NetCell renting is always optimal for SME since the rent will last for as long as the employee works for SME. Thus, SME using Kornet is actually using their employees as "outsourcing" and the flow in the number of employees would not create the need for larger/smaller office space. As soon as the job is finished, SME will let go the "additional workers", until other work increase occasions.

6.2.2 Example 2: A Call Operator Service (as an example of a NGO Office)

This example uses a call operator service as an example of a NGO. The more specific association to the work of NGOs or local government is those call centers that are created in and during various sorts of political or public opinion campaigns.

In a call center office, there are two way communications. First, external communication that uses the telephone as major device for communication with users and second, internal communication that is processing collected data for clients. Contact with target group of people is mostly performed in verbal communication that creates a certain level of noise.

Operating the call center in the form of campaigns can last from few days to a few months. According to the specific need of a client, a call center is hired that provides a certain number of operators to the campaign of that client and designates them information they need to provide to target group. Thus, call centers employ large number of operators creating a pressure on spatial demand in classical call operator organization.

Moreover, there exists the possibility that, when work load increases, to disperse additional workers to a nearby Kornet office. That way, the external communication remains the same (telephone) and the internal communication is performed through the Internet connection with the headquarters of the call center.

6.2.3 Example 3: An Advanced Producer Service (Accounting, Legal, etc.) Office

The final example is that of an advanced producer service office such as an accounting or legal office. These services, like most administrative services have an obstacle of overcoming the prevailing preference for analogue form of documents. Still, the validity of electronic signature (the law of the validity of electronic signature was adopted in 2004 in Serbia) creates the expectation that these obstacles can be overcome and that the use of digital forms and electronic signatures will continue to grow.

Considering that, functioning of one accounting office in Kornet is possible today. Invoices could be sent through the internet and authorization of documents could be done in digital form. Since accountant, governance, legal, in one word – all administrative work has as ultimate obligation of archiving files thus, the potential usage of cloud computing (that Kornet could provide) could provide a significant benefit considering safe managing and storage of endless amount of data.

7 CONCLUSION AND EXTENSIONS

The KornetCity concept, previously postulated as a tool for reducing energy-dependent travel, is argued in this paper as a tool for economic development. It has placed the concept within the more general urban economic development literature, which among other things focuses on small and medium enterprises, the need for agglomeration economies, and the role of IT. Using the Belgrade, Serbia context as an example, the results are framed with the need for both design (characteristics of buildings, including the lack of parking spaces) and economic (what types of firms) considerations. Examples of three proto-typical kornet work spaces are provided.

Potential future research topics could include: (1) more "kornet" examples; (2) results of implementation of a "kornet"; and (3) a larger scale "economic" analysis. Each is briefly discussed. First, consider as an example of other types of kornet spaces, the game NetCell. Physically, the minimal dimension is 3.0x2.7m (8.1m2). There is no need for natural light. The orientation and view of the surrounding space is unnecessary and even undesirable. Interior design would cost less than 400 Euro/m2, since such things are of secondary importance. Acoustic insulation between NetCells should be of high quality. Such NetCells that do not require the natural light could be very useful tool in providing the maximum parameters in re/designing Kornet building in the high density constructed areas. The IT parameters include high network data flow capacity. Hardware equipment should provide excellent graphical solution – large high-resolution monitors, fast processors, etc. in short – expensive hardware. Additionally, specific equipment is needed – VR helmets/headsets, gloves, "weapons", steering-wheels, joysticks, and headphones. The option for on-line gaming should be anticipated – therefore, high-volume network data flow is required. The Game NetCell for gaming should be profiled, in terms of size, to the User in sitting position, as well as to allow the said User the room for limited maneuvering (leg se apart, crouching, jumping, lying down, simulation of sitting in a vehicle/a flying craft/on a motorbike, etc). Second, a pilot project underway, consisting of just 7 NetCells, "KornetCity: an IT Business Concept that reduces Motor Vehicle Traffic in Cities" has been endorsed by the European Commission's Sustainable Energy Europe Campaign as an Official Partner. (http://www.sustenergy.org/tpl/page.cfm?pagID=15&id=2698&submod=details). Monitoring and evaluation of this project, estimated to provide significant energy savings, will provide further empirical evidence of the usefulness of this approach. Third, it could be interesting to conduct two related studies: an inventory of potential "kornet" buildings – those that are available for such conversion as well as a much more detailed inventory of SOHO-type firms in the Belgrade context. The forthcoming paper by Dimitrijevic and Prosperi (2010) begins this line of research. The current research reported here indicated that certain sections of the Belgrade have more entrepreneurs than others, areas that would be particularly amenable to KornetCity solutions.

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Learning from Barcelona: Towards Urban Sustainability

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1 ABSTRACT

The compact Mediterranean city is undoubtedly synonymous with the sustainable and libeble city.

Barcelona, constructed in a relatively small area of 92 (square?) km, with a density of 16,000 inhabitants per square kilometer –still one of the highest in Europe–, represents a model that serves to put into question the relationship between the compact city and its administration. It is an administration that, up until Ildefonso Cerdà's 1859 [ensanche] urbanization project, has been understood as "forthcoming developments" leading to a compact and complex city.

Nowadays the first steps towards urban sustainability should include planning tools, understood as the supports that allow for forthcoming developments.

The big challenge for new master plans is to introduce progress made in other disciplines –far removed from strictly urban roots or disciplines–, highlighting those innovations that stress the sustainability of those planning instruments.

Thus, for a while now, urban planning has incorporated urban ecology recommendations, aiming for compacity, allowing for denser and more energy efficient urban patterns, clearly departing from low density, extensive models.

In the same way, the introduction of generous proportions of complexity or a higher diversity of uses and activities makes it possible to move away from the unintentionally single use functionality of exclusively residential areas. Mixed patterns promote social integration and diversity.

2 INTRODUCTION

Even though livability is primarily a subjective experience, and one of the main questions that planners are concerned with, there is currently a growing consensus regarding the characteristics of a livable city for designing livability.

In fact, cities are now emphasizing the importance of competing on the basis of livability and the quality of life offered, and it is becoming an increasingly important factor in modern business location decisions, especially among high technology and knowledge firms (Richard Florida, 2008).

Standard economic criteria for the livable city comes fundamentally from Mercer's Quality of Living Survey and from Monocle Magazine.

In the first case, they adopt 39 criteria that include safety, education, hygiene, health care, culture, environment, recreation, political-economic stability and public transportation. On the other hand, Monocle Magazine includes some non-scientific criteria, such as safety/crime, international connectivity, climate/sunshine, quality of architecture, public transportation, tolerance, environmental issues, access to nature, urban design, business conditions, proactive policy developments and medical care.

But the criteria adopted by citizens are, at least in part, different. The Livable City Organization has as its goal to help create "new community models that focus on the interconnected relationships among growth issues such as transportation, housing, environment, affordability, neighborhoods, culture and the economy in an equitable and sustainable manner".

But from the early 1960s, economists and planners such as Jane Jacobs, Gordon Cullen, Lewis Mumford and Kevin Lynch, who shared a mainly negative image of suburbanization after the massive construction during the 1950s and 1960s and during the first petroleum crisis in Europe and the United States, were focusing on the change in the meaning of the livability of public space, reclaiming, basically, the missing sense of identity in the territory (MOORE,C.W., 1965). More recently, Michael Sorkin (1992) demands a more

authentic urban reality, a city based on physical and cultural proximity (FREESTONE,R., GIBSON, 2006), beginning an appreciable chapter in the recuperation of public space. Relations of proximity that not only improve security on the street but also encourage economic and cultural creativity as a consequence of the fluidity of connections.

Our article stresses on idea of the importance of liveable and sustainable society, based on the relation of proximity, as one of the basic criteria of a liveable city inside compact city model linked to its territory. As Richard Florida (2009) explained a great city is not a big village, but a number of relationship that are multiply their potential

The manner in which Barcelona has developed through the expansion project of Ildefonso Cerdà in the middle of XIX centuries, which for almost a century was denied, may have a new interpretation in terms of liveability in a different and compact city.

2.1 The communication is divided into two sections

Interpretation of the project by the engineer Ildefonso Cerda, 1855-63 of Barcelona expansion and its actual construction, using criteria of the urban ecology as like compactness, complexity, efficiency, stability and social cohesion (BUSQUETS J., COROMINAS M, 2009; MAGRINYÀ, F., 2009; RUEDA, 1995)

The result is that the project includes some of the criteria of a good liveability like those we adopt nowadays in the era of globalization.

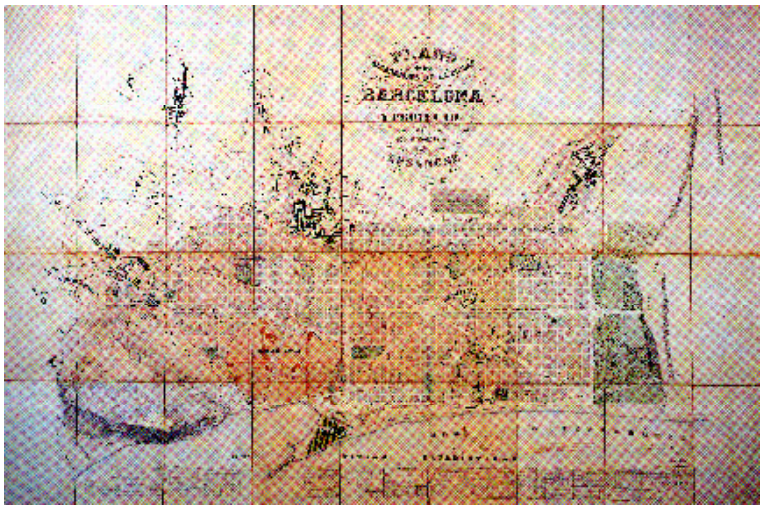

Fig. 1: Ildefonso Cerdà, Expansion project for Barcelona, 1859

Fig. 2: Barcelona, 2008

A prospective scenario for the Barcelona of the 21st century using criteria of urban ecology in particular made by the Agenzia di Ecologia Urbana of Barcelona(Rueda, 1995). It is an intentional model, based in the functional model proposed by Gatpac (Group of technical architects for Contemporary Architecture) in 1934,

that aims to lay down the patterns and the direction that Barcelona must follow in a process towards sustainability in the new information age

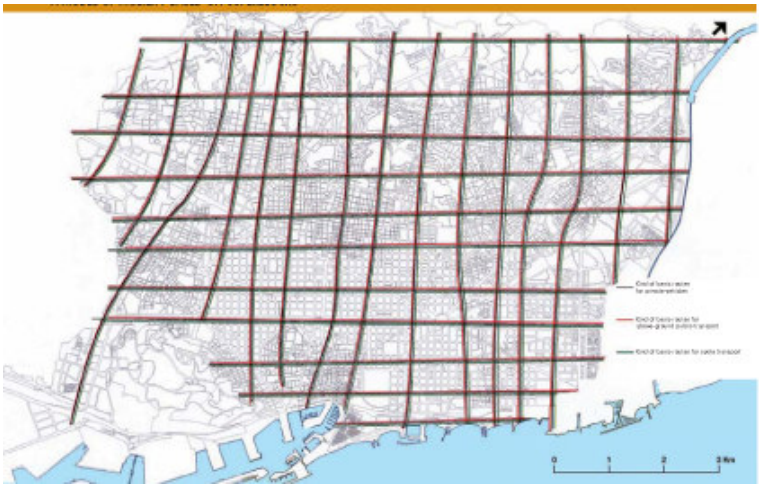

Fig. 3: Model of mobility based on superblock

Fig. 4: The public space that appears in the proposal of superblock

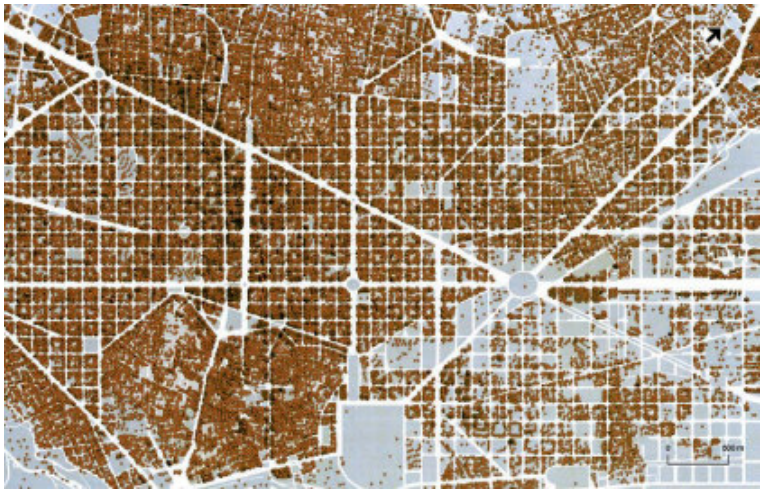

Fig. 5: Activity density of the superblocksuperblock

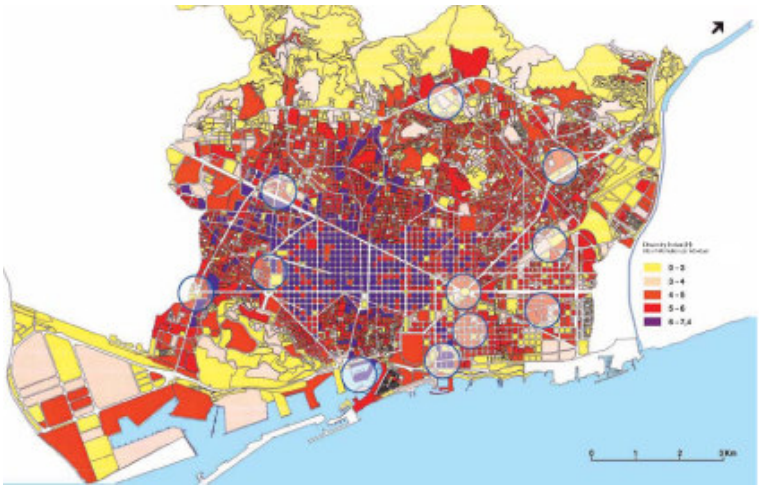

Fig. 6: Areas of new centrality

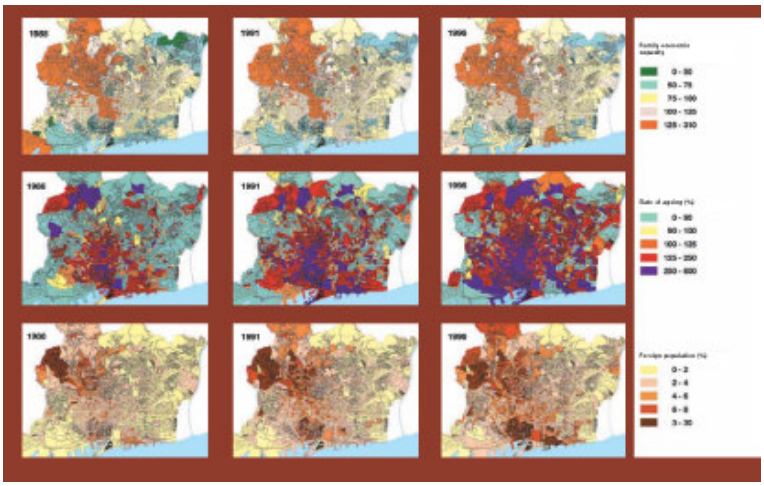

Fig. 7: Stability a social choesion

3 CONCLUSION

The project of Cerda, that this year is the 150 anniversary, has its first quality in to be a processual project with a big introspection abut which are the qualities of the mediterean city.

From the analysis of its evolution emerges that the history of the transformation of Barcelona teaches some objective for the mediterrean cites in order to preserve their liveability:

- To defend the compact and diverse city, with a public space of quality.
- To improve mobility and to make the street a welcoming environment.
- To achieve optimum levels of environmental quality and to become a healthy city.
- To increase social cohesion, reinforcing the mechanisms of equity and participation.
- To reduce the impact of the city on the planet and to promote international cooperation.
- To protect the free spaces and biodiversity and to extend the urban greenery.

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Liveable and resilient Ho Chi Minh City: Tackling the challenges of climate change, energy security and sustainable urban development

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1 ABSTRACT

Emerging Megacities in East Asia face common challenges in responding to rapid population growth and there is an urgency to develop these cities in a more liveable and sustainable manner. Future Asian Megacities can play a key role in improving energy efficiency and addressing the effects of climate change through practical and pragmatic urban environmental planning measures. This contribution illuminates the way adaptation to climate change is tackled in spatial planning strategies. The possible impacts of climate change on mega-urban regions in South-East Asia are highlighting that spatial design and urban environmental planning are a promising tool in adapting to climate change, because its integral responses are capable in dealing with uncertainties.

Dealing with adaptation to climate change in the context of emerging Asian megacities requires a shift in policy options towards more proactive response strategies. While urban development trends in HCMC are addressing both mitigation needs and the rationale of adaptation to the effects of climate change, the main focus of combating climate change impacts in the mega-urban region of HCMC has to be the practical implementation of adaptation measures. Planned adaptation implies spatial planning decisions and measures at the urban-scale that facilitates the reduction of the adverse impacts of climate change. Further however adaptation has the potential to realise new opportunities for defining livability and sustainability in an Asian context of urban development planning, scoping planning issues and opportunities at different spatial scales.

2 ADAPTATION TO CLIMATE CHANGE IN VIETNAM

Vietnam has a long history of coping with natural disasters and mitigating their effects in many ways. However, the country must recognize that some impacts of global climate change are unavoidable, and as such there is an urgent need at present to start adapting the mega-urban regions to the current impacts of extreme weather events and the predicted impacts of climate change with which they are likely to be confronted in the future. With more than half of Vietnam's population now living in low elevation zones, coastal urban settlements are becoming increasingly vulnerable.

Recently climate change and its future impacts on Asian megacities in high-risk zones, such as the continent's main river delta regions, have emerged at the top of the international research agenda. Since then, international policy agreements have been established to limit the emission of greenhouse gases. Nevertheless, even if a reduction in these emissions is achieved, the time lag in the climatic system will inevitably cause a substantial degree of climate change. The impacts of this change are, however, uneven with inter-tropical, densely populated delta regions exposed to rising sea levels among those expected to be hardest hit. Here unprecedented cooperation and research is needed to identify the planning options available for adapting these regions to changing climate, advancing and disseminating knowledge and understanding. Spatial planning strategies which focus on the adaptation strategies to climate change require information regarding future changes at a scale relevant to the area under investigation.

2.1 Adaptation needs in the context of mega-urban regions in South-East-Asia

The overall objective of adaptation measures to reduce the future impacts of climate change is to assist the relevant authorities, in particular developing countries, including many of the least developed countries, firstly to improve their understanding and assessment of impacts, vulnerability and adaptation; and secondly to improve their ability to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socio-economic basis, taking into account, of course, current and future climate change and variability. Adaptation tools are however only practical at the local level, in concrete spatial localities. For our research project a mega-urban approach is the main guiding element. Only at the urban level is it possible to integrate the many layers of site specific information and to work closely with the many administrative actors. The presence of a megacity enables the site specific

weighting of options, the integration of stake-holders and administrative institutions and the results and success of measures to be evaluated.

Table 1: Population Changes (2004-2009) in HCMC at district-level

Name of district	Area (km^2)	Population (Oct 1. 2004)	Population (Apr 1. 2009)	Population Difference 2004-2009	Population Density Difference 2004-2009(Inh./km^2)
District 1	7,73	198.032	178.878	-19.154	-2478
District 2	49,74	125.136	145.981	20.845	419
District 3	4,92	201.122	189.764	-11.358	-2309
District 4	4,18	180.548	179.640	-908	-217
District 5	4,27	170.367	170.462	95	22
District 6	7,19	241.379	251.912	10.533	1465
District 7	35,69	159.490	242.284	82.794	2320
District 8	19,18	360.722	404.976	44.254	2306
District 9	114	202.948	255.036	52.088	457
District 10	5,72	235.231	227.226	-8.005	-1400
District 11	5,14	224.785	226.620	1.835	357
District 12	52,78	290.129	401.894	111.765	2118
Go Vap District	19,74	452.083	515.954	63.871	3236
Tan Binh District	22,38	397.569	412.796	15.227	680
Tan Phu District	16,06	366.399	397.635	31.236	1945
Binh Thanh Dist.	20,76	423.896	451.526	2.763	1331
Phu Nhuan Dist.	4,88	175.293	174.497	-796	-163
Thu Duc District	47,76	336.571	442.110	105.539	2209
Binh Tan District	51,89	398.712	572.796	174.084	3355
Total Inner Districts	**494,01**	**5.140.412**	**5.841.987**	**701.575**	**1420**
Cu Chi District	434,50	288.279	343.132	54.853	126
Hoc Mon District	109,18	245.381	348.840	103.459	948
Binh Chanh Dist.t	252,69	304.168	421.996	117.828	467
Nha Be District	100,41	72.740	99.172	26.432	263
Can Gio District	704,22	66.272	68.213	1.941	2
Total Suburban Districts	**1.601**	**976.839**	**1.281.353**	**304.514**	**190.202**
Entire City	**2.095,01**	**6.117.251**	**7.123.340**	**1.006.089**	**481**

(Source: Statistical Office HCMC 2009)

3 URBAN DEVELOPMENT TRENDS IN HCMC

The spatial form of urban areas must be considered for adaptation planning. Asian cities, like HCMC, are getting more and more dispersed (see table 1), increasing their land areas without taking into account the natural conditions. This urban expansion processes are at the root of many urban hazards, especially urban floods. The later identification of risk areas and the resettlement of populations from these urban areas is a complex process which involves social, technical and financial questions not easily managed. As long as the current model of urbanization in Asian megacities continues to ignore the environmental constraints, no planned adaptation to climate change is possible. The current patterns of urban development, expansion and land use must be re-examined, because the generated dispersed urban forms (see figure 1) are reflections of processes which reproduce climate change related risks in new contexts, amplifying their intensity and increasing the numbers of vulnerable urban areas and population.

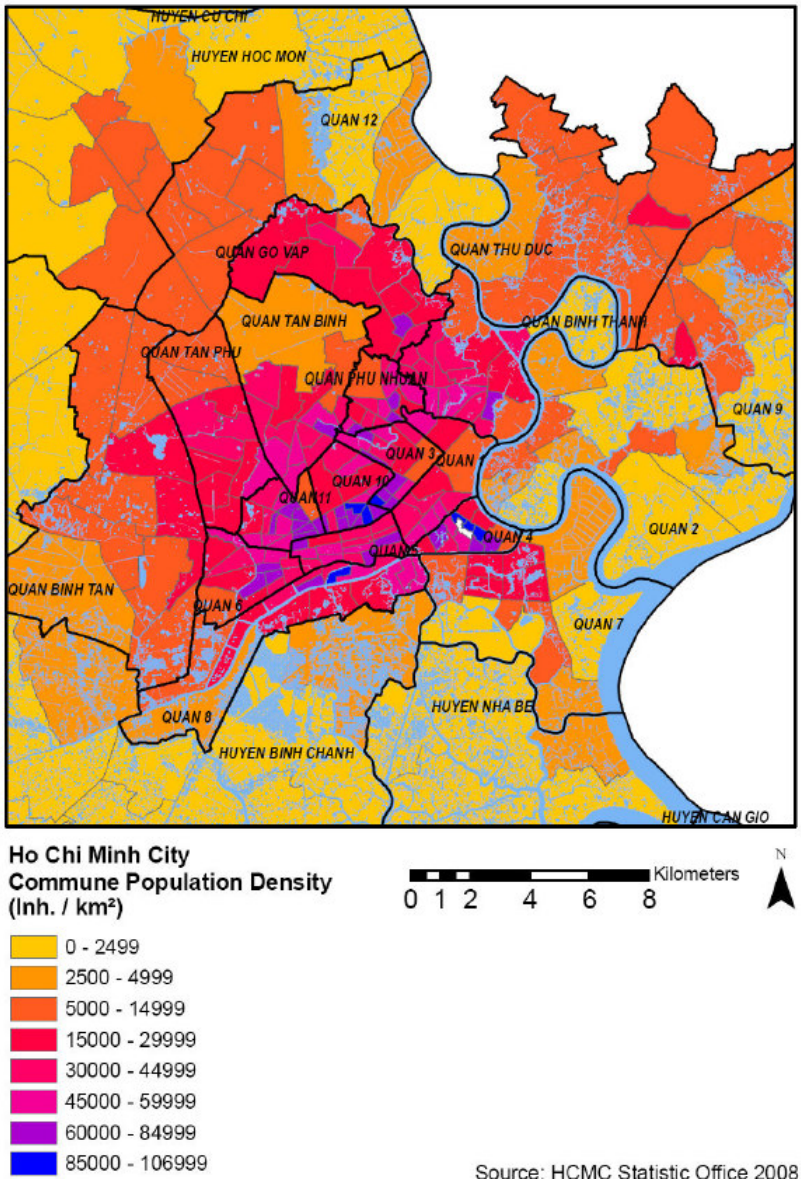

Figure 1: Ho Chi Minh City's Population Density in 2008 at Commune-level

Asian cities will play a specific role in adaptation research related to Climate Change. With population increasingly concentrated in urban spaces, and considering their dense nature and diverse urban forms and disrespect for the natural site conditions and climate phenomena, cities are among the spaces of greatest vulnerability to Climate Change. Ho Chi Minh City constitutes a hotspot where Climate Change related natural hazards are intensified, also congregating social and economic risks, whether or not they are produced at the urban scale. Emerging megacities, like HCMC, therefore, constitute a specific focus for adaptation measures guided by spatial planning science, since they are and will increasingly be the principal spaces of vulnerability.

4 SPATIAL PLANNING AND CLIMATE CHANGE

Climate change exhibits a strong influence on HCMC and its surrounding areas. Adaptation of the urban pattern and form, natural areas and the water system as well as housing and buildings is essential to protect HCMC from both the present and future impacts of climate change and extreme events to its complex system of physical, economic and social structures. Many of the components are interrelated, and therefore research needs to focus on the different scales evident in the mega-urban context (building, street block, neighbourhood, district, city, mega-urban conurbation) and their respective interaction. Due to the fact that investments in cities are long-term (sewage system, industrial areas, urban development projects, transport and water infrastructure etc.), finding the appropriate timing intervals in which action can be undertaken additionally plays an important role. These transitions in HCMC demand a careful organisation and

allocation of space, which is difficult not only to plan but also to manage. Therefore future climate scenarios, with all their associated uncertainties, must now be taken into account in development plans, urban design and environmental urban management concepts.

4.1 Adaptation tools for indicator-based decision-making in spatial planning

To gain insight into the effects of climate change on the urban level, such as the risk of flooding, heat stress in built up areas, a higher level of land subsidence and inadequate sewer capacity and to deal with them, the planning authorities of HCMC have the need to use spatially explicit information of climate effects highlighting which problems are to be found where, as well as diagrams of promising adaptation measures and projects. The indicator-based assessment approach we are taking calls for knowledge – and the dissemination of knowledge – to comprehend the consequences of climate related impacts on the urban area of HCMC. To draw up a well-considered climate adaptation strategy or to enable an assessment of its effects, certain tools to enable decision-making are needed. These include vulnerability assessment tools – which play a role particularly in policy preparatory work of spatial planning, such as urban development scenarios, spatially explicit assessment frameworks, such as risk and vulnerability assessment tools based on Strategic Environmental Assessment (SEA) for land-use planning– and evaluation tools that can be utilized at the implementation stage of concrete projects (planning studies, pilot project), such as monitoring and evaluation methods.

5 THE INTEGRATING CONCEPT OF “SPACE”

An adaptation of the mega-urban region of HCMC to climate change can only be achieved through the broad integration of urban and environmental planning approaches. The scale of the megacity itself presents the opportunity for sector-specific adaptation and mitigation approaches to combine into an integrative planning approach. As a result the central integration concept is `spatially referenced`. The concept ´space` allows the impacts of climate change on the megacity to be positioned on different spatial scales. Here spatial planning as a central strategy within our project can meaningfully combine individual approaches through the integrating concept of “space” as well as the embedment of the goal orientation of local stakeholders from administration and science. The spatiotemporal process of urban development, next to climate change, is the central dynamic element which enables spatially explicit scenarios. The integrative process of developing an Adaptation Planning Framework forms a comprehensive basis for implementing urban development adapted to climate change. For this, the broad inclusion in the administrative and political decision-making structures is necessary. An important contribution to the future political agenda for urban development in HCMC can thereby be made.

5.1 Administrative spatial planning framework

The most important agencies which determine overall land use, spatial zoning and environmental quality in HCMC are the Department of Natural Resources and Environment (DoNRE), the Department of Architecture and Planning (DPA) and the Department of Construction (DoC). Urban planning (in Vietnam, also referred to as urban development planning) is an essential tool for steering urban development processes and the spatial arrangement of land uses in HCMC. Theoretically, in Vietnam land-use and urban planning are a practical expression of socio-economic development strategies. In HCMC there are three master plans: the Socio-economic Development Plan, the Urban Development Plan (Master Plan) and the Land Use Plan. The Socio-economic Development Plan is designed to provide a context for the Urban development Plan and the Land Use Plan. Although these three plans differ in both their legal origins and their responsible administrative agencies, in principle they should share common targets for a coordinated and sustainable urban development. One important condition for the effective use of these urban environmental planning tools and guidelines is that they take into account the specific characteristics of climate change and adaptation policy. These include not only the inherent political character of planning processes in general, but also the long-term perspective, the uncertainties that arise and the dependence on other societal interests and developments. The planning administrations in HCMC require clear and unambiguous, spatially explicit and location-specific information that must be available and usable in the short-term. At the same time they are confronted with the need to draw up long-term spatial land-use and urban development plans with regard to climate change and are faced with major uncertainties of climate projections on the local level.

6 INDICATOR SYSTEM TO SUPPORT INTEGRATIVE URBAN LAND-USE PLANNING

The main objective of the proposed indicator system is to support the research project and the relevant administrative bodies in HCMC with indicator selection and the application of vulnerability and risk assessments in the context of impacts resulting from climate change and associated natural hazard impacts. The indicator system combines the challenge of theoretical conceptual improvement with the required integration of remote sensing and GIS techniques for both the monitoring and mapping of vulnerabilities and risk. The main tasks of the integrated indicator concept hereby are to: (1) assimilate existing vulnerability concepts from various scientific disciplines (e.g. flood management, urban climate assessment, urban energy security and transport planning); (2) apply indicators for spatially explicit vulnerability assessments for climate change and natural hazards; (3) apply and improve GIS-based quantitative approaches for analysing and modelling vulnerabilities and risks; (4) undertake complex spatially explicit vulnerability and risk assessments for the mega-urban region of HCMC based on advanced GIS techniques and the integration of remote sensing data for data management, data analysis and up- and downscaling in the framework of mapping vulnerability and risks.

6.1 Spatially explicit indicator system

According to the redefined role of urban environmental planning in times of climate change, spatial planning concerns the vulnerability assessment of space and place as a basis for action or intervention. Accepting this new task, spatial planning goes beyond traditional urban land use planning to bring together, draw upon and integrate policies for urban development and land use. The challenge of a changing climate influences both the nature of urban spaces and profoundly how they can function. Therefore, the integration of climate change adaptation planning into the spatial planning framework at the urban level is necessary. Here the main task of an indicator system is to capture the degree of integrated adaptation measures of spatial planning in a quantifiable manner. The development of the proposed indicator system has been guided by the following principles: (1) Indicators for adaptation planning in a spatial planning context need to be based on adaptation and mitigation objectives that can be derived from spatially explicit land-use and urban development plans, (2) These indicators must reflect spatial planning's contribution to the achievement of integrating specified key sector-specific adaptation and mitigation policies in the urban areas of HCMC.

Indicator sets can then be incorporated into a monitoring system that can assess spatial planning outcomes in terms of cross-sectoral adaptation and mitigation policy integration. A major consequence therefore is that the analysis of spatial adaptation plans will no longer solely focus on single indicator values, but increasingly on the combination of single base-indicators to yield meaningful policy measures, guiding adaptation and mitigation measures. Naturally, this type of analysis has to include the spatial dimension of the indicator system, by emphasising the importance of functional areas, spatial linkages and connections. Urban planners and key stakeholders can then utilise these plan-led indicators to revise their assumptions and core strategies that initially led to the policy actions. They will then be able to modify climate-related adaptation and energy-related mitigation policy in light of new issues identified. As a result the adaptation planning framework will help provide a communicative and iterative learning approach to monitoring, which will embed monitoring right in the centre of the policy-making process.

In our indicator system, single indicators are not intended for use in an isolated manner, but rather within an integrative framework which views them as parts of the resulting zoning guidelines in spatially explicit planning recommendation maps. Similarly, by using an Urban Structure Type approach the indicator system views individual locations as parts in a much wider spatial context rather than as isolated entities. This approach provides adequate flexibility to stretch the potential of obtained data to yield the necessary spatial information base, allowing effective monitoring of planning policy deliverables in combating adverse climate change impacts at the urban level.

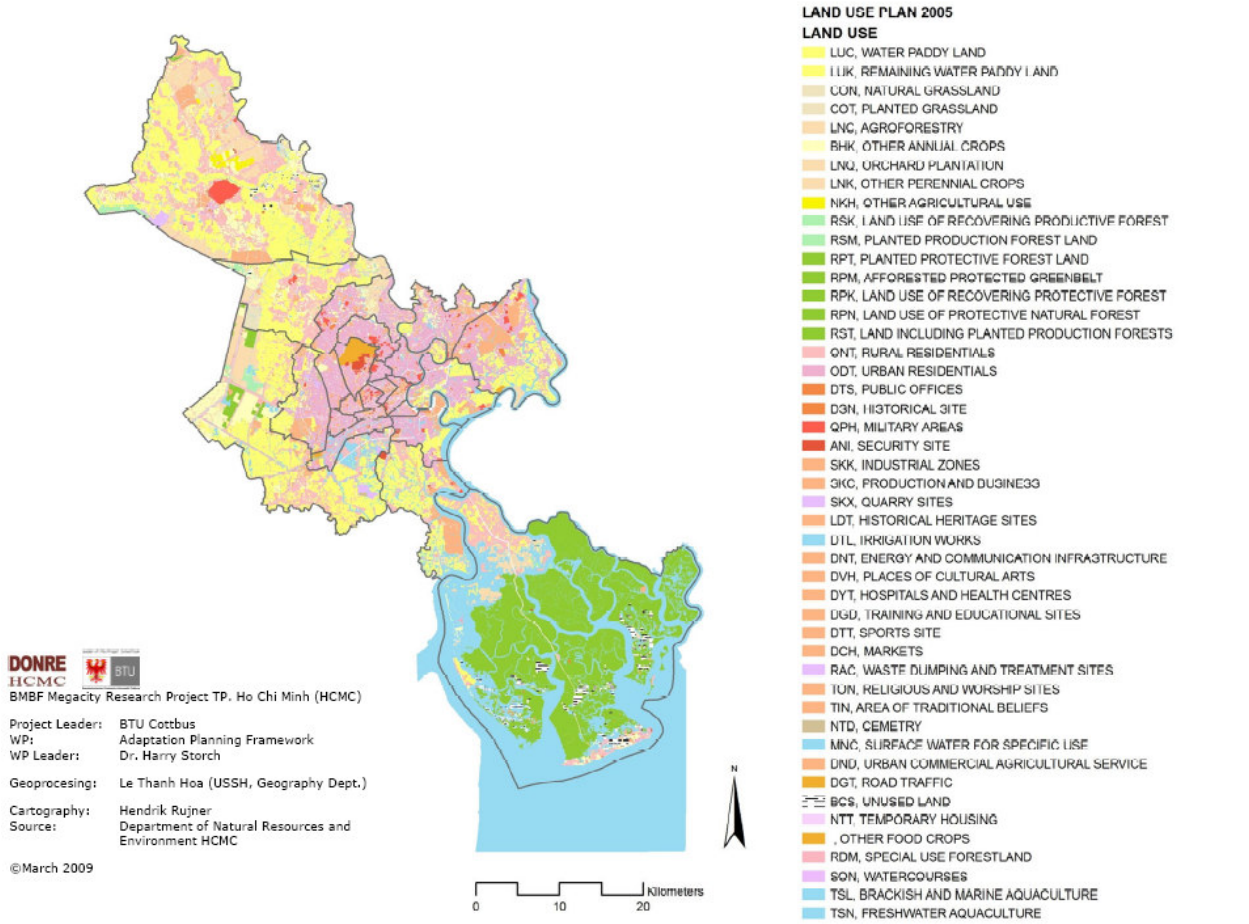

Figure 2: Land use map of HCMC as central component of the spatial information system

6.2 Spatial Urban Information System

Given the complexity of spatial policy implementation for adaptation and mitigation measures, the analytical and model-driven integration of base indicators is an essential tool for providing a more rounded view of different aspects of climate change policy. The emphasis is on developing a group of indicators within each thematic sector (Flooding, Climate, Energy and Transport) and collectively analysing them to understand the broader thematic spatial planning outcomes. This approach facilitates cross-cutting analysis by combining indicators across different thematic sectors, as well as including other more contextual sets of indicators.

If spatial planning activities involving indicator-driven spatial databases are not coordinated with the local administrative planning bodies, the indicator-specific data generated at various levels for urban planning and management purposes remains uncoordinated and limits their use to support decision making. In order to address these issues in a holistic manner, the central Spatial Urban Information System, developed from our specific GIS databases, will assist spatial planning decisions at the most relevant scales for the HCMC megaurban region. The Urban Information System will also be useful for assisting the modification and preparation of the upcoming versions of the Land Use Plan and the Urban Development Plan. Furthermore it can support more detailed urban planning schemes and serve as a decision-making support and strategic environmental assessment platform.

The Urban Spatial Information System has the key objective to meet the requirements of land-use, urban and environmental planning in the existing organisational and institutional environments of the administrative spatial planning departments of HCMC. The basic spatial data such as the base map, land use map and thematic maps generated can be utilised by various planning departments as well as for the further generation of derivative themes and sector-specific information.

7 TOOL FOR INTEGRATION INTO THE INSTITUTIONAL ENVIRONMENT FOR CLIMATE CHANGE RESPONSES

For the process of adaptation to climate change, land use planning is a key criterion for effective strategies to deal with the coming challenges. Adaptation is unattainable without improvements in the usability of scientific results for decision making and their integration into the existing planning process. Within the HCMC administration there is profound awareness in regards to the necessity of integrating environmental aspects, in particular the requirements from global climate change into the existing planning system. Nevertheless, the challenges of climatic change require a new level of cooperation to emerge between politics and administration, between the different sectors of administration and between academics, planners and decision makers in general. In order to identify possible starting points for the integration of climate change relevant planning requirements into the existing planning process, on the one hand, the organisation of the administration and governance structures within HCMC and the paths for decision making and on the other hand the problems concerning the integration of environmental requirements in the planning process, all these have to be analysed. To identify and estimate the local risks and adverse impacts arising from climate change, the project supports the HCMC administration to establish a well-founded data base with reliable information. The organisation of data access and the process of data exchange and dissemination between different sectors of the administration are important challenges in this context, not only in a technical sense but even more in the administrative respect. On the basis of such, data sets and maps with planning advice in reference to measures (restrictions, bans, conditions and development objectives) can be developed.

Some of the main spatial data for indicator base maps and land use maps will be obtained from remotely sensed sources, which will then be used for integration with the official land-use map using our Urban Structure Type approach. The focus of the indicator-driven Urban Spatial Information System is primarily to address the urban land-use planning and management functions. The data currently used has been collated from the respective urban administrative bodies and relevant departments, integrated into the GIS environment, and spatially geo-referenced. This data is then processed to derive spatial explicit ‘base indicator maps’.

7.1 Developing Planning Recommendation Maps: Goals and Problems

In further steps, domain specific GIS applications, analytical models and thematic assessment methods will be used to develop customised packages which in turn will generate sector-specific risk and vulnerability analyses in a spatially explicit manner. On the back of the obtained results from these procedures, so-called planning recommendation maps, an essential element for future urban planning and management will be generated. The overall aim here is the interlocking of the planning recommendation maps (multifunctionality of the landscape functions) or at the very least endeavour to consider the joint heighten significance of spatial areas, provided by the fact that many areas share a common requirement profile and should not only be individually represented in a plan. In this respect the same area may contain significant unsealed surfaces, or exhibit an infiltration, retention and or evaporation potential. In addition the same or adjacent area may also render itself suitable for preferential roof greening or for the development of retention water bodies or even for the protection of nature river banks.

The official HCMC Land Use Plan itself displays only the pure designation of land use utilisations. The inherent qualities i.e. environmental significance or the exposure or resilience of areas or structures, the urban structural densities or the real utilisation are not illustrated. For measures and planning recommendations maps, an initial differentiation between the restoration of the existing asset and the planning recommendations/guidelines for new designated areas has to be undertaken. Using the example from the Urban Climate and Urban Flooding viewpoint the focus here lies on recommendations and measures for the protection of Green- and Open Spaces and the establishment of more urban green in existing structures. Additionally the fundamental guidelines for new development sites i.e. regulations regarding building height, building density, and soil sealing degree will be suggested. For the thematic fields of Urban Climate and Urban Flooding, the formation of planning recommendation maps for the HCMC urban area arranges itself along the following considerations:

7.1.1 Reducing the surface runoff following extreme rainfall events.

Through the utilisation of the water household model ABIMO, in the framework of the research project, the mean surface water runoff can be investigated on the one hand due to the effects of climate change and on the other by the processes of urbanization. Hereby the additional problems associated with rainwater drainage will be seen. Planning recommendation maps are not specially localised, but inherently general suggesting increasing evaporation and where possible also infiltration by appropriate measures, i.e. rain water utilisation.

7.1.2 Protection of the Existing Forest and Green and Open Spaces

The protection is valid for all green and open spaces which are able to counteract or reduce the adverse effects of climate change for the urban area, i.e. are able to act as retention surfaces, urban-climatic functionally important areas etc. It is to be assumed that the Urban Climate investigations will validate their significance as local evaporation areas and temperature compensating areas/zones. Hereby, highlighting more precisely their interactions and specific importance and function to the surrounding settlements.

7.1.3 Planning of New Residential Developments with low flooding risk

The classification of development sites in areas which are at risk of flooding. In this context, in next working step of the project, the scientific justification and identification of such risk areas will be strengthened.

7.1.4 Enlargement of the Urban Green on the basis of urban climate considerations

This is the central goal of the work package Urban Climate. The main strategy is to improve the local urban ventilation patterns/ cold and fresh air generation zones and decrease the overall heat Island potential of the urban area. The designation of protection worthy zones in potential new development areas and within existing developments and the determination of small proportions of green areas for the entire greater regions should be implemented. Naturally a significant enlargement of the Urban Green will not be possible, since widespread demolition is not an option, but in light of the present situation in HCMC, the protection of these current areas is an asset. As widespread demolition is not an option, options include the potential “networking of green areas and “eco-belts” along the existing traffic arteries or the possible roof greening of existing structures. These measures could also lead to a reduction in the Urban Heat Island effect (and associated health impacts).

7.1.5 Classification/Designation of Retention Surfaces

On the one hand, the reservation of retention area (protected areas) for flood waters associated with Sea Level Rise or fluvial flooding events. While on the other hand, additional surfaces for the intermediate storage of rain waters must be identified and safeguarded for heavy rainfall events (rainwater retention functions).

7.1.6 Focus areas for measure to reduce surface runoff in existing area

Measures include unsealing, roof greening, rain water storage and –reuse. Whether it is however both possible and meaningful to locate these areas must be discussed (i.e. areas with high soil sealing rates, areas which are often flooded, areas where the existing canalization is inadequate). In the field of Urban Climate, a similar strategy is required, i.e. existing development on the basis of the “Thermal Load Map” are required to be defined and which are primary envisaged to be suitable for unsealing and greening.

8 OUTLOOK AND SUMMARY

In HCMC autonomous environmental planning for concretisation of the regional requirements is presently not recognizable. Therefore, the working results should be capable of fulfilling the needs for the new Master Plan in terms of transparency and professionalism. The process of joint development and discussion of planning bases will enable the administrative planning bodies to treat other aspects of environmental protection and the protection of natural resources in a similar way. Their interest in the approach of classification of protected areas and the determination of impact and priority areas or even “taboo areas” have an important role for the improvement of the the planning process. The consistent processing of spatial data from the database to the planning map is a substantial part of the knowledge transfer in the context of the project. Thereby an important role for cooperation arises in work-sharing groups of equitable scientists

and planners with a common obligatory objective. Via the cooperation of German and Vietnamese scientists from various universities on the one hand and different administrative bodies of HCMC on the other, the research project strengthens the willingness to cooperate for mutual benefit.

In regard to the administrative deficits, which exist in the administration of HCMC, large improvements are foreseen to result from this research project and by the incorporation of the Vietnamese partners. In the centre stands the consistent processing of reliable core indicators as planning information as well as their exchange between the different actors and the administrative bodies of development and environmental standards in spatial planning. Altogether a high demand for consulting exists, in regard to the development of environmentally referenced spatial data and their implementation into planning.

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Maintainable 3D Models of Cities

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1 ABSTRACT

In the last decade 3D city models received an increasing amount of attention from both, the scientific community and the professional field. One of the requirements for city models is that they should be maintainable, i.e., the system should be kept going and not be created for a specific decision and then abolished. What is the effect of such a requirement? Creating a model that represents the current status of a city is only problematic due to the vast amount of data to be collected and processed. Keeping the resulting model up-to-date, however, is more complex. This requires, for example, the introduction of 'time' as a concept in the model because then it can comprise the history and current status of the city as well as future development scenarios. The processes that lead to changes in the city must thus be represented in the city model to allow the changes. In the paper we discuss these problems and show necessary properties for city models and systems maintaining them to reach a reasonable level of maintainability.

2 INTRODUCTION

Digital city models are an important topic in current research. Topics include automatic building detection (Brenner 2000; Früh and Zakhor 2003) or sub-surface infrastructure (Forkert 2006). Applications of 3D city models include noise modelling (Kurakula and Kuffer 2008). Cities like Berlin (www.3d-stadtmodell-berlin.de/3d/seite0.jsp) or Vienna

(www.wien.gv.at/stadtentwicklung/stadtvermessung/geodaten/stadt¬modell/produkt.html) invest large amounts of money to create such models. Applications must then create enough revenue to justify these expenses. However, cities change constantly and thus the models will be outdated one day. There are two different scenarios to counter this problem:

- 1.The revenue from the applications is large enough to reach the break-even point before the model is outdated. Then again money can be invested to create a new model.
- 2.The model is constantly updated and can thus be used over an extended period. Revenues from applications will then pay for the updates and any profit provides down-payments for the investment.

The remainder of the paper is structured as follows: We start with some definitions to avoid misunderstandings. Then we briefly discuss the different quality levels that have been defined for city models and observation processes suited to collect data for these levels. We then show typical applications where city models are used. These applications demand specific levels of quality from the city models. The next section discusses changes in a city that need to be captured to keep the model up-to-date. Finally, we discuss possible update processes for each quality level and relate it to the applications. Some conclusions finish the paper.

3 DEFINITIONS

Several definitions are necessary as a starting point. We discuss maintainability of city models. Thus we have to explain what we mean by maintainability and city models. A term frequently used when discussing spatial decisions and city models is sustainability. We show how this concept is typically used and argue why this should not be used for the questions addressed in this paper.

3.1 Models of Cities

Models of cities can mean different things. It may be a model of the interactions within a city or a model of topographic relations between objects in cities. We use the second type of city models. Many objects in cities can only be reasonably well described in three dimensions and thus city models are often 3D models. A standard frequently used for structuring the data is CityGML (Kolbe and Bacharach 2006).

3.2 Sustainability

The definitions of sustainability are manifold. It is said, for example, that it "relates to the maintenance or improvement of the integrated natural systems that collectively comprise life on our planet" (Egger 2006, p. 1236) or that it "is related to the life and more specifically to the survival of all beings and humans in the environment" (Mitoula and Economou 2007). Sustainable urban development can then be seen in the context of "environmental stewardship, inter-generational equity, social justice, and geographical equity" (Haughton 1997, p. 189). The goal is typically ecological sustainability (Bandyopadhyay, Bandyopadhyay et al. 2009; Cerreta and Salzano 2009; Mahmoudi and Fanaei 2009) but also economical and social sustainability are discussed (Ostermann and Timpf 2007; Meir 2009; Ostermann 2009). These three kinds of sustainability have been defined in the Agenda 21 (United Nations 1992). These definitions extend the meaning of the term sustainability to cover different kinds of impacts. This is crucial when discussing city development. In this paper we discuss digital city models that serve as data basis for decision making. Above definitions complicate the discussion for the kind of application addressed in this paper and impede the concentration on the core technical problems for digital city models. A completely different definition can be found in the Brundtland report, which defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, Khalid et al. 1987, p. 24) but this is even more difficult to translate to technical issues of 3D city models.

3.3 Maintainability

"To uphold as valid, just, or correct" is another definition of sustainabiliy (Nichols 2001). This is a perfect definition for the purpose of this paper. It is, however, not a typical definition in spatial planning. Thus talking of sustainable models could lead readers to wrong conclusions about the content. We thus decided to use the term maintainability for the fact that the model should be used during an extended period for multiple decisions and applications. The model must then be adapted whenever the city itself is significantly changed. The significance of a change depends on the application.

4 QUALITY CLASSES OF 3D CITY MODELS AND HOW TO OBTAIN THE DATA

CityGML defines five different quality levels for city models (Kolbe, Gröger et al. 2005):

- Level of detail 0 (LoD0): digital terrain model (DTM) + aerial image
- Level of detail 1 (LoD1): Block models of buildings
- Level of detail 2 (LoD2): Roof structures, textures
- Level of detail 3 (LoD3): Detailed roof and wall structures including balconies and vegetation
- Level of detail 4 (LoD4): Interior structures like rooms, doors, stairs, and furniture

These levels of detail require different types of data collection. Models with LoD0 to LoD2 can be produced automatically from aerial images whereas interior structures, for example, depend on the availability of either detailed surveys or architectural documents. Table 1 shows the level of detail needed for different applications.

Aerial photogrammetry can provide information on 3D geometry (height of terrain and buildings, footprints of buildings, and roof structure) and ground texture. It is difficult to get texture for vertical walls from aerial photogrammetry because of the wall's distortion in the image. Aerial images have been used to provide texture because it is cheaper and sometimes no other sources are available (see, for example, Steidler and Beck 2005). However, aerial images do not lead to high resolution textures. When creating views from a pedestrian perspective then the texture must be applied in resolutions which can be provided only by terrestrial photography (Göbel and Freiwald 2008). Thus many projects use terrestrial images for texturing the objects (Holzer and Forkert 2004; Poesch, Schildwächter et al. 2004).

Airborne laser scanning (ALS) can provide more accurate geometrical data. ALS data have been successfully used for automatic detection and modelling of buildings (Rottensteiner 2003). ALS data contain no information about the texture. However, they may be used to detect vegetation since the different reflection characteristics allow a classification (compare, for example, Maier and Hollaus 2008).

Terrestrial surveys can provide all necessary data but the costs are higher than those of airborne methods. Thus methods like car-mounted fisheye cameras have been adopted to reduce the costs (e.g., Forkert, Haring et al. 2005). Still, these methods are expensive and can only provide data for LoD2 (textures) and LoD3 (façade details). Interior structures still require classical surveys using, for example, laser scanners. However, available architectural maps can provide some information as shown in the case of the Vienna underground modelling (Forkert 2006).

5 USAGE OF 3D CITY MODELS

3D city models have usage in various domains, e.g., urban planning and management, noise and air pollution, disaster management, tourism, facility management and environmental management simulations, homeland security, real estate management, vehicle and pedestrian navigation, and training simulators etc. A rough categorization of tasks in spatial planning includes (Navratil 2006)

- planning for future development,
- planning for dealing with a specific situation where planners propose solutions and a discussion leads to a decision, and
- planning for dealing with a specific situation where the affected agents (lay people) develop a solution.

The three kinds of tasks have different demands for the quality of 3D city models. The planning of future development requires a complete inventory of relevant objects. Precise information on colour, patterns, or shape is not necessary. The presentation of a specific solution to a wide audience, however, is typically done with virtual reality. Then not only the completeness of the inventory is important, but also the detailed graphical representation. In the following paragraphs we give a brief account of the usage of 3D city models for urban planning, disaster management, and noise and air pollution.

Virtual 3D city models enable urban planers to visualize the existing city state, and take decisions for future developments accordingly. The development plans can be simulated before execution, thus enabling intelligent decision making. The possible data sources for a 3D city model are cadastral data, digital terrain models, building models, street-space models and green space models (Döllner, Kolbe et al. 2006). Urban planning is a complex task involving the interplay between multiple aspects of a city, e.g., transport, pollution, and crime. Hamilton, Wang et al. (2005) introduced the concept of nD urban model that provides a holistic view of the city by integrating diverse data sources like 2D maps, 3D urban models, thematic information, historical data, national statistics, local survey, and various policy and regulations.

3D city models are tools for rescue operations during disasters, e.g., flooding, earthquake, and fire, etc. The disaster situations can even be simulated so as to train rescue operators and even preplan the strategies to tackle emergency situations, e.g., location of damaged site, indoor and outdoor navigation for helpers, and determining escape route for affected people from effected site or building (Kolbe, Gröger et al. 2005).

With the growing population in urban areas, there is a dire need to address the issue of noise pollution. The major source of noise is the traffic noise and affects the inhabitants along road sides mostly. In order to mitigate the effects of noise pollution, 3D noise maps in combination with 3D city models are used (Kurakula and Kuffer 2008). Since noise propagation depends on topography, building structures and other structures (trees etc), 3D city models help the decision makers to envisage the intensity, propagation patterns of the noise in cities and take appropriate actions. The data required for noise modeling include road networks, noise sources (traffic information, construction sites, industries etc.), buildings (residential, schools, offices, hospitals etc.), population (inhabitants) and green areas (parks), etc.

3D city models are important tools to visualize and simulate air pollution levels. The pollutants carried by the wind may be trapped in the high building structures and street canyons thus causing high pollution in such areas. One of the dominant sources of air pollution is the traffic pollution. Information about traffic air pollution and distribution of pollutants is therefore important for taking effective decisions for air quality improvement and future urban designs (Wang, van den Bosch et al. 2008). The data sources include pollution sources (vehicles, industry etc), wind data (speed, direction etc.), surface temperature, street canyon geometry (Métral, Falquet et al. 2009), and the shape of buildings etc.

Application Area	Model LOD
Urban Planning	LOD0-LOD3
Noise Pollution	LOD1-LOD3
Disaster Management	LOD3, LOD4
Traffic Management	LOD1
Air pollution	LOD0-LOD3

Table 1: Model LoD for different applications

6 CHANGES IN CITIES

Cities are changing constantly. There are two categories of changes:

- Constant changes, e.g., replacement of a building, construction of a new road, etc.
- Temporal changes, e.g., snow on the streets, trenches along streets to install supply lines, etc.

Typically, only the first kind of change is important for 3D city models. Temporal changes are only necessary for analysis of situations that are affected by the change. Traffic guidance, for example, may be influenced by road construction work because roads are blocked. Such tasks are usually not solved by 3D city models but they may become relevant, e.g., in disaster management. However, such information could be integrated in the application from outside sources and need not be stored in the city model itself. They would not be relevant for the city model itself.

Constant changes may influence different aspects of a 3D city model:

- Creation, change, or destruction of a single object: Examples are the creation of a new building or road, the change of a building façade, the replacement of an old bridge, or the clearance of an old gas station.
- Changing objects in a specific area: The construction of a new road is an example for a situation where above actions are performed on a number of different objects: fences are relocated, traffic signs placed, and trees cut down.

The first type of change has been modelled for database objects (Medak 2001). It not only applies to large changes like the reconstruction of parts of a building since applications may also be sensitive to small changes like repainting a façade. The second type of change comprises a set of changes of the first type. Thus the mechanisms shown by Medak also apply to this case.

All of above examples occur at a specific point in thime. Thus they have a date attached to them. This date may be fuzzy like in ‘the building was created in the years 2007 to 2009’ but it exists. This is not the case for natural changes like deterioration either by environmental influences on the object or use of the object. Roads with high traffic loads, for example, will show wear and colours on façades change over time. These changes do not fit in Medak’s system. However, they may be important for some decisions. Visualizing the existing city state must include the deterioration because otherwise the city planners will come to wrong conclusions. Although inspection of the city area in discussion will clearly show the difference, problematic areas might be missed when only using the digital model. In order to eliminate this problem other tools will have to be used. This somewhat lessens the benefits of the model itself for city planning because it is only one of a few tools.

7 UPDATE OF 3D CITY MODELS

What does the above mean for 3D city models? Objects in the model must be changed if the original changes. The challenge is finding all changes in the city.

7.1 Level of Detail 0

The DTM will only change either due to natural disasters like earthquakes, land slides, or volcanic activities or due to massive earth movement on construction sites. Natural disasters typically cause a large amount of destruction and thus imply dramatic changes. Thus a reconstruction of the affected area will be necessary. Constructions are more difficult to be detected. It may be, however, that constructions with sufficient change

of the terrain must be announced. Then the information about the existence of changes is available and only the effects have to be determined.

7.2 Level of Detail 1

For block models most of the changes discussed in section 6 are irrelevant. The only important changes are

- the creation of new buildings,
- the destruction of buildings, and
- a massive change of a building shape.

Again, if these kinds of changes must be announced, the information about the change is available. Otherwise the detection is tricky. Current approaches use the creation of new models and the comparison of the old set of blocks with the new set of blocks. Although the interpretation of the survey data (e.g., GPS tracks or ALS data sets) can be done automatically to a large degree, there is still some effort necessary to classify the deviations. In addition, the surveys themselves are costly and thus performing them without reasonable suspicion that there are changes is questionable.

7.3 Level of Detail 2

LoD2 requires roof modelling in addition to the building outlines. Roofs can be modelled, e.g., by aerial photogrammetry (e.g., Frere, Hendrickx et al. 1997), ALS (e.g., Haala and Brenner 1997), or a combination of both (e.g., Rottensteiner and Briese 2003, Jaw and Cheng 2008). LoD2 only contains the general shape of the roof. The roof of a simple, rectangular building then typically consists of two planes. These can be detected with a high degree of automatization. In this case the main costs for the roof detection emerge from the ALS-flight itself. The situation may be more difficult in old city centres with different and very specific roof structures but results for Vienna (Rottensteiner and Briese 2003) suggest that a combination of ALS and aerial photogrammetry may solve the quality problem. It is questionable, however, if these processes can be fully automated and work without human supervision.

Single roofs can also be determined from other data sets like construction drawings, terrestrial laser scanning, terrestrial photogrammetry, or classical, terrestrial survey at lower costs than by ALS. It is necessary, however, to know which roofs have been changed to adapt these methods. This is simple if changes have to be announced but if this is not done then ALS or aerial photogrammetry seems to be the only method to update the city model. The problem is then reduced to finding significant differences between the roof models.

Textures are also available in LoD2 models. As discussed in section 4 these are difficult to collect because airborne methods currently do not produce textures with the required quality. The texture of the façade may be relevant for different kinds of application. Visualization of urban planning projects may depend heavily on the state of the surrounding façades. Thus current images of façades may be relevant for decisions. Announced changes of façades can be easily tracked. Unannounced changes, however, provide the same problem as the roof structures: Complete resurvey would be necessary to detect all changes and this resurvey is expensive.

7.4 Level of Detail 3

What has been said about the roofs in LoD2 is also true for the detailed root structures in LoD3. The only difference is the detail of the survey and the degree of interpretation. A more detailed survey with ALS may require lower flight height and thus a straight path covers a smaller strip of land. More flight time is then necessary to cover the area of a city. This increases the cost of data collection. Since more data are produced (the amount of data produced by ALS depend on the scan frequency and the scan duration), more effort is necessary to interpret the data. Detailed roof models consist of more parts than the simple ones used in LoD2. Thus both, the interpretation of the ALS data and the change detection are more difficult: Does the difference between the models reflect an actual change or is it based on the specifications of the equipment and interpretation algorithms used? If the difference is based on the equipment, which of the two models is the ‘correct’ one? These questions may be difficult to determine and may require on-site inspection.

Wall structures present another challenge. Some structures may not be visible from above, e.g., a small balcony below a large one. Thus methods like terrestrial photogrammetry or terrestrial laser scanning are necessary to capture the data. Both methods are expensive and periodic application is not feasible.

The collection of vegetation can be done by aerial photogrammetry or ALS. Vegetation is influenced heavily by both types of changes discussed in section 6. Growth models for vegetation and different kinds of rendering algorithms may help determine the natural changes like seasons or growth. This is more difficult for changes by human intervention. The human intervention may aim at keeping vegetation in a specific shape like it is, for example, the case in the garden of castle Schönbrunn. In this case the hedges are kept in a specific shape. City models can ignore these kinds of interventions because they keep the city model up-to-date. The same cannot be said about interventions that are necessary for other reasons like surrogate plantation for trees that had to be cut during construction works. Again missing documentation leads to high costs.

7.5 Level of Detail 4

Adding interior structures like rooms, doors, stairs, and furniture is extremely expensive. Airborne methods cannot provide these data. The only methods are evaluation of existing construction documentation or specific surveys. The use of existing documentation is cheaper, especially if the documentation is available in digital form. However, old buildings typically only have such documentation if they are of public interest (town halls, airports, school, etc.) and these are only a minority within a city. Thus comprehensive city models with LoD4 are not realistic. The data is extremely expensive and the only application for it seems to be disaster management. In detail this is only necessary for crowded buildings. As soon as the people are led out of the buildings then the interior structure is irrelevant. Thus LoD4 is only necessary for the first step during disaster management and this is typically only done in a structured and organized way for public buildings.

8 CONCLUSIONS

We showed that higher levels of detail affect the process of keeping the city model up-to-date. Maintaining a model with LoD0 can be done almost automatically, whereas in theory a model with LoD4 would require an update whenever an apartment is refurnished. This is not feasible. The challenges are

- receiving information about the change and
- assessing the significance of a change.

The main problem is thus the data collection and not the data modelling. Efficient strategies are necessary to acquire all data necessary to keep the model up-to-data. These data can be acquired either for the whole city at once in regular intervals or continuously as the reality changes. In both cases the process must be cost effective. This typically calls for a high degree of automatization or automatic communication from the initiator of the change. There are three possible solutions:

- Keep the 3D city models simple: Models with only blocks for buildings or even with detailed roof models can be automatically updated as long as the data can be generated automatically from sources like aerial photographs, satellite images, and ALS.
- Allow different levels of detail for different parts of the city: Important historic buildings could be modelled with higher level of detail than other parts of the city. It is then necessary to assess the benefits added to the model by these additions. Different levels of detail may be problematic for some tasks that shall be supported by the city model. Judging architectural design, for example, calls for a model with detailed façade textures and vegetation, which is level of detail 3. If parts of the city model only have level of detail 2 or lower then this process cannot be supported throughout the city. How to communicate the level of detail is thus an important question in the design phase.
- Install processes that force citizens to provide data for significant changes: Compulsory building permits, for example, show where new buildings are planned and may also provide detailed 3D geometric data on the building. This would eliminate the need for surveys detecting changes. However, such changes of processes should not be implemented too frequently because they change the way public administration works and public administration should be stable.

Recent developments in data capture include crowd sourcing or volunteered geographic information (Goodchild 2008). It is not yet clear how this method can be used to collect large data sets. First experiences, e.g., with OpenStreetMap, look promising and may be adapted to detect changes in cities that need to be included in city models.

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Menschen als Messfühler – die Kombination von Geowebmethoden und Sensorik

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1 ABSTRACT

Eine Frage beschäftigt die Planung seit jeher: Wann ist die Stadt lebenswert? Mit welchen neuen, computergestützten Methoden kann die stadtplanerischen Diskussion eine neue Qualität erhalten? Monitoringsysteme, gespeist mit individuellen Daten verschiedener Benutzergruppen können hierbei in einem neuen bottom-up Planungsverständnis wertvolle Erkenntnisse liefern. Die Idee hinter dieser Aufgabenstellung ist, ähnlich wie es Kevin Lynch mit seinen Mental Maps praktizierte [Lynch 1960], den stadtplanerischen Horizont zu erweitern und ihn zusätzlich mittels neuer Geowebtechnologien einer digitalen Renaissance zu unterziehen. Am Beispiel der Stadt Kaiserslautern werden die Bewegungsmuster von Probanden in der Stadt Kaiserslautern über einen längeren Zeitraum getrackt, über diese „Tracking People Methode“ mit Menschen als Messfühlern untersucht. Datengrundlagen sind OSM-, Google Earth-und GPS-Daten, die zusätzlich über sogenannte „Walking Diaries“ validiert werden. Alle Daten werden anschließend aggregiert, so dass städtische Dichtekarten von bevorzugten Wegen und Aufenthaltsorten der Testgruppe entstehen. Mit diesen Karten können Hotspots, aber auch ungenutzte Bereiche in der Stadt identifiziert werden, die eine neue Sichtweise auf die Nutzung städtischen Infrastruktur zulassen. Zusätzlich können durch diese Informationen dem Planer neue inhaltliche Analysemöglichkeiten eröffnet werden, welche dieser im urbanen Planungsprozess gewinnbringend einsetzen kann.

2 THEORETISCHE GRUNDLAGEN

Lebenswerte, gesunde und prosperierende Städte sind ein erstrebenswertes Ziel für die Stadtplanung sowie auch für deren Bürger. Doch bevor Maßnahmen getätigt werden um diese Vision zu erreichen, stellt sich die Frage: Wann überhaupt ist eine Stadt lebenswert und ist es möglich, darüber quantifizierbare und validierbare Aussagen zu treffen? Neben den klassischen Standortfaktoren gewinnen die weichen zunehmend an Bedeutung und werden immer mehr zum ausschlaggebenden Faktor, wenn es darum geht Standortentscheidungen zu treffen – sei es für Unternehmen als Standort für den Firmensitz oder auch als Lebens- und Arbeitsmittelpunkt für den einfachen Bürger. Dieser Aspekt wurde unter anderem auch schon von Richard Florida untersucht, welcher in diesem Kontext erläuterte, dass sich das ehemalige Prinzip „People follow Jobs“ sich umgekehrt hat und heutzutage attraktive und lebenswerte Städte mit einem gutem Image und einer kulturellen Vielfalt – entstanden durch die dort lebenden Menschen – die sog. „kreative Klasse“ und damit auch Arbeitsplätze anziehen [Florida 2004]. Dreh- und Angelpunkt dieser Betrachtung ist der Faktor „Mensch“. Doch wie kann eben dieser methodisch als Messfühler für planungsrelevante Fragestellungen eingesetzt werden? „Normale“, konventionelle und quantifizierbare Werte, wie etwa Baulandpreise, Bodenrichtwerte oder Lärmmessungen werden schon seit langer Zeit in der Stadtplanung verwendet. Wie jedoch können komplexere und subjektive Daten erfasst und kartografiert werden, damit deren weitergehende Nutzung und Analyse und schließlich deren fachliche Nutzbarmachung möglich ist? Lassen sich z.B. Mental Maps im Sinne von Kevin Lynch verorten, so dass diese für die stadtplanerische Diskussion nutzbar sind? Hierbei stellt sich die Frage, wie Methoden für der Datenerfassung und Behandlung aussehen können und welche speziellen Fragestellungen und Probleme zu beachten sind und welche Anforderungen das Arbeiten mit dem Menschen als Messfühler verlangt. Ergänzend wird auch die Frage nach der Konzeption einer adäquaten Visualisierung dieser komplexen Fragestellung behandelt.

Insbesondere mobile Anwendungen auf mobilen Endgeräten befeuern diesen Trend zunehmend und liefern wichtige Innovationsideen und -methoden, denn räumlich verortete Informationen und Dienste wie Location Based Services (LBS) sowie vor allem auch die daraus generierten Inhalte erlangen zunehmend Relevanz. Deshalb ist es nicht verwunderlich, dass die Koppelung von GIS- und GPS-Systemen zunehmend im Fokus

des planerischen Interesses steht. Mental Maps können dementsprechend aufgewertet werden, in dem Probanden mithilfe der GPS-Technik „in stadträumlichen Umgebungen durch digitale Systeme gewissermaßen eine Art zweites ‚Erinnerungs-Bild" extrahieren können [Streich 2005:308]

Einige Projekte, wie zum Beispiel die „Regionsidentifizierung" in „1,2,.. Scheibenhardt" [Berchtold et al. 2002:44ff], das Projekt „emomap Mannheim"[vgl. hierzu Zeile et al. 2009] oder die „GPS-Studie Studentenstadt Karlsruhe" [Berchtold et al. 2009] liefern erste Anhaltspunkte darüber, wie „Tracking" des Messfühlers „Mensch" als mögliche Methode für planerische Aufgaben eingesetzt werden kann: Wurde bei der ersten Arbeit von Berchtold et al. noch die Aufzeichnung der Wege dafür benutzt, um die Region Karlsruhe durch ihre Bewohner in ihrer ganzen Vielfalt zu beschreiben und um Hauptattraktoren zu identifizieren, so bedienen sich die neueren Arbeiten schon der GPS-Technik zur Aufzeichnung der Wege. Einmal verbunden sogar mit der Verknüpfung von physiologischen Daten zur Identifizierung von emotionalen Hotspots [vgl. Zeile et al.] zum anderen wurden bei der „GPS-Studie Studentenstadt Karlsruhe" 100 Probanden mithilfe eines GPS-Trackers und eines digitalen Routenbuches über einen Zeitraum von vier Wochen in Karlsruhe beobachtet.

3 DAS EXPERIMENT „TRACKING PEOPLE"

Im Rahmen von zwei studentischen Projekten wurde als Untersuchungsfeld die Mobilität der Studierenden in Kaiserslautern ausgewählt. Während bei dem vorangehenden Forschungsprojekt Emomap [vgl. Zeile et. al. 2009] sich der Fokus auf eine Verknüpfung von physiologischen „Befindlichkeiten" sowie der Wegemuster bezog, wurde bei dieser Projektarbeit mittels des Trackings der Probanden deren Wege- und Aktivitätsmuster erhoben. Durchgeführt wurde das Experiment in zwei Untersuchungsreihen: Die erste über den Zeitraum von zwei Wochen im Mai 2009 sowie eine vierwöchige zweite Phase im Dezember 2009.

3.1 Methodik

Die Methode des Tracking umfasst drei wesentliche Arbeitsschritte: Zum einen die Aufnahme der Daten aller Probanden über ein sogenanntes „Walking Diary" – eine Art Tagebuch – das die einzelnen Wege und Punkte sowie deren Zweck mittels Google Earth dokumentiert. Zum anderen die GIS-gestützte Aggregation der Daten aller Teilnehmer und drittens die Abfrage und Auswertung dieser Daten. Für alle Aktionen wurde ein vordefinierter Katalog mit 22 Attributen und eindeutiger Nomenklatur erstellt, um verschiedene Schreibweisen und Fehlinterpretationen auszuschließen.

Im Walking Diary müssen die Probanden ihre Wege nach Datum, der Uhrzeit mit Beginn und Ende der Strecke, sowie den Start- und Endpunkt des Weges mithilfe der „Strecke zeichnen"-Funktion erfassen. Zusätzlich sind die Attribute wie „Zweck des Weges", „Verkehrsmittelwahl" sowie das „Geschlecht" und eine eindeutige, anonymisierte „ID" der Probanden mit aufzunehmen. Da nicht nur die Bewegung wichtig ist, sondern auch die Verweildauer vor Ort, müssen zusätzlich über die „Placemark setzen"-Funktion in Google Earth die Aufenthaltsorte erfasst werden. Diese sind wiederum nach Datum „Ankunft", „Abreise", „Ort", „Zweck" und „ID" und „Geschlecht" zu sortieren. Zusätzlich können an einem Aufenthaltsort auch sogenannte „Statuswechsel" erfolgen, wenn zum Beispiel der Proband von „Freizeit" auf „Schlafen" wechselt. Die Punkte und Wege werden in Google Earth mit einem Datumsstempel versehen, und in Ordner zum jeweiligen Tag archiviert und gespeichert. Das Aufzeichnen des Diaries geschieht über eine Tabelle, die über den jeweiligen Datums- und Uhrzeitenstempel mit den jeweiligen Geodaten der Wege und Aufenthaltspunkte in einem GIS-System verknüpft werden. Danach ist es möglich, verschiedene raumrelevante Abfragen mit den erfassten Attributen zu tätigen. Beispielhaft sind die Wege aller Probanden als Dichtekarte oder das geschlechtsspezifische Einkaufsverhalten zu nennen. Alle daten wurden mithilfe eines GIS-Systems aggregiert und analysiert.

3.2 Auswertungsergebnisse

Die Auswertung der Projektarbeit sollte anhand thematischer Schwerpunkte geschehen, zu denen die Studenten ihre getroffenen Annahmen anhand der Datensätze in Bezug auf ihre Validierbarkeit überprüfen. Hierbei wurden Untersuchungsfelder gewählt, wie etwa verkehrstechnische Betrachtungen bezüglich des Modal Splits (hier wurde z.B. für die Probanden die Feststellung gemacht, dass v.a. die pendelnden Studenten sich vorwiegend mit dem Auto in der Stadt fortbewegen, während die Wohnhaften überwiegend zu Fuß gehen oder mit dem Fahrrad fahren), vielfach aufgesuchte Bereiche (beliebte Punkte für Einkaufen,

Weggehen etc.) oder etwa die Verteilung der Orte des Lernens an der Universität. Folgende exemplarische Beispiele verdeutlichen die gemachten Beobachtungen:

3.2.1 Einkaufsverhalten

Die folgende Abbildung zeigt das Einkaufsverhalten der Studenten in der Innenstadt von Kaiserslautern. Der grün unterlegte Bereich wurde anhand einer Dichtemessung generiert und zeigt den Hauptaktivitätsbereich der Probanden. Die Haupteinkaufsort wurden zudem mit punktuellen Symbolen verortet. Als Feststellung wurde beobachtet, dass die weiblichen Probanden (rote Symbole) sich vorwiegend im Bereich der Innenstadt in einer Straße mit einer Vielzahl von Textileinzelhandelsgewerbe aufhielten, während die männlichen Probanden diesen Bereich nahezu komplett zum Einkaufen mieden und vorwiegend Güter des täglichen Bedarfes in anderen Bereichen der Innenstadt nutzten.

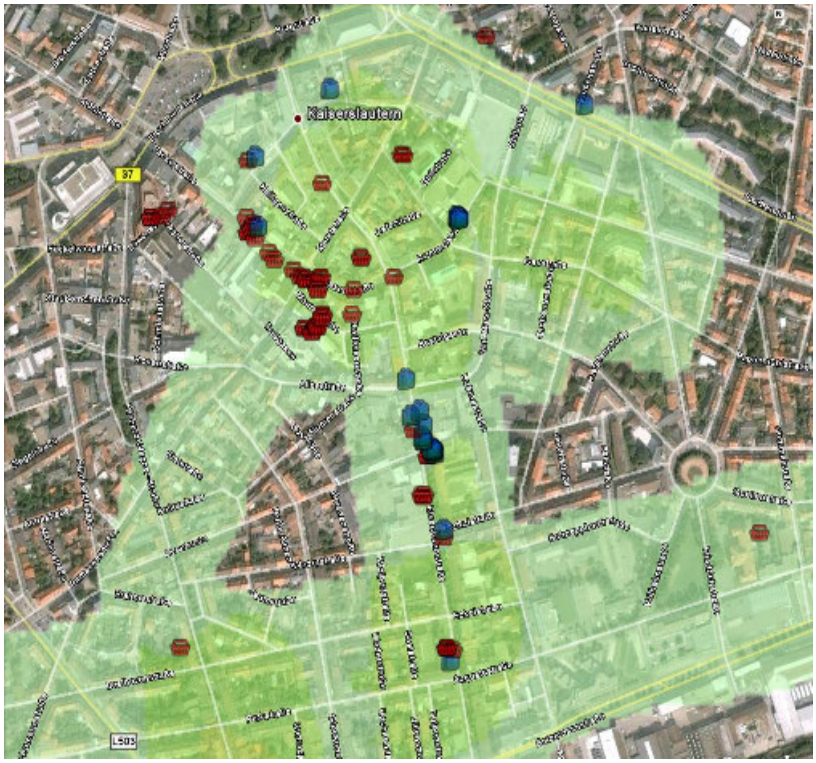

Fig. 1: Unterscheidung Einkaufsverhalten der männlichen (blau) und weiblichen Probanden (rot), Analyse Probanden Braun, Ohnesorg & Schaaf [CPE 2010]

3.2.2 Zweckgebundene Aufenthalte an der Universität

Die Vorgabe sah keine ausschließlich flächige Verortung der erhobenen Daten vor, auch eine Visualisierung mittels Google Earth und verorteten Balkendiagramme war möglich. Bei der folgenden Grafik ist die unterschiedliche Aufenthaltsdauer der Studenten je Zweck an der TU Kaiserslautern zu sehen. Auffällig ist hier beispielweise der gelbe Ausreißer in einem der Hauptgebäude der Universität, an welchem eine Party auf der Universität stattfand und die Studenten großteils dort eine lange Aufenthaltszeit hatten, sich sonst aber eher selten in dem Gebäude aufhielten.

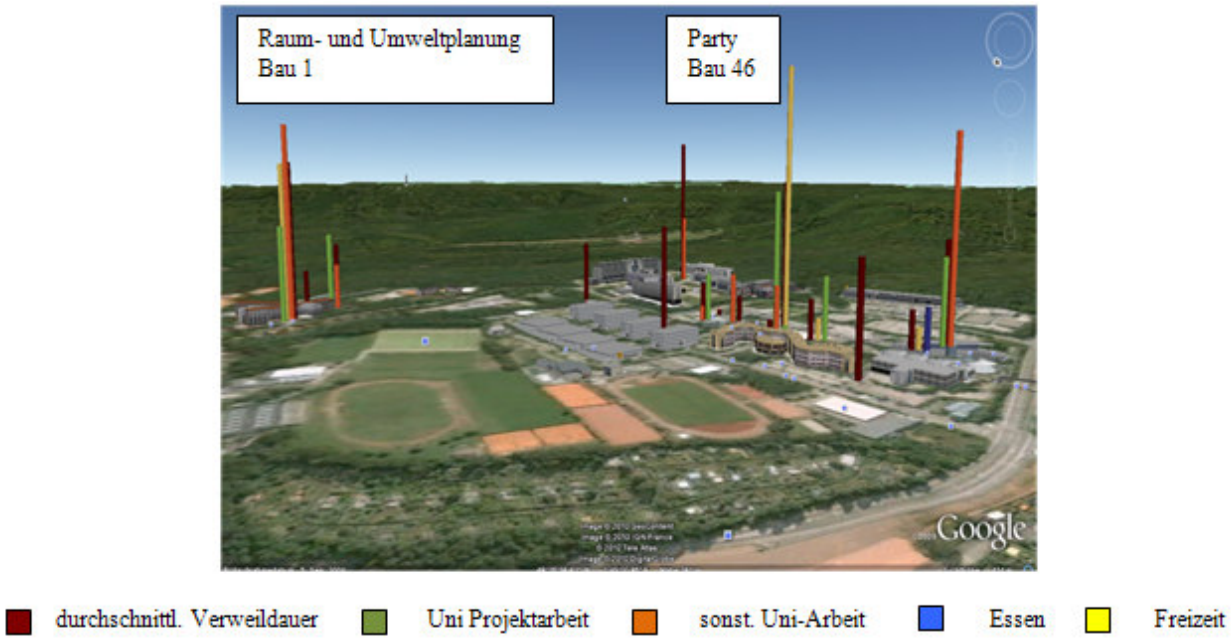

Fig. 2: Durchschnittliche Aufenthaltsdauer nach Zweck an der Universität, Analyse Probanden Moser & Sailer[CPE 2010]

3.2.3 ÖPNV-Analyse

Die konkrete planerische Anwendbarkeit kann anhand des folgenden Analysebeispiels aufgezeigt werden. Die linke Grafik zeigt die zurückgelegten Wege mit Hilfe des Fahrrads, die mittlere diejenigen mit dem Auto und die rechte die Wege mit dem ÖPNV. Hierbei wie wird insbesondere im zentralen Bereich der Karte eine starke Diskrepanz beider Karten deutlich. Dies beruht auf dem Fakt, dass der Weg zu einem größeren Einzelhandelsgeschäft, hauptsächlich für den täglichen Bedarf, überwiegend mit dem Fahrrad zurückgelegt werden muss, weil eine ÖPNV-Anbindung nicht existent ist. Dadurch ließe sich die planerisch relevante Aussage treffen, dass eine angebotene Buslinie kontinuierlich von Studenten frequentiert werden würde.

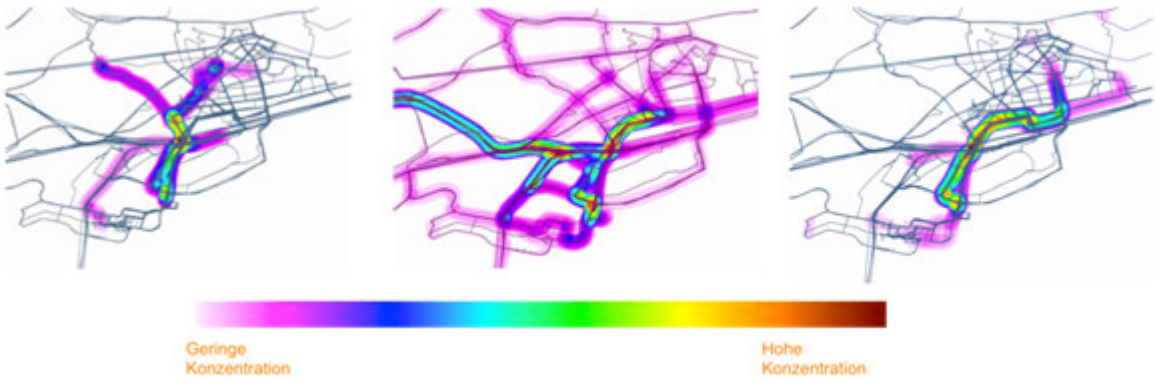

Fig. 3: Analyse Fahrradwege (links), Analyse Autowege (Mitte) & Analyse Busverbindungen (rechts), Analyse Probanden Picht & Wendt[CPE, 2010]

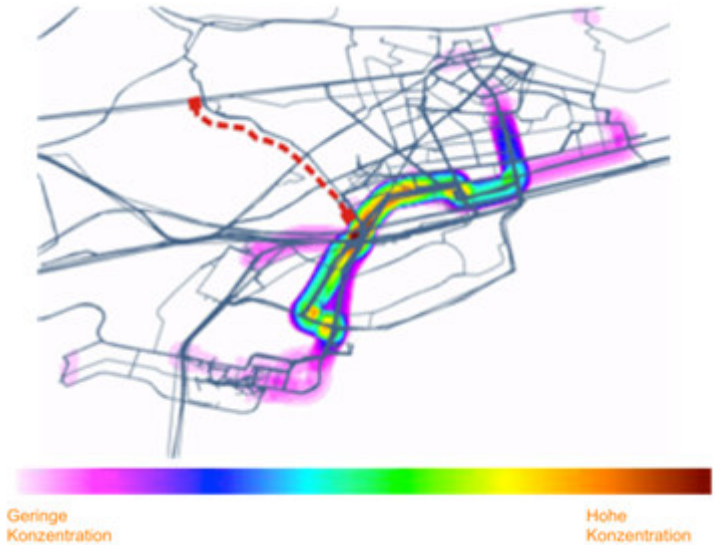

Fig. 4: Analyse Ausbaupotenzial ÖPNV, Analyse Probanden Picht & Wendt [CPE 2010]

4 REFLEXION METHODISCHER SCHWIERIGKEITEN

Ein der größten methodischen Schwierigkeiten besteht darin, dass fehlerhafte kausale Zusammenhänge bezüglich der gesammelten Daten gezogen werden und dabei zu falschen Schlussfolgerungen gezogen werden. Damit verbunden ist auch die Tatsache, dass z.B. in dieser Übungsreihe kein repräsentativer Datensatz der Bevölkerung dargestellt wird und deshalb keine Schlussfolgerungen für die Planungen abgeleitet werden können. Davon abgesehen stellt der Transfer von nicht quantifizierbaren in quantifizierbare Daten schon eine grundsätzliche potenzielle Fehlerquelle dar. Neben dieser Problematik ist der private Datenschutz ein Thema, welches nicht außer Acht gelassen werden darf. Jedoch muss hierbei der Fakt herausgestellt werden, dass für den Planenden die Gesamtaggregation der Daten im Vordergrund steht, und somit die datenschutzrechtlich notwendige Anonymisierung der Daten problemlos erfolgen kann. Darüber hinaus lassen sich noch folgende Problematiken betrachten:

4.1 Erfassung & Bearbeitung

Eine überlegte Datenaufnahme mit möglichst wenigen Fehlerquellen sowie einer konsistenten Kausalkette sollte die Voraussetzung für eine solche Betrachtung sein. Bei dem vorliegenden Fallbeispiel bestand die Problematik darin, dass die manuelle Erfassung der Daten, welche nicht in Echtzeit und sekundengenau erfolgte, durch den Faktor Mensch als Fehlerquelle beeinflusst wurden. So wurden die Wegstrecken und Zeiten nur durch die nachträgliche Reflexion am Ende des Tages erfasst, was natürliche Verzerrungen und eine reduzierte Detailliertheit der Datensätze zur Folge hat. Auch die manuelle Integration in Google Earth führt zu Ungenauigkeiten und teilweise fehlerhaften Eingaben. Die individuelle Erfassung der jeweils eigenen Tätigkeit und deren Zuordnung zu den genutzten Status (Schlafen, Freizeit, Privat, etc.) ist zwischen den Probanden nicht immer konsistent, so dass teilweise ähnliche Tätigkeiten unterschiedlichen Kategorien zugewiesen wurden. Daraus resultiert eine Reduktion der Vergleichbarkeit. Alleine die unterschiedlichen Schreibweisen von Straßennamen, Stati und Orten haben zur Folge, dass die Auswertung verfälscht wurde. Des Weiteren wurden von einigen Gruppen Begriffe – wie etwa Pendler – doppelt und missverständlich vergeben. Dies hatte zur Folge, dass die Datensätze anderen Gruppen zugeordnet worden sind (an Stelle von Wochenendpendler, z.B. den Tagespendlern) und damit die Ergebnisse der einzelnen Gruppen teilweise andere Ergebnisse hervorbringen. Da zusätzlich keine standardisierte Auswertungsmethodik vorgegeben wurde, kamen daher unterschiedliche methodische Vorgehensweisen bei der Bearbeitung der Daten in die Betrachtung, was natürlich auch zu anderen Ergebnissen führt.

4.2 Interpretation

Der zweite wichtige Punkt ist die Interpretation der Daten. Hierbei muss entschieden werden, ob die ermittelten Daten belastbar sind und ob die ursprüngliche Intention anhand der Daten auch belegt werden kann. Insbesondere der Faktor der Scheinkorrelation ist hier als potenzielle Fehlerquelle anzuführen. Für die betrachteten Fallbeispiele bedeutet dies, dass klare Aussagen für die erhobene Probandengruppe getätigt

werden. Diese Daten sind jedoch nicht repräsentativ und damit nur im Falle für die beteiligten Studierenden gültig. Im Rahmen des Projektes zeigte sich, wie sich bei der Analyse der Datensätze weitere, noch nicht angedachte, Interpretationsmöglichkeiten durch die Kombination der Datensätze ergeben. So wurden z.B. aufgrund der Daten Schlafrhythmen und Aktivitätsprofile ausgewertet.

4.3 Visualisierung

Bei der Visualisierung der aufgenommenen oder analysierten Daten muss darauf geachtet werden, dass diese exakten Zahlwerte die Realität nicht so genau abbilden können, wie dies nach der Bearbeitung durch ein GIS-Programm o.ä. suggeriert wird. Deshalb eignen sich genau quantifizierbare Klassifizierung mit Hilfe von Kardinalskalen nicht so gut wie etwa Ordinalskalen mit Rangfolgen, welche etwa durch weiche Farbverläufe dargestellt werden können. Zusätzlich kann eine unterschiedliche Akzentuierung und Farbgebung beim Betrachter unterschiedliche Assoziationen hervorrufen. Da es keine standardisierte Methode der Visualisierung gibt und geben kann, wird diese immer durch persönliche Präferenzen und technische Fähigkeiten beeinflusst. Dies zeigt sich beispielhaft bei der folgenden Abbildung, welche auf dem exakt gleichen Datensatz beruhen. Hierbei war die Zielstellung für die Bearbeitergruppen, alle Wege aller Probanden im betrachteten Zeitfenster in einer für sie schlüssigen Darstellung zu veranschaulichen. Dabei zeigt sich, wie unterschiedlich diese Umsetzung wirken kann und wie lediglich durch die Modifikation der Darstellungsparameter, nicht aber der Ausgangsdaten, ein teilweise völlig unterschiedliches Erscheinungsbild hervorgerufen werden kann.

5 AUSBLICK

Neben diesen Wegemustern gibt es auch weitere zukünftige Forschungsfelder, in die der „Mensch als Sensor“ mit einbezogen werden kann. Ziel ist immer, ein umfassendes planerisches Bild einer Stadt zu gewinnen. So wie es erste Projekte zur Visualisierung von Kriminalitätsdelikten auf städtischer Ebene – das sog. Crime Mapping gibt [vgl. Wolf et. al. 2009], so könnten potentiell Wohlfühlräume charakterisiert und kartografiert werden. Des Weiteren wäre es möglich, über Verortungen von Nachrichten aus Web 2.0 Communities wie etwa Twitter – durch thematische Analyse und Verortung der jeweiligen Textbausteine – Gruppen wie z.B. kreative Milieus zu identifizieren. Auch wenn aktuell noch keine Aussage über die „Lebensqualitätswert“ oder das Image einer Stadt aufgrund dieser Daten getroffen werden kann, so können zumindest sektoral in der Stadtentwicklung Probleme und Potentiale aufgezeigt werden. Lokalisierte Datensätze und technische Analysemöglichkeiten entwickeln sich rasant und deren Verfügbarkeit nimmt zu. Es wäre wünschenswert, wenn diese Daten den planerischen Diskurs erweitern und neue Erkenntnisse für eine auf den Menschen und Bürger zentrierte Planung liefern könnten.

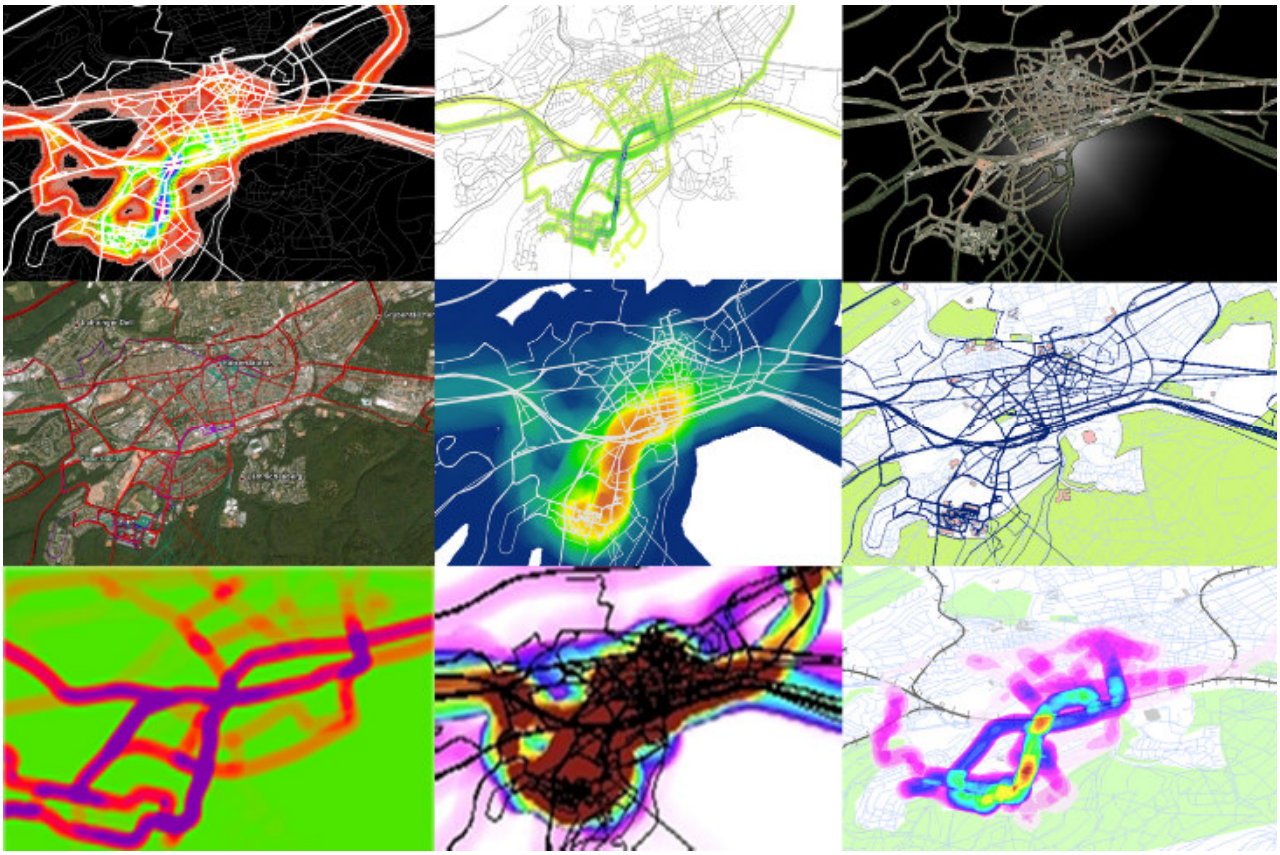

Fig. 5: Vergleich Visualisierungsmöglichkeiten aller getätigten Wege aller Probanden in Kaiserslautern während des Beobachtungszeitraums, Gesamtanalyse Probandengruppen [CPE 2010]

6 FAZIT

Den Menschen in den Fokus der planerischen Betrachtung zu stellen ist seit jeher oberste Planungsmaxime, ihn aber konkret als Messfühler für planerische Betrachtungen heranzuziehen, ist ein relativ neuer methodischer Ansatz, welcher jedoch enorme Potenziale für die Planung bietet. Einen Schritt zur Erforschung dieser Möglichkeiten stellen die beiden Projekte dar, die zeigen, dass sich trotz einiger Unzulänglichkeiten (Erfassungsprobleme, keine breite Datenbasis etc.) zumindest sektoral belastbare Daten extrahieren ließen, welche den planerischen Diskurs um neue Erkenntnisse bereichern können. In diesem Kontext sind die Ergebnisse deshalb beachtenswert, da die studentische Versuchsgruppe mit nur den ihnen zur Verfügung stehenden Daten sowie dem vorhandenen Basiswissen in GIS-Software eine Vielzahl an planerisch relevanten Ergebnissen und Aussagen (Taktung, Auslastung und Linienführung ÖPNV-Systeme, Frequentierung der Mensa- und Kioskstandorte, unterschiedliches Einkaufsverhalten der weiblichen und männlichen Probanden) ableiten und visualisieren konnten. Dabei zeigt sich an den erzielten Ergebnissen deutlich die hohe Relevanz, die dem Datenschutz in zukünftiger Entwicklung generell zukommen muss. Denn in Zeiten eines zunehmendes Data Minings und der damit verbundenen Verschneidung unterschiedlichster Daten (ökonomischer, sozialer Art) bestehen weitreichende Eingriffe in den Persönlichkeitsrechte von Kunden und Bürgern. So wichtig die Erhebung und Analyse von geocodierten und personenbezogenen Daten für die Stadtforschung auch ist, so wichtig ist hierbei eine Anonymisierung und Aggregation der Daten, um individuelle Auswertungen und Datenmissbrauch zu vermeiden.

In technisch-methodischer Hinsicht zeigte sich, dass die Erhebung mittels manueller Eingabe im Vergleich zur automatisierten Erfassung über GPS Vor- und Nachteile hat. Bei manueller Erfassung reduziert sich die Genauigkeit der erfassten Ortsdaten, da eine metergenaue Eintragung (z.B. der Straßenseite) für die Probanden zu aufwändig ist, während eine Erfassung via GPS dies grundsätzlich ohne Mehraufwand ermöglicht. Allerdings sind GPS-Empfänger anfällig bezüglich Bebauung und Wetter (Wolkendecke), wodurch die Genauigkeit der GPS-Signale stark beeinträchtigt werden kann und damit eine Datenbereinigung erfordert. In Kombination mit den Diaries erfolgt bei der manuellen Erfassung zudem gleichzeitig eine Aufzeichnung der Statuswechsel. Insgesamt erfordert die automatisierte Erfassung im Vergleich beim jetzigen Stand der Technik einen höheren technischen und finanziellen Aufwand.

Dementsprechend wird sich eine automatische Erfassung – trotz höherer Genauigkeit und geringerem Aufwand für den Probanden – erst langfristig durchsetzen. Zum aktuellen Zeitpunkt hängt der Einsatz von der jeweiligen Untersuchungsfrage und dem Umfang des Projektes ab. Für die Analyse von Verkehrswegen und der Nutzung des ÖPNV bietet die genutzte Methode somit einen vielsprechenden Ansatz. Gerade eine längerfristige Erfassung und Auswertung von Fahrradrouten könnte auf diesem Wege erfolgen.

Das Forschungsprojekt „Tracking People“ stellt hierbei eine Momentaufnahme dar, die zeigt, was alleine nur durch Verortung von Wegbeziehungen und Tätigkeiten schon auf einer einfachen Stufe möglich ist. Zudem gibt es – im Kontext mit den anderen vorgestellten Projekten – einen Ausblick darauf, welche planerischen Erkenntnisgewinne möglich wären. Anknüpfungspunkte für zukünftige Projekte wären z.B. die Kombination mit Biodaten oder anderen ortsbezogenen Daten. Sehr wahrscheinlich werden in diesem Forschungsfeld neue Methoden der Stadtanalyse entstehen, die Planern neue Wege in der Entscheidungsfindung eröffnen. Zusätzlich könnten durch Phänomene wie etwa Crowdsourcing die Aspekte des Web 2.0, durch ihre Lokalisierungen räumlicher Daten, auf einer neuen Ebene nutzbar gemacht werden.

7 DANKSAGUNG

Die Autoren möchten sich bei allen teilnehmenden Studierenden bedanken, die mit Engagement und Ausdauer zum Gelingen der Projekte beigetragen und durch ihre kritische Reflexion wichtige Hinweise für die Methodenentwicklung gegeben haben. Dank geht auch an die hilfswissenschaftlichen Mitarbeiter Willi Wendt und Timo Wundsam, die maßgeblich an der technischen-methodischen Verbesserung im Rahmen von Tracking People 2.0 beteiligt waren.

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🏆 *reviewed paper*

Mobile Stadtinformationssysteme und Location Based Services – Neue Potentiale für die Touristen- und Bürgerinformation

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1 ABSTRACT

Internetfähige Mobiltelefone sind in den letzten Jahren zum Standard geworden. Die mobile Verfügbarkeit des Internets bietet Städten und Regionen vielfältige Möglichkeiten, Informationen direkt vor Ort bereit zu stellen. Bisher waren städtische Informationssysteme nur „statisch“ im Netz vorhanden und wurden in der Regel am heimischen PC abgerufen. Das mobile Internet ermöglicht es Städten und Regionen, die bestehenden Informationssysteme nun auch mobil zur Verfügung zu stellen. Die Projektgruppe „Mar.Vis – Marketing.Visualisierung“ des Lehrgebietes cpe | Computergestützte Planungs- und Entwurfsmethoden in Raumplanung und Architektur an der TU Kaiserslautern entwickelte basierend auf der QR-Code-Technologie das mobile Informationssystem „Urban-Code“: Webinhalte lassen sich einfach und effektiv direkt vor Ort mobil verfügbar machen – jeder Besitzer eines internetfähigen Kamerahandys kann darauf zugreifen. Mit dem „Urban-Code“ können neben klassischen Webseiten auch multimediale Inhalte wie Filme und Audiospots mit realen Objekten verknüpft werden. Das folgende Paper gibt eine Übersicht der verschiedenen Anwendungsmöglichkeiten und einen Ausblick auf die Entwicklungstrends der Mobilfunktechnologie und Location Based Services.

2 MOBILE INFORMATIONSSYSTEME

2.1 Trends und Probleme bei der mobilen Informationsbeschaffung

„Das ganze Internet auf dem Handy ist die pure Propaganda!“, schrieb die Süddeutsche Zeitung noch 1999, das seien „unerfüllbare Erwartungen“ [Kurbjuweit et al., in: Der Spiegel vom 07.12.2009, S.71]. Heute boomt der Verkauf internetfähiger Mobiltelefone. Die Verwendung von Handys eben nicht nur zum Telefonieren sondern zur Nutzung einer Vielzahl zusätzlicher multimedialer Funktionen ist alltäglich geworden. Noch vor wenigen Jahren ließ die viel zitierte „Usability“ auf Mobiltelefonen zu Wünschen übrig: Umständliche Bedienung, instabile Software sowie Displaytechniken, die höchstens zum Schreiben von SMS geeignet waren. Heute verbreiten sich Smartphones mit intuitiven Touchscreens zunehmend schneller: Audio und Videodateien abzuspielen gehört ebenso zum Standard wie der Zugriff auf mobile Inhalte im Internet. Einhergehend mit den immer günstiger werdenden Internet-Flatrates wandelt sich der Umgang mit Mobiltelefonen dahingehend, dass fast jeder sein Mobiltelefon als „kleinen digitalen Begleiter“ dabei hat. Die Vision des „Ubiquitous Computing“ [Weiser 1993] – der Allgegenwart rechnergestützter Informationsverarbeitung – lässt sich an diesem Trend ablesen. Mit dem Smartphone kann der User fast alle erdenklichen Dinge anstellen, seien es auch oft nur Spielereien [vgl. Streich 2005, S.190: Der homo ludens als Quelle der Erkenntnis und des wissenschaftlichen Arbeitens]. Erweitert wurde die mobile Internetnutzung in den letzten Jahren durch die Netbooks und jüngst durch das iPad von Apple. Die „Multimediaassistenten“ der Zukunft ermöglichen also den uneingeschränkten Zugriff auf alle Informationen – jederzeit und allerorts.

Laut dem Spiegel vom 07.12.2009 ist eines der größten Probleme bei der Informationsbeschaffung im Internet das dort herrschende Überangebot. Wissen ist überall und ständig verfügbar und der Nutzer will es überall und ständig haben! Das hat zur Folge, dass jede Neuigkeit die volle Aufmerksamkeit verlangt [Kurbjuweit et al., in: Der Spiegel vom 07.12.2009, S.72]. Das Internet ist zwar im Alltag angekommen, aber der Nutzer weiß in vielen Fällen nicht, wie er der Informationsflut Herr werden soll. Es stellt sich oftmals eine Überforderung ein [zur aktuellen Diskussion über den Umgang mit allseits digital einfallender Information vgl. Schirrmacher 2009].

Hier stellt sich die Frage: Wie kann dem Nutzer die richtige Information zur richtigen Zeit und am richtigen Ort vermittelt werden? Gerade im mobilen Bereich will nicht jeder Nutzer eines Mobiltelefons mit mobilem Internet immer und überall erfahren, welche interaktiven, sehenswerten, „wichtigen“ oder eben „unwichtigen“ Dinge gerade um ihn herum oder sogar weltweit geschehen.

Das Medium Internet sollte zurücktreten und im übertragenen Sinne nicht mehr als solches erkennbar sein. Es soll nur „Mittel zum Zweck“ sein und somit quasi unsichtbar. Ziel ist es, dass der Nutzer nur noch das erfährt und sieht, was er selbst gerade will. Es bedarf einer Filterung, und zwar einer Filterung, die nicht der Nutzer gegenüber einem Informationsberg unternimmt, der mitunter auch viele Falschinformationen enthalten kann. Es ist daher sinnvoll, Objekte, die Interesse wecken können oder sollen, zum Input einladen zu lassen. Die Nutzung des Internets findet also erst nach geweckтem Interesse direkt vor Ort statt, und zwar gezielt – nicht in Form einer aktiven Suche des Nutzers im Internet, sondern indem das Objekt des Interesses selbst dem Mobiltelefon den entsprechenden Input gibt.

2.2 Verfügbare Technologien für mobile Informationssysteme

Wenn nun also nicht der Nutzer selbst mit seinem Mobiltelefon im Internet nach Informationen suchen soll, wie gelangen die Informationen dann zum Interessenten? Im Folgenden wird ein Überblick über die aktuellen Systeme QR-Code, Bluetooth, RFID/ NFC, Google Goggles und Location Based Services sowie deren Anwendungsmöglichkeiten im Bereich der mobilen Informationssysteme gegeben.

2.2.1 QR-Code

Seit einigen Jahren hat sich vor allem in Japan ein System durchgesetzt: Der so genannte QR-Code, der „Quick-Response-Code“. Es handelt sich dabei um einen schwarzweißen Code ähnlich dem Strichcode, der zur Preisabfrage in Supermärkten dient. Anhand des QR-Codes lassen sich Texte, Internetadressen, digitale Visitenkarten oder Telefonnummern mit bis zu 250 Zeichen verschlüsseln. Wird dieser Code mit dem Kamerahandy fotografiert, so wird über eine Dechiffrier-Software der Text entschlüsselt, der sich hinter dem QR-Code verbirgt. Die Dechiffrier-Software ist auf neueren Mobiltelefonmodellen bereits vorinstalliert oder kann im Internet kostenfrei bezogen werden . Idealerweise stellt der Text eine Internetadresse dar, auf die das Handy direkt zugreifen kann. Somit lässt sich über den Code gezielt vor Ort eine bestimmte Internetseite abrufen. Aber auch auf Dateien, die online verfügbar sind, lässt sich so mit dem Handy zugreifen. Ohne dass der Nutzer auf Internetseiten suchen muss, wird direkt ein Film oder eine Tondatei auf dem Handy abgespielt. Der QR-Code ist eine einfache zweidimensionale Grafik und hat daher den Vorteil, dass er sich problemlos auf Plakaten, Schildern oder per Aufkleber am Objekt des Interesses platzieren lässt.

Fig. 1: Anwendungsbeispiel QR-Code

2.2.2 Bluetooth

Ohne mobile Internetverbindung kommt das Bluetooth-System aus. Hierbei werden dem Handy über Funk Daten übermittelt. Verwendung findet das System vor allem im privaten Datenaustausch, doch lassen sich über Bluetooth-Sendegeräte auch Informationen über ein bestimmtes Objekt vor Ort vermitteln. Bedingung ist, dass der Mobilfunknutzer den Bluetooth-Empfang auf seinem Handy oder Netbook/ iPad aktiviert hat. Das Bluetooth-System sendet die Informationen permanent an alle empfangsbereiten Geräte in Reichweite, der Nutzer kann die Annahme der Information jedoch auch ablehnen. Ist sie erwünscht, können Filme, Bilder, Tondateien und Texte objekt- oder standortbezogen abgerufen werden, ohne dass der Nutzer mobil online gehen muss. Von Nachteil beim Bluetooth-System ist die geringere Geschwindigkeit bei der Datenübertragung. Das Versenden größerer Dateien dauert also wesentlich länger als über das Hochgeschwindigkeitsinternet HSDPA.

Die Bluetooth-Technologie wird bereits seit einigen Jahren von Unternehmen als Instrument des mobilen Marketings genutzt. Der 2008 von der Zeitschrift Absatzwirtschaft herausgegebene „Praxisleitfaden MOBILE MARKETING“ [Steimel et al. 2008] enthält hierzu diverse Beispiele. Abgesehen von interaktiven Werbeflächen der Firma Wall und Sendeterminals der Telekom gab es allerdings bisher kaum Anwendungen der Bluetooth-Techologie als Informationsträger im städtischen Raum. Bluetooth-Information oder Bluetooth-Marketing beschränkte sich auf geschlossene Veranstaltungen wie Fachmessen, Festivals oder Sportevents. Neue Wege geht hier die Stadt Koblenz, deren städtisches Bluetooth-Informationssystem in Kapitel 3.3 näher beschrieben wird.

2.2.3 RFID/ NFC

Ein System, das für Handys noch nicht zur Standardausstattung gehört ist das sogenannte RFID-System. RFID steht für „Radio Frequency Identification“ und bedeutet „Funkerkennung“. Das System funktioniert, indem ein Gegenstand mit einem Transponder ausgestattet wird, der auf die Anfrage eines Lesegerätes reagiert und diesem Informationen überträgt. Für die Datenübertragung ist kein direkter Kontakt zwischen Lesegerät und Transponder erforderlich. Das System findet derzeit bereits in vielen Bereichen Anwendung, zum Beispiel in der Logistik und in Kaufhäusern. Seit einigen Jahren werden auch Haus- und Zootiere mit einem RFID-Transponder unter der Haut gekennzeichnet, somit lassen sich die Tiere einwandfrei identifizieren und dem Besitzer zuordnen. Dabei handelt es sich jedoch nur um einen kleinen Teil des

möglichen Einsatzspektrums der RFID-Technologie. Im Bereich der mobilen Anwendung wird die RFID-Technologie als „Near Field Communication“, kurz NFC, bezeichnet. Ab Ende 2010 sollen Mobiltelefone zunehmend mit einem NFC-Lesegerät ausgestattet werden. Das System wird sich möglicherweise zu einer Standardanwendung von Mobiltelefonen entwickeln. Bei mobilen Informationssystemen könnte die Technologie wie folgt Verwendung finden: An Orten von Interesse ist ein Hinweis auf den vorhandenen NFC-Transponder angebracht. Der Nutzer hält das Lesegerät – in diesem Fall das Mobiltelefon – in die Nähe des Transponders und empfängt einen weltweit einzigartigen „Festcode“ auf sein Telefon. Diesem Code ist eine Internetadresse zugeordnet, über die sich nun wie beim QR-Code die vielfältigsten Informationen übermitteln lassen. Der Vorteil gegenüber den QR-Codes besteht darin, dass der Nutzer keinen Code abfotografieren muss, sondern lediglich das Gerät in die Nähe des Transponders halten muss. Bereits 2006 wurde auf der Nordseeinsel Sylt ein solches mobiles Informationssystem mittels NFC-Technologie aufgebaut. An bestimmten Punkten wie Restaurants oder Bushaltestellen wurde ein Transponder angebracht und der Nutzer konnte sich vor Ort informieren. Das System konnte sich allerdings nicht richtig durchsetzen, da es lediglich mit einem Handymodell funktionierte, das auf der Insel ausgeliehen werden musste. Außerdem konnte das Telefon die Inhalte nicht ansprechend auf dem kleinen und niedrig auflösenden Display vermitteln.

2.2.4 Location Based Service

Eine ähnliche Technik, die es dem Nutzer ermöglicht selektive Informationen vor Ort zu erhalten ist der Location Based Service. Mittels GPS (Global Positioning System) kann der Standort von Mobiltelefonen mit GPS-Empfänger ermittelt werden. Auch über die Sendemasten des Mobilfunknetzes kann eine Ortung erfolgen: Eine Software ermittelt den Standort des Mobiltelefons über die „Cell-ID“ der jeweiligen „GSM-Zelle“ (Global System for Mobile Communications), die durch die Verteilung der Sendemasten entsteht. Zusätzlich kann über einen im Mobiltelefon eingebauten digitalen Kompass neben der genauen Position des Nutzers die Blickrichtung festgestellt werden. Mit diesen Bezugspunkten ist es möglich, Informationen zum gerade anvisierten Objekt in Echtzeit im Handydisplay darzustellen.

Die Positionsermittlung über die Cell-ID findet zum Beispiel bei der Firma Google Anwendung: Bei der Positionsermittlung des Google-Dienstes „GoogleMaps“ wird auf diese Methode zurückgegriffen. Fraglich ist allerdings die Vorgehensweise der Firma Google: Die Cell-IDs wurden nicht direkt von den Mobilfunknetzbetreibern bezogen sondern indirekt ermittelt: Google sammelte die Cell-IDs mit Hilfe von Handynutzern, die diese über ein Mobiltelefon mit GPS-Empfänger preisgaben. Seitdem kann Google auch den Standort von Nutzern ermitteln, deren Telefon über keine GPS-Funktion verfügt.

2.2.5 Google Goggles

Eine weitere Entwicklung, die es ermöglicht Informationen zu diversen Objekten, Gegenständen oder Gebäuden zur Verfügung zu stellen, ist Google Goggles. Der Ort oder Gegenstand von Interesse wird abfotografiert und das Mobiltelefon stellt im Browser die objektspezifischen Informationen zur Verfügung. Das System funktioniert über eine Bilderkennungssoftware, die den abgebildeten Gegenstand erkennt und dann gezielt im Internet nach diesem sucht. Allerdings funktioniert das System noch längst nicht bei allen Gegenständen sondern nur bei bekannten Sehenswürdigkeiten, Büchern, berühmten Kunstwerken und Logos. Google Goggles ist bisher auch nur für das Handybetriebssystem Android verfügbar. Die Software befindet sich noch im Beta-Status und ist dementsprechend noch nicht ausgereift.

2.3 Anforderungen an mobile (städtische) Informationssysteme

Drei technische Grundvoraussetzungen muss das Mobiltelefon erfüllen, um die mobilen Informationssysteme im vollen Umfang nutzen zu können:

- Das Handy muss über einen Internetzugang verfügen, idealerweise über eine Internet-Flatrate, um zusätzlich anfallende Verbindungskosten zu vermeiden. In Zukunft ist davon auszugehen, dass neu abgeschlossene Mobiltelefonverträge bereits eine Internet-Flatrate beinhalten.
- Das Handy benötigt eine gut auflösende Kamera – mittlerweile gehört auch dieses Ausstattungsmerkmal zum Standard.
- Für die genaue Positionsbestimmung des Mobiltelefons ist ein GPS-Empfänger nötig und um die Blickrichtung zu ermitteln ein integrierter digitaler Kompass.

Angesichts aktueller Verkaufszahlen von Smartphones, die als Motor des mobilen Internets angesehen werden, kann die These aufgestellt werden, dass spätestens in fünf Jahren fast jeder zweite Bürger mobile Informationsdienste nutzen wird und ein Gerät mit den oben genannten Spezifikationen besitzt.

In der Praxis bieten die unterschiedlichen Lösungen der mobilen Informationssysteme sowohl Vor- als auch Nachteile. Der Vorteil der QR-Code-, Bluetooth- und NFC-basierten Systeme besteht darin, dass die objektspezifischen Informationen direkt und ohne Umwege auf dem Mobiltelefon dargestellt werden. Bei den Informationen handelt es sich um solche, die nicht auf den ersten Seiten einer Suchmaschine erscheinen, insbesondere bei allgemeinen Suchbegriffen. Davon abgesehen muss bei Suchmaschinen zusätzlich der Name des gesuchten Objektes per Hand eingeben werden. Sucht der Nutzer beispielsweise nach einer Kurzdokumentation über den Baustellenverlauf einer Stadt, so wird er diesen Film nicht auf den ersten zehn Seiten der Suchmaschine finden, wenn er nur den Stadtnamen als Suchbegriff eingibt. Alles was über das Eingeben des Stadtnamens per Mobiltelefontastatur hinausgeht, ist dem Nutzer nicht mehr zuzumuten und nicht praxisgerecht. Beim System Google Goggles bleibt dem Nutzer das Eingeben des Suchbegriffs zwar erspart, die Suchergebnisse sind allerdings nach wie vor allgemeine Informationen, in aller Regel ist der erste Treffer das Objekt betreffend ein Wikipedia-Eintrag. Exakte und deutlich umfangreichere oder speziellere wie ortsspezifische Informationen lassen sich mit dem System hingegen nicht vermitteln.

Hinsichtlich der Aktualität existieren zwischen der QR-Code- und NFC-Technologie auf der einen Seite und Google Goggles auf der anderen Seite zwei grundlegende Unterschiede: Während sich die Inhalte, die sich hinter den QR-Codes und den NFC-Transpondern verbergen, problemlos aktualisieren lassen, indem die verlinkte Internetseite mit neuen und aktuellen Inhalten versehen wird, können bei Google Goggles hingegen auch ältere und nicht mehr aktuelle Information weiterhin als erster oder zweiter Treffer der Suche erscheinen. In einigen Bereichen spielt die Aktualität der Information nicht die entscheidende Rolle – soll aber vor Ort eine wichtige und hochaktuelle Information vermittelt werden, ist dies ein entscheidender einschränkender Faktor für das System Google Goggles.

3 MOBILE INFORMATIONSSYSTEME IN STADT UND REGION IN DER PRAXIS

Die Diskussion über mobile Informationssysteme, der Bereitstellung von mobilem Content, erinnert zum heutigen Zeitpunkt sehr stark an die Diskussion der Frage „Brauchen wir überhaupt eine Homepage?“ mit Vertretern von Städten und vor allem kleineren Gemeinden um das Jahr 2000. Die Rahmenbedingungen waren seinerzeit auch bei der Diskussion über Endgeräte und Infrastruktur sehr ähnlich: Es fehlten Internetanschlüsse allgemein, High-Speed-Internet war nur an Forschungseinrichtungen verfügbar und vor allem gab es auch nur einen Bruchteil an „richtigen“ Internetnutzern. Heute ist das „bottleneck“ der Übertragungskapazität überwunden, fast jeder benutzt das Internet und es gibt auch fast keine Gemeinde mehr, die sich nicht „im Netz“ präsentiert. Einzig die stationäre Bindung an die Informationsbeschaffung ist derzeit noch zu überwinden.

Die mobilen Informationssysteme bieten ein großes Potenzial für die Vermittlung von objektbezogenen Inhalten im touristischen Bereich. Zudem lassen sich auch Inhalte aus dem stadtplanerischen Bereich darstellen – der Bürger besitzt über einen neuen Kanal weitere Möglichkeiten der Partizipation. Zum Beispiel könnte der Interessierte noch auf der „grünen Wiese“ den Bebauungsplan für das Gelände oder verschiedene Varianten für die Baumaßnahme betrachten. In einem weiteren Schritt wäre es denkbar, direkt über eine der Varianten abzustimmen oder ein Feedback zu senden. Für diese Anwendungen bietet sich der QR-Code im Sinne des „Urban-Codes “[1] an. Sowohl touristische, als auch planungsrelevante Inhalte können über den „Urban-Code“ vor Ort und je nach Einsatzgebiet über Sehenswürdigkeiten, Baumaßnahmen, Stadtführungen und vieles mehr informieren.

[1] Siehe www.urban-code.de

Fig. 2: QR-Code zum Film: “Urban-Code” – www.mar-vis.de/uc/uc.3gp

3.1 Beispiel: Urban-Code Aalen

Am Beispiel des Urban-Code-Systems der Stadt Aalen lässt sich gut erläutern, welche Information zur Verwendung im mobilen Informationssystem sinnvoll ist und welche nicht. Gegenüber einem klassischen Hinweisschild muss die mobile Information einen erkennbaren Mehrwert haben. Die simple Wiederholung dessen, was auf dem Schild steht, ist nicht von Interesse. Auch wenn zusätzliche Informationen mobil zur Verfügung gestellt werden – niemand will sich längere Texte auf seinem Mobiltelefon durchlesen. Die multimedialen Potentiale des Gerätes sollten ausgeschöpft werden, damit die Aufmerksamkeit erhöht und durchaus auch ein Spieltrieb geweckt wird. Die Informationen sollten außerdem kompakt vermittelt werden, da sich die wenigsten Nutzer im Rahmen einer touristischen oder ähnlichen Tätigkeit unzumutbar lange mit ihrem Mobiltelefon beschäftigen wollen. Am besten geeignet zur kompakten und eingängigen Information sind somit Filme, die auf aktuellen Mobiltelefonen in ausreichend hoher Qualität wiedergegeben werden können.

Von der Dokumentation bis zur Animation lässt sich in ein bis zwei Minuten eine ausreichende und einprägende Information gestalten. Auch Audioinhalte können interessanter gestaltet werden, indem sie zum Beispiel durch einen virtuellen „Avatar“, der im Idealfall einen Bezug zur Information hat, vorgetragen werden. Beispielhaft sei hier der „Spion von Aalen“ genannt – ein heldenhafter Charakter aus dem Mittelalter, dem in Aalen ein Denkmal gesetzt wurde. Mithilfe von 3D-Software kann die Statue des Spions zum „Leben“ erweckt werden und dem Nutzer Anekdoten aus der Aalener Stadtgeschichte erzählen.

Insbesondere Informationen, die über „analoge” Wege schlecht vermittelbar sind, lassen sich über Filme hervorragend mit dem Handy verknüpfen: Lokale Besonderheiten wie Geschichten, die beispielsweise von einem „Einheimischen” erzählt werden, vielleicht seine eigenen Erlebnisse, können kulturelle Eigenarten und Erinnerungen wach halten. Temporäre Ereignisse, wie zum Beispiel Volksfeste können während des restlichen Jahres per mobil abrufbaren Film eindrucksvoll wiedergegeben werden. Informationen, die an einer bestimmten Stelle abgerufen werden (zum Beispiel über QR-Code oder NSC), können den aktuellen Blickbezug des Nutzers aufnehmen und beispielsweise die selbe Stelle in historischen Ansichten wieder aufleben lassen oder einen zukünftigen Zustand vermitteln. Bei städtebaulichen oder architektonischen (Groß-) Projekten kann so ein Eindruck dessen, was geplant ist, schon während der Bauarbeiten nahe gebracht werden. Vor allem 3D-Stadtmodelle lassen sich hierfür mit den mobilen Informationssystemen verbinden. Dies beinhaltet einen weitaus größeren inhaltlichen Wert, als wenn das Modell weit entfernt vom Ort des Geschehens vor dem heimischen PC betrachtet wird.

Fig. 3: Der „Spion von Aalen“ – zum Leben erweckt mittels 3D-Software

3.2 Beispiel: Stadtwiki Koblenz

Enzyklopädien im Internet haben Hochkonjunktur – das wohl populärste Nachschlagewerk ist die Plattform Wikipedia mit mehr als 650.000 Artikeln in der deutschen Version. Doch haben es im Wikipedia vor allem Themen schwer, die sich ausschließlich mit lokalem Sachbezug befassen.

Seit 2003 gibt es regionale Pendants zur großen Schwester: Die Stadtwikis. Das verbindende Ziel der offenen Stadtwiki-Gemeinschaft ist es, Informationen über die jeweilige Stadt zu sammeln und der Allgemeinheit frei zur Verfügung zu stellen. Mit dem Stadtwiki Karlsruhe ging 2004 die erste regionale Online-Enzyklopädie in Deutschland an den Start – und viele Städte zogen nach. Auch eine Gruppe engagierter Koblenzer begann Mitte letzten Jahres mit dem Aufbau einer Informationsplattform für die Stadt und die Region Koblenz. Neben klassischen Informationen über Sehenswürdigkeiten, Museen und Denkmäler sollen auch Koblenzer Vereine die Möglichkeit haben, sich und Ihre Aktivitäten auf dieser Plattform einer breiten Öffentlichkeit zu präsentieren.

Der Verein „Freies-Wissen-Online e.V.“, Betreiber des Stadtwiki Koblenz , legt hier die Verantwortung für den Aufbau eines mobilen Stadtinformationssystems in die Hände der Stadtwiki-Community, also der Koblenzer Bürger. Die Erfahrungen aus der großen Enzyklopädie Wikipedia und auch dem Stadtwiki Karlsruhe haben gezeigt, dass Sachlichkeit, Korrektheit und Aktualität der Informationen durch die Pflege der Autorengemeinschaft gewährleistet werden können. Dies bewies 2004 eine Studie der Firma IBM und dem Massachusetts Institute of Technology (MIT) [Viégas et al. 2004, S.575ff] mit dem so genannten Historyflow-Verfahren, mit dem die Evolution von Wiki-Artikeln untersucht wurde.

Im Vergleich zu anderen Stadtwikis gibt es beim Stadtwiki Koblenz jedoch einen wesentlich Unterschied: Die Informationen des Stadtwikis sollen nicht nur im Netz verfügbar, sondern per QR-Code auch am Objekt vor Ort per Mobiltelefon abrufbar sein. Hierzu sollen die Autoren der jeweiligen Artikel die Möglichkeit haben, sich automatisch einen QR-Code mit der entsprechenden Internetadresse ihres Artikels zu generieren. Außerdem sollen sie den QR-Code auch direkt als Schild im Stadtwiki-Design bestellen können.

3.3 Beispiel: Bluetooth-Marketing Koblenz

Die Stadt Koblenz nahm 2008 den Betrieb eines auf Bluetooth basierenden Informationssystems auf. Dreizehn über die Stadt verteilte Sendestationen versorgen Besucher und Bürger kostenlos mit Informationen: Sobald sich die Nutzer mit ihrem Mobiltelefon auf rund 30 Meter einer Sendestation nähern, erhalten sie Textnachrichten, kurze Videos oder Audiodateien mit Informationen zu dem Ort, an dem sie sich gerade befinden. Die Besonderheit des Koblenzer Systems ist die zentrale Steuerung: Jede Sendestation ist per UMTS oder Kabelzugang mit dem Internet verbunden – die zu sendenden Inhalte können von einem zentralen Rechner aus jederzeit modifiziert werden. So konnte zum Beispiel an der Sendestation am Deutschen Eck während der Veranstaltung „Rhein in Flammen“ das aktuelle Bühnenprogramm und kurz-

fristige Änderungen per Bluetooth an die Besucher verschickt werden. Diese Flexibilität ist der große Vorteil des von der Koblenzer Firma WizAi Solutions entwickelten Systems. Ein Nachteil besteht allerdings in den relativ hohen Kosten: Insgesamt investierte die Stadt rund 240.000 Euro in Aufbau und Betrieb.

4 FAZIT

Das mobile Internet ist für sich bereits als mobiles Informationssystem zu bezeichnen. Allerdings sollte das Ziel eines mobilen Informationssystems nicht darin bestehen, dem Nutzer eine unüberschaubare Menge an Objektinformation zur Verfügung zu stellen. Stattdessen müssen Informationen sinnvoll gefiltert werden und der Nutzer sollte nur genau die Informationen erhalten, die er vor Ort benötigt. Insbesondere bei mobilen Informationssystemen ist dies besonders wichtig, da auf Grund von Hardwarefaktoren wie Displaygröße des Endgerätes und Übertragungsgeschwindigkeit des verfügbaren Netzes ein Überangebot an Informationen kontraproduktiv wirkt.

Im Gegensatz zu vielen anderen Ländern hat Deutschland in der Entwicklung von Anwendungsbereichen mobiler Informationssysteme noch Nachholbedarf. Dies liegt zum Großteil nicht an der technischen Entwicklung oder den Kosten, sondern in der Akzeptanz der Anwender. Deshalb ist es besonders wichtig bei der Konzeption von mobilen Informationssystemen den Fokus auf einen sinnvollen Inhalt zu legen, denn ein Informationssystem ist eben nur so gut wie die angebotenen Inhalte. Erhält ein Nutzer vor Ort nicht die gewünschten Informationen, wird er das System nicht akzeptieren und keine weitere Nutzung vornehmen. Das Informationssystem verfehlt somit seinen Zweck.

Technologisch sind die Weichen für einen erfolgsversprechenden Ausbau von mobilen Informationssystemen mittlerweile gestellt: Die Preise für mobile Internetflatrates sinken stetig, fast alle neuen Mobiltelefone verfügen über die entsprechenden Schnittstellen und Techniken. Es ist sogar zu vermuten, dass es in absehbarer Zeit keine Mobilfunkverträge mehr ohne Internetoption geben wird, denn viele Funktionen der Mobiltelefone werden ausschließlich durch eine mobile Internetverbindung funktionieren. Schon heute können mit Hilfe der QR-Codes Informationen mit einem realen Objekt verknüpft und per Mobiltelefon abgerufen werden. Die RFID- beziehungsweise NFC-Technologie befindet sich gerade im Einzelhandelsbereich im Aufbruch und wird in absehbarer Zeit ihre Potenziale auf mobilen Endgeräten ausspielen. So entstehen neue Möglichkeiten das Abrufen von Informationen zu erleichtern.

Google Goggles sollte insbesondere unter Datenschutzgesichtspunkten als kritisch eingestuft werden, da Google über die Nutzung des Systems an zahlreiche Daten und Interessen des Nutzers gelangt. Insofern ist es durchaus möglich, dass die Bevölkerung dem System äußerst skeptisch gegenüber stehen kann und es ähnliche Abwehrreaktionen geben könnte wie gegenüber dem Google-Dienst „Street-View“. Auch die automatische Standorterkennung per GPS oder Verortung der Cell-ID werden von der Bevölkerung aus Datenschutzgründen mitunter kritisch betrachtet. Ohne das Wissen des Nutzers könnten Bewegungsprofile aufgezeichnet und zum Beispiel für individuell angepasste Werbung missbraucht werden.

Die vorgestellten Beispiele zeigen allerdings, dass Städte und Gemeinden sich mit diesem Thema auseinander setzen und zunehmend die Weichen für mobile Informationssysteme und zukünftige Kommunikationswege stellen: Interessierte Bürger und Touristen können Informationen rund um die jeweilige Stadt und Region unkompliziert und direkt vor Ort über ihr Mobiltelefon abrufen. Die Inhalte des „Urban-Codes“, der auf der QR-Code-Technologie aufbaut, lassen sich aufgrund ihrer Verknüpfung mit dem mobilen Internet problemlos an zukünftige technische Entwicklungen anpassen. Die vielseitigen Anwendungen eröffnen den Mobiltelefonnutzern umfangreiche Möglichkeiten zur Information und Interaktion – von der Information über Städte, Regionen und ihre Sehenswürdigkeiten über das Erlebnis virtueller Stadtrundgänge und kultureller Besonderheiten bis hin zu Partizipationsprozessen in Planungsfragen.

Im Gegensatz zu den späten 1990ern, in denen noch keine digitalen Inhalte für die Internetpräsenz von Städten und Gemeinden vorhanden waren und diese Inhalte erst erarbeitet werden mussten, ist die Adaption der verfügbaren Informationen auf mobile Endgeräte heute hingegen mit relativ wenig Aufwand verbunden. Einige Blogdienste und Content Management Systeme optimieren sogar automatisiert Inhalte für die mobile Anwendung. Mobile Informationssysteme sollen auch nicht die traditionelle Übermittlung von Daten ersetzen, sie stellen ein weiterführendes Angebot dar, einen neuen Distributionskanal, der eine andere

Klientel anspricht. Diese Form der Vermittlung von Inhalten sollten als Chance, nicht als „technische Last“ empfunden werden.

Weiterführende Informationen und Filmbeiträge im Internet unter:

www.mar-vis.de

www.urban-code.de

www.youtube.com/marvistv

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🏆 *reviewed paper*

Mobility barriers in urban transport for the sight or hearing impaired: Solutions help all passengers

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1 ABSTRACT

People with visual or hearing impairments represent a significant part of the population. Using public transport services they have to overcome numerous specific problems and obstacles. Quite often they are not even recognized as a group for themselves with special needs and demands but rather mistaken for blind and deaf people. Taking into account that mobility barriers for these groups are completely different, this situation, of course, is not acceptable.

In order to reveal the most common and most hindering specific problems people with sight and hearing impairments are confronted with and to collect proposals to solve them, the Institute for Transport and Logistics Management of the WU Vienna conducted a qualitative short-study based on interviews with persons directly concerned, their representatives, authorities and transport companies as well as on discussions in related internet-fora respectively. Problems at stops and stations, in vehicles, general mobility problems and public perception were taken into account.

Thus the barriers detected and the related solutions proposed were rated according to their technical and financial feasibility as well as to the utility gain for the passengers concerned. It can be shown that numerous measures could be realised at low or even no cost at all as many problems are merely resulting from a lack of awareness, empathy or insufficient training only. Furthermore the implementation of several measures would not only improve access to public transport for the two specific groups but for almost all passengers.

2 BACKGROUND

For most of us mobility is an important part of our everyday life and partly even regarded as a basic human right. However, there are many people who have to face different barriers concerning their personal mobility, for instance people with walking disabilities, other physical or mental handicaps, deaf and blind persons, but also two groups which are usually not getting appropriate attention, namely people with sight or hearing impairments. These two groups are in the focus of this report.

The two groups represent a significant part of the population and, unfortunately, they are often mixed-up with the blind and deaf although these groups have completely different need and requirement profiles concerning their personal mobility. Since blind people cannot see at all they must replace the sense of sight by using their other senses or by additional support like guide dogs. Visually impaired persons on the contrary rely on their optical sense, but are of course unable to reach the same level of vision as normal-sighted persons. Analogously deaf persons cannot hear at all, whilst hearing impaired can but need auxiliary means to improve their acoustic perceptions.

Thus measures in public transport which are implemented and regarded as useful for the blind or deaf mostly fail to foster the mobility of visually or acoustically impaired persons. Another important point to be taken into consideration is the large size of the two groups of people with visual or acoustic impairments. From a statistical point of view their number exceeds by far the blind or deaf or other groups with limited mobility: However public awareness of their relative importance is low. At this point it is important to stress, that it is not the author's intention to set the different groups against each other or to achieve a redirection of funds. The intention is rather to increase the sensitivity for the affected groups, to identify problems and to show ways how to solve them in order to significantly improve the mobility of visually and acoustically impaired persons eventually.

3 DEFINITION

Before the problems and related solutions for sight and hearing impaired persons can be discussed in detail, it is important to delimit to a certain extent the field of interest.

From a medical point of view the delimitation for visual impairments is based on the visual acuity (visus cum correctione, v.c.c; 1.0 = 100% is the average normal eyesight) where a range from 30% down to 10%

acuity can be seen as (moderately) impaired vision and the range from 10% to 2% as severely impaired. Oftentimes the visual field loss is also used to determine the degree of the impairment.

Referring to the WHO International Classification of Diseases (ICD-10) from 2007 visual disturbances and blindness can be found in the groups H53-H54. Table 1 gives the classification of severity of visual impairment which is included in the ICD-10 at the end of the groups H53-H54:

Category of visual impairment	**Visual acuity with best possible correction**	
	Maximum less than:	**Minimum equal to or better than**
1	6/18	6/60
	3/10 (0,3)	1/10 (0,1)
	20/70	20/200
2	6/60	3/60
	1/10 (0,1)	1/20 (0,05)
	20/200	20/400
3	3/60	1/60 (finger counting at 1 metre)
	1/20 (0,05)	1/50 (0,02)
	20/400	5/300 (20/1200)
4	1/60 (finger counting at 1 metre)	Light perception
	1/50 (0,02)	
	5/300	
5	No light perception	
9	Undetermined or unspecified	

Table 1: Classification of severity of visual impairment recommended by a WHO Study Group on the Prevention of Blindness, Geneva, 6-10 November l972. (WHO Technical Report Series No. 518, 1973) The term "low vision" in category H54 comprises categories 1 and 2 of the table, the term "blindness" categories 3, 4 and 5, and the term "unqualified visual loss" category 9. If the extent of the visual field is taken into account, patients with a field no greater than 10 o but greater than 5 o around central fixation should be placed in category 3 and patients with a field no greater than 5 o around central fixation should be placed in category 4, even if the central acuity is not impaired. (Source: World Health Organization: http://apps.who.int/classifications/apps/icd/icd10online/)

Level 1 could be referred to as “moderate” visual impairment, level 2 as “severe” visual impairment This article is focusing mainly on persons with a moderate low vision (acuity 0.3 to 0.1) though, however it has to made clear at this point, that basically anybody with a visual acuity lower than 1.0 which cannot be corrected by spectacles or contact lenses could be considered as visually impaired. This is a crucial point as measures taken in public transport for people subject to the rather narrow definition above shall also help all other passenger with an acuity of less than 100%.

Hearing impairments (included in chapter VIII, groups H60ff. of the ICD-10) can be measured through many different means. The most commonly used method is the “hearing distance”-test. According to the guidelines the hearing distance is the distance in which at least half of the words spoken by the examiner are repeated correctly by the test person. Another important test to determine the degree of impairment is the quantitative measure of the hearing ability according to Boenninghaus u. Röser (1958). In this test two tables are used, one for the hearing distance for whispered and normal spoken words and the other for the results of an audiometric measurement, to define the degree of acoustic impairment. This article focuses on the group with a medium level of hearing impairment.

There are no detailed official statistics which could help to determine the exact size of the two groups in the population. For Austria, in 2007 a dedicated module focusing on persons with impairments was included in the microcensus by Statistics Austria. According to this survey roughly 3.8% of the Austrian population suffer from a persisting visual and about 2.5% from a persisting acoustical impairment respectively. In both groups the majorities show medium to heavy impairments; women make up the larger parts.

4 METHOD

In a qualitative short study the Institute for Transport and Logistics Management of the WU (Vienna University of Economics and Business) mobility barriers for the sight and hearing impaired have been addressed. On the basis of a literature research a survey guideline with several open questions to be used in structured expert interviews was developed. The interviews were restricted to Austria though, but the results might still be transferable to other countries.

To get a comprehensive picture not only persons directly affected by a sight or hearing impairment were interviewed but also their representatives in associations or support groups as well as public authorities and responsible persons from transport companies (Table 2).

Interview Partners	Count
Visually impaired Persons	11
Acoustically impaired Persons	5
Associations	3
Transport companies	4
Authorities	2

Table 2: Persons interviewed

Furthermore dedicated threads were opened in internet-based discussion fora in order to reach also those affected persons who are not mobile (Table 3).

List of discussion boards	URL
Nahverkehrsforum: Train Simulator	http://www.tssf-forum.de/yabbse/index.php?board=24
Hamburger Nahverkehrsforum	http://forum.bahninfo.de/list.php?5
Nahverkehr-FFM	http://forum.nahverkehr-ffm.de
Hear-it	http://www.german.hear-it.org/forside.dsp?area=242
Schwerhörigen-Forum	http://www.schwerhoerigenforum.de/cgi-bin/cutecast/cutecast.pl
Menschen mit Behinderungen	http://www.menschen-mit-behinderungen.info/forum/register.php
Das Forum für sehbehinderte und blinde Menschen	http://f24.parsimony.net/forum56094/
Taubenschlag	http://www.taubenschlag.de/

Table 3: List of internet-fora

Table 4 shows the basic structure of the interviews which were slightly adapted according to the respective interview partner.

Subjects
Estimation of the size of seeing and hearing impaired persons in the population
Mobility problems of the affected groups
How are problems detected?
Development of possible solutions
Ways of taking specific measures

Table 4: Contents of the interviews

The interviews were transcribed and detailed lists of the detected problems of hearing and seeing impaired people with regard to their mobility were compiled. The possible solutions raised by interview partners were also included. During several project meetings categories were defined and the problems and solutions were classified accordingly. Furthermore the technical feasibility, the relevant costs and the utility gain for the affected were assessed.

To depict the results a rating system was introduced based on a 5 point scale where a higher score denominates a better result. As an example one point on the “cost-scale” of the following tables would represent high investments whilst five points would mean little to no costs at all.

5 RESULTS

The following tables show the results of the short study. To allow easier understanding the problems and solutions have been assigned to the following areas: “stops and stations”, “vehicles”, “other/general mobility problems”, and “public awareness”.

5.1 Stops and stations

The following table depicts commonly occurring problems at stations and the surrounding area.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for
Complex use of ticket machines	Possibility to increase the size of text.	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Voice output on demand	☹☹	☹	☺☺☺☺☺	Sight impaired
Readability of timetables	Timetables placed not too high – legibility has to be guaranteed (e.g. using reading aids, loupes, etc.)	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Pre-printed timetables in large print	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Decrease of distance between glass and timetable to allow reading with low vision aids	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Use of antireflection glass for showcases	☺☺☺☺	😐😐😐	☺☺☺☺	Sight impaired
Displays	Extended information on displays	☺☺☺☺	☺☺☺☺	☺☺☺☺☺	Both groups
	Use of contrasting colours	😐😐😐	😐😐😐	☺☺☺☺	Sight impaired
	Increase of font size	😐😐😐	☺☺☺☺	☺☺☺☺☺	Sight impaired
	Decreased height of mounted displays to eye-level and increased accessibility	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
Incomprehensible announcements at stations	Show announcement on displays and info-screens (“two-senses-principle”)	☺☺☺☺	☺☺☺☺	☺☺☺☺☺	Both groups
	Use of induction technology, especially at larger stations	☹☹	☹	☺☺☺☺☺	Hearing impaired
	Information per SMS upon requests	😐😐😐	😐😐😐	☺☺☺☺	Both groups
	Announcements available through MMS	😐😐😐	😐😐😐	☺☺☺☺	Both groups
	Free hotline with tape-service for important information	☺☺☺☺	☺☺☺☺	☺☺☺☺	Both groups
	Clear, slow and understandable tape-records and announcements	☺☺☺☺☺	☺☺☺☺☺	☺☺☺☺☺	Both groups
Inadequate guiding systems	Installing additional guiding systems	😐😐😐	☹	☺☺☺☺	Sight impaired
	Purpose-check of existing guiding systems by affected persons	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Including affected in planning process	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Both groups
	IT-based guiding systems (web-based, cellular)	😐😐😐	☹	☺☺☺☺	Both groups
Multi vehicle stations	Clear splitting of station areas for different lines	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Clearly visible display of the line arriving next	☺☺☺☺	😐😐😐	☺☺☺☺	Both groups
	Announcements of approaching vehicle	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
Station signposting	Bigger font sizes	☺☺☺☺	😐😐😐	☺☺☺☺☺	Sight impaired
	Use of clearly visible markings, paying attention to contrasts, height and place	☺☺☺☺	😐😐😐	☺☺☺☺	Sight impaired
Stations in rural areas	Safe footpaths	☹☹	😐😐😐	☺☺☺☺	Both groups
	Speed-limitations for other traffic in the station area	☺☺☺☺	☹☹	☺☺☺☺	Both groups
	Relocation of stations aside from main roads	😐😐😐	☹	☺☺☺☺☺	Both groups
Specially trained staff	Especially at central stations more support personnel	☺☺☺☺	☹	☺☺☺☺	Both groups
Entering and leaving vehicles	No traffic on lanes between vehicle and station while dis-/embarkation	😐😐😐	☺☺☺☺	☺☺☺☺	Both groups
Information at stations	Continuous information through Bluetooth or IR	☺☺☺☺	😐😐😐	☺☺☺☺☺	Both groups
	Downloadable web-based route-planning and on-trip use	😐😐😐	☹	☺☺☺☺☺	Both groups
Elevators at stations	Emergency-button for hearing impaired persons	😐😐😐	☹☹	☺☺☺☺	Hearing impaired
	Acoustic information	😐😐😐	☹	☺☺☺☺	Both groups

Table 5: Problem identification and possible solutions for the stops and station area

The main problem areas identified were missing guiding systems particularly for sight impaired persons, whereas hearing impaired people often had problems with the elevators at stations and with the service

hotlines in a case of emergencies. Other regularly mentioned problem areas were the signposting and the announcements at stations.

5.2 Vehicles

The second area of interest were the problems within the means of transport as shown by the following overview.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for …
Use of ticket machines on vehicles	Voice output on demand	☹☹	☹	☺☺☺☺☺	Sight impaired
	Bigger font size	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
Legibility of network plans	Plans at eye-level, focus on legibility	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Driver has plans in large print	☺☺☺☺	😐😐😐	☺☺☺☺	Sight impaired
	Network plans in large print available	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
Displays on vehicles	Show announcements on displays (“two-senses-principle”)	😐😐😐	😐😐😐	☺☺☺☺☺	Both groups
	Check used colours with the affected	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Font size easily readable	☺☺☺☺	☺☺☺☺	☺☺☺☺☺	Sight impaired
Quality of announcements	Optical display of announcements	😐😐😐	😐😐😐	☺☺☺☺☺	Both groups
	Use of induction-technology	☹☹	☹	☺☺☺☺☺	Hearing impaired
	On-demand information about next station (Bluetooth)	☺☺☺☺	😐😐😐	☺☺☺☺	Both groups
	SMS- or MMS-queries	😐😐😐	😐😐😐	☺☺☺☺	Both groups
	Free hotline with tape-service for important information	☺☺☺☺	☺☺☺☺	☺☺☺☺	Both groups
	Take employees for test drives to let them perceive the comprehensibility and quality of announcements	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Both groups
	Pronunciation, clarity and speed of announcements and tape-records	☺☺☺☺☺	☺☺☺☺☺	☺☺☺☺☺	Both groups
Automating	Mobility training for affected supported by transport companies	☺☺☺☺	😐😐😐	☺☺☺☺	Both groups
Distance vehicle – pavement	Drivers to stop close to pavement	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Use of low-floor-vehicles	☺☺☺☺	☹	☺☺☺☺☺	Both groups
Information in the vehicle	Device to be informed about the route, the next stop etc. Upon request	☹☹	☹☹	☺☺☺☺☺	Both groups
	On-demand general information via bluetooth	☺☺☺☺	😐😐😐	☺☺☺☺☺	Both groups
	Downloadable web-based route-planning and on-trip use	😐😐😐	☹	☺☺☺☺☺	Both groups
Doors	Large tactile door opening buttons	☺☺☺☺	😐😐😐	☺☺☺☺	Sight impaired

Table 6: Problem identification and possible solutions for vehicles

The main problem for sight impaired persons was the small print of network plans on the vehicles which forces them to use low vision aids like loupes. On the other hand many of these plans are placed at the roof of the vehicle which inhibits the use of such tools. A simple and cost effective solution would be the printing of network plans in bigger fonts and attaching them at eye-level.

Hearing impaired persons often criticize the bad quality or even the lack of the announcements in the vehicles. Not only are they regularly spoken too fast but also quite often incomprehensibly. The visually impaired also expressed problems with the announcements as they are often unable to read the name of stations and therefore rely on it in order to know where to get off. Thus the use of the two-senses-principle, which means that information should always be available optically and acoustically, should definitely be the standard.

5.3 General mobility problems

Some other – rather general – mobility problems could further be identified as shown in table 7.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for …
Information about transport on the internet	Possibility to increase the size of fonts and inverted colours	☺☺☺☺	☺☺☺☺	☺☺☺☺☺	Sight impaired
	On-demand voice output of site	☺☺☺☺	😐😐😐	☺☺☺☺☺	Sight impaired
Road signs as barriers	Place on gantries	☺☺☺☺	☹☹	☺☺☺☺	Sight impaired
	Use of max. permiss. height (2.2 m)	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Use of protective coatings	☺☺☺☺	😐😐😐	☺☺☺☺	Sight impaired
Bollards, hydrants, advertising pillars, green spaces, cordons	Use signal colours	☺☺☺☺	☺☺☺☺☺	☺☺☺☺	Sight impaired
	Double cordons with connecting elements	☺☺☺☺	😐😐😐	☺☺☺☺	Sight impaired
	Replace by fixed railing	☺☺☺☺	😐😐😐	☺☺☺☺☺	Sight impaired
Construction site security	At least to crossbars	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Signal colours for scaffoldings	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Solid barriers at building pits	☺☺☺☺	😐😐😐	☺☺☺☺	Sight impaired
	Barriers with construction fences	☺☺☺☺	😐😐😐	☺☺☺☺☺	Sight impaired
Weather conditions	Stricter regulations for snow removal and gritting	😐😐😐	☹☹	☺☺☺☺	Both groups
	Fixed cordons when danger of roof avalanches	☺☺☺☺	😐😐😐	☺☺☺☺	Both groups
	Tree and bush cutting	☺☺☺☺	😐😐😐	☺☺☺☺☺	Both groups
Railroad crossings without gates	Installation of gates	😐😐😐	☹	☺☺☺☺☺	Both groups
	Tactile floor markings	😐😐😐	☹	☺☺☺☺☺	Sight impaired
	Flashlights in the floor before train arrives	😐😐😐	☹	☺☺☺☺☺	Both groups
	Tow away parked vehicles	☺☺☺☺	☺☺☺☺☺	☺☺☺☺	Sight impaired
	Restaurant menu tables on the wall, restaurant tables not on the pavement	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
Other obstacles on pavement	No placards/advertisements covering signs	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Removal of different levels, gaps	☺☺☺☺	☹☹	☺☺☺☺	Both groups
	Tactile and optically contrasted markings	☺☺☺☺	☹☹	☺☺☺☺	Sight impaired
Cycle tracks	Involvement of seeing and hearing impaired people	☺☺☺☺☺	☺☺☺☺	☺☺☺☺☺	Both groups
	Distinct separation by advertisements or similar	☺☺☺☺☺	☺☺☺☺	☺☺☺☺☺	Sight impaired
Architecture	Easily visible handrails	☺☺☺☺☺	☹☹	☺☺☺☺	Sight impaired
Glass walls	Use of non-transparent glass	☺☺☺☺	☺☺☺☺	☺☺☺☺	Sight impaired
	Use of safety glass	☺☺☺☺	☹☹	☺☺☺☺	Sight impaired

Table 7: Identification and possible solutions for general mobility problems

In this area railroad crossings without gates were identified as a predominant problem for both groups. Particularly crossings in rural areas are not equipped with optical signals and are therefore dangerous for acoustically impaired persons. In Austria it could already be achieved at least, that an extra sign has to be placed at such crossing requesting people to pay particular attention to acoustic signals of approaching trains.

Another very problematic topic were the security measures around building sites, where sight impaired persons often come into danger because of missing or inappropriate barriers that would prevent them from entering such places. Adequate safety measures would not necessarily cost more than the ones in use but significantly increase the safety for impaired persons.

Many other problem areas could be identified, like glass doors or cycle lanes where accidents leading to severe injuries are likely. Again quite cheap solutions could allow enormous improvements.

5.4 Public awareness

The lack of awareness and empathy for sight and hearing impaired persons as well as insufficient training of drivers, service staff and planners is probably the most important and fundamental source of mobility problems of the groups concerned. This is partly due to the fact that they cannot be easily recognized at first sight as having special mobility needs and requirements. The following problems could be detected.

Identified problem	Possible solution	Technical feasibility	Related Costs	Utility gain	Mainly for …
Inadequate training of staff and planners	Special courses focusing on different disabilities and impairments for architects, planners, drivers and other staff of transport companies	☺☺☺☺☺	☺☺☺☺☺	☺☺☺☺	Both groups
	Lobbying by associations	☺☺☺☺☺	☺☺☺☺	☺☺☺☺	Both groups
	Brochures, information material	☺☺☺☺	☺☺☺☺	☺☺☺☺	Both groups
Unawareness of specific problems	Improve publicity of related information platforms	☺☺☺☺	☺☺☺☺☺	☺☺☺☺☺	Both groups
Research & Development	Include affected people in research & development	☺☺☺☺	☺☺☺☺☺	☺☺☺☺☺	Both groups
Lack of awareness and empathy	Information campaigns	☺☺☺☺☺	😐😐😐	☺☺☺☺☺	Both groups
	Special events like "Dialog im Dunkeln"	☺☺☺☺	😐😐😐	☺☺☺☺	Both groups

Table 8: Problem identification and possible solutions within the field of public awareness

A need for increasing public awareness for the two groups was one of the major topics raised by affected persons and their representatives both in the interviews and in the internet-discussions. Many people simply do not know about the large size of the two groups and their specific needs and requirements concerning their mobility. This information deficit could be overcome at relatively low costs.

Furthermore it would be useful to include sight or hearing impaired persons directly or their representatives in all major planning processes for new public transport buildings or vehicles and to take their demands into account right from the beginning.

6 CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

Sight and hearing impaired persons are two large groups of the population who – each for themselves – have to face specific mobility barriers. It is problematic, that they are often not seen as individual groups but are mistaken as blind or deaf. This inadequate perspective seems to be quite common among transport companies and authorities.

The interviews have shown that in the past too little has been done to improve the mobility of the sight and hearing impaired, but also that the situation has slightly improved over the last years.

Transport companies would like to have clearer and more obvious guidelines on how to design vehicles and stations in an appropriate way. Dedicated guidelines or standards as well as support from official authorities would be regarded as useful.

The most fundamental result was, however, that as a first step public awareness of the two groups and their problems needs to be urgently raised.

The detailed results of the short study show many aspects and problems for visually or acoustically impaired and proposals for their solution. It could be shown, that many measures would not even require large investments but merely the willingness to put oneself in the position of the persons who have to overcome mobility barriers. Thus it becomes evident, that the most common problem is ignorance and rarely scarce funds.

Therefore it seems as if the two groups still do not attract sufficient attention, otherwise solutions which could be taken at low costs but yield significant improvements would already have been realised. Taking such measures would clearly be economically beneficial for transport companies as many people, currently limited in their mobility, would use public transport services again resulting in higher passenger counts and revenues. Moreover the general attractiveness of public transport would rise which helps all passengers to get along with the services provided.

The short-study presented in this article can be seen as an initial step to treat related problems from a research perspective. However, there is a clear need for further research, aiming at a clear definition of specific demands for the two groups and at the development of common standards which can be applied by transport companies and technical suppliers. Recently, a large-scale research project related to these goals has been launched in the framework of the ways2go programme initiative and will be funded by the Austrian

Federal Ministry of Transport, Innovation and Technology (BMVIT) and the Austrian Research Promotion Agency (FFG).

The project, called “MoViH” (Mobility of the sight and hearing impaired in public transport) comprises in detail the following objectives:

- Clear identification and description of special needs and requirements
- Evidence on actual and desired mobility
- Identification of factors enhancing and hindering mobility
- Determination of intrinsic mobility barriers
- Development of new solutions and measures
- Detection of potentials for improvements of existing solutions
- Analyses of the gap between the transport companies’ and the sight and hearing impaired people’s points of view
- Economic assessment of newly developed measures
- Development of a tool for the evaluation of measures (“efficiency indicator”)
- Creation of an internationally applicable standard to be used by public transport companies
- Raise of general awareness by sharing information and dissemination of results

The project partners (universities, associations, transport companies and technical suppliers) hope that the new project will help to better understand the problems of the sight and hearing impaired and to improve their access to public transport services. Any measure taken for these people, however, will not only help them but the total of all passengers and hence make public transport more attractive.

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🏆 *reviewed paper*

Multi-Criteria Land Use Classification in GIS for Buildings Construction

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1 ABSTRACT

Preparation of spatial plan is response to the objectives, which are often in conflict. Planners decide to search for optimal solutions, where the optimum is usually a subjective assessment of meeting the set of goals and criteria. Given that the land is limited resource, it raises more the question of sustainability of life on Earth and the necessity of rational, scientifically-based land planning purposes. This study developed a methodology for multi-criteria land use classification based on a set of relevant factors and geographical parameters, using the AHP method (Analytical Hierarchy Process) for multi-criteria decisions and GIS tools for creation, storage, analysis and operations of the data.

The developed methodology is tested to solve the problem of evaluation and classification of land for the building construction, using data related to the area of Tuzla Municipality. The result of this research in a general sense is a methodology for multi-criteria land use analysis in GIS needed for spatial planning. In the specific sense a result of this research is the map of categorized land for building construction in the municipality of Tuzla, which clearly indicates the spatial potentials and constraints. Thematic maps, obtained as a result of applying the presented methodology allows planners make rational and strategically important decisions regarding the allocation of land purposes, and planning for sustainable development.

2 INTRODUCTION

As the land is very limited resource nowday, it is important to recognize its potential, and optimize its use. Due to the complex needs and a large number of criteria (environmental, economic, sociological, natural) decision-makers needs to use techniques of multi-objective planning and multi-criteria analysis in many social activities related to land, especially in the field of planning of spatial organization [4].

Because of the rapid urbanization process frequently arises the need for space planning purposes with emphasis on building high-rise buildings, and construction of urban infrastructure for housing, work and a variety of supporting activities of the population. Due to the large number of specific criteria (geotechnical, environmental, construction, urban and others), which need to be considered in this planning, the application of multi-criteria analysis methodology can have a significant impact on the quality, speed and cost of the planning. It will primary assist in valorization of land which serves as the ground for the planning. Efficient approach, which involves the application of tools for geospatial analysis (GIS) methods and techniques of multi-criteria system analysis, will enable spatial planners to solve easier and faster the problem related to land use planning for the construction of high-rise buildings and associated infrastructure [10]. This approach can be applied in the framework of special studies (evaluation of land use for the construction of high-rise buildings), which would give answers to many questions of importance for the spatial plan. Some of the issues which correlate with this research area are the following:

- identification of the land with natural and technological predispositions for building high-rise buildings,
- creation of the optimal model for the valorization of land which indicates cost effectiveness of investments and
- compliance with the measures and objectives of urban development according to international conventions.

3 APPLICATION OF MULTI-CRITERIA ANALYSIS TO URBAN LAND-USE PLANNING

3.1 A brief overview of the methodology

The methodology for the evaluation and classification of land for the construction of high-rise buildings consists the following 4 stages (Fig. 1):

- 1) Identification of multi-criteria decision making elements involves the identification of objective synthesis model. As the objective model in the study it is identified environmental synthesis model where weights are assigned considering environmental criteria.
- 2) Criteria weights definition means evaluation of weights assigned to criteria (factors) according to the target synthesis model.

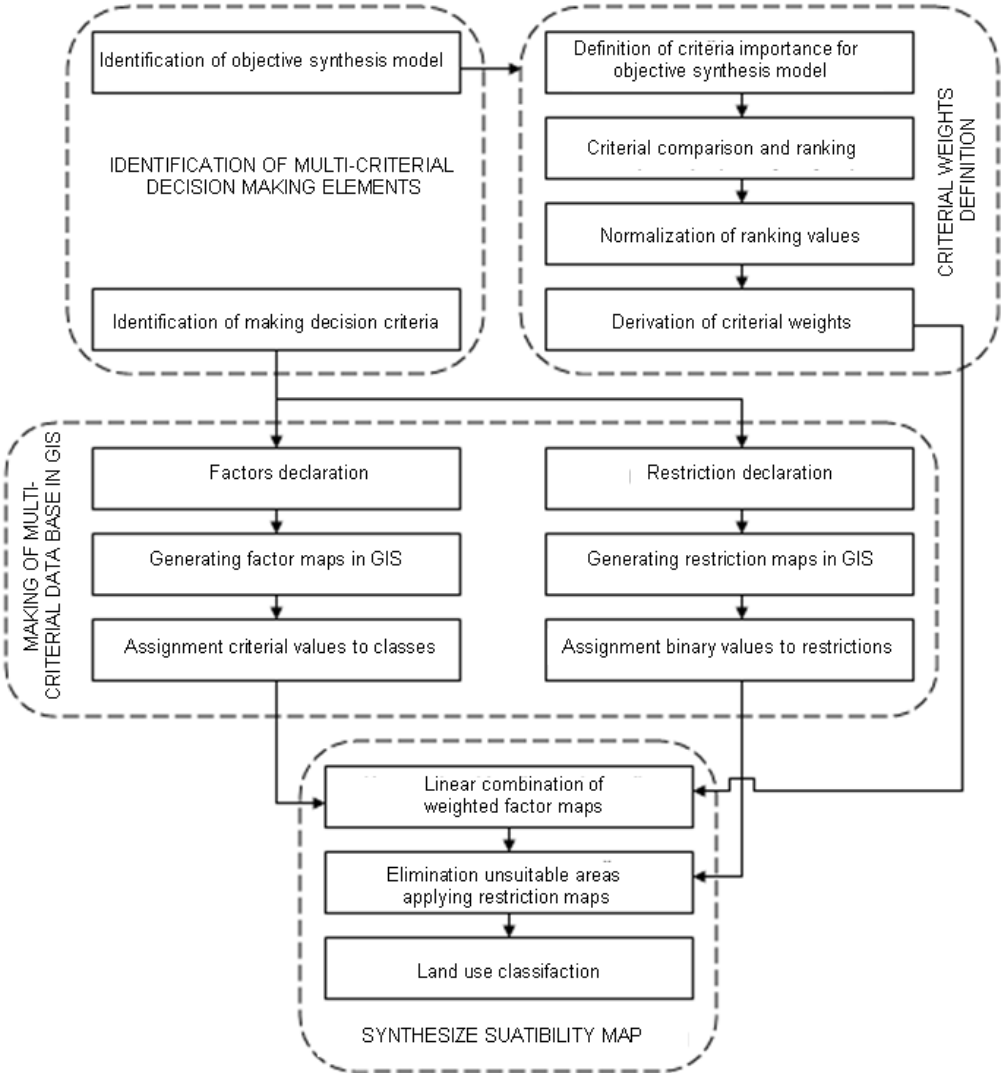

Fig. 1: Key stages in the procedure of land use classification for construction of high-rise buildings

- 3) Making of multi-criteria database in GIS is implemented generating factor maps and restriction maps, and assigning criterial and attribute values to each class of factor and restriction maps.
- 4.) Synthesize suitability map is realized through the analysis of linear combination weigthed factor maps, the elimination of unsuitable areas and land use classification. Overview of certain classes of land (with or without restrictions) is usually represented by area balances table.

3.2 Land suitability map

In the process of spatial planning a digital land suitability map is a graphical spatial representation of land use for certain use [5]. This map can be generated as thematic map in GIS, based on appropriate model of multi-criteria analyses [2]. Multi-criteria analysis includes different criteria that determines the geological, geomorphologic, environmental and other characteristics of land. Land suitability map for a particular purpose (e.g. the construction of high rise-buildings) contains the set of arranged and classified values (assigned to cells) by all established criteria. This map demonstrates the spatial distribution of classified abilities. The accuracy of geospatial analysis and performance of the used analytical algorithms depends very much on selected grid resolution [3]. The spatial framework with grid resolution (cell size) of 10x10 m is used in this study.

3.3 Criteria for evaluation of land suitability

Selection of the criteria is very sensitive task and it should take into account those aspects that significantly affect the selection of sites for construction facilities and that are relevant to the preservation of the environment (environmental syntheses model) [1]. As a result of the selection process within the framework of this study the following criteria and restrictions were identified [6]:

- 1. Technical and technological aspects:
  - 1.a. land accessibility,
  - 1.b. slope of the land surface
- 2. Security aspects:
  - 2.a. geotechnical suitability,
  - 2.b. influence of terrain sinking,
  - 2.c. restrictions related to the impact of landslides
- 3. Environmental aspects:
  - 3.a. restrictions in terms of already occupied areas (farmland, forest area, public transport area, water surface, surface and underground mines area)
- 4. Urban-ambiance aspects:
- 4.a. aspect of terrain.

3.4 Weights assignment procedure

In this study the AHP (analytic hierarchy process) method is used to weight and compare the criteria. It is based on creating a matrix of pairwise comparisons. In this technique, the weight can be defined using the basic eigen-vectors of a square reciprocal matrix of pairwise comparisons between the criteria. These comparisons are considering the relative importance of two criteria used to determine the suitability of a defined objective. Ratios are defined by continuous scale (Fig.2) of nine points (degrees).

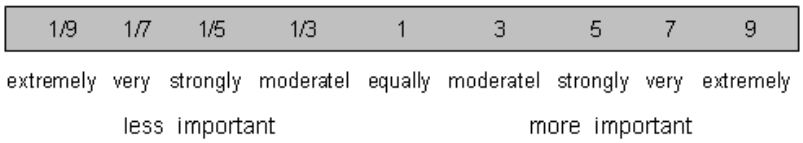

Fig. 2: The continuous rating scale used for the pair wise comparison of factors in the multi-criteria evaluation

Definition of weight includes comparison of every possible pair of criteria by entering scores (range) in a matrix of pairwise comparison (Table 1). As a good approximation for the calculation procedure of eigen-vectors can be used the sum of weights for each column and determination of the average value for each entry in all columns [8]. According to this procedure it is carried out criteria weighting in accordance to their importance as described in Table 1.

Factors	Land Accessibility	Terrain Slope	Geotechnical Usability	Terrain Sinking	Terrain Aspect
Land Accessibility	1	1/5	3	5	1/7
Terrain Slope	5	1	5	7	1/3
Geotechnical Usability	1/3	1/5	1	3	1/7
Terrain Sinking	1/5	1/7	1/3	1	1/9
Terrain Aspect	7	3	7	9	1
Sum of weights	**13.53**	**4.54**	**16.33**	**20**	**1.72**

Table 1: Sum of weights calculation

The total value of the sum weights for all columns is 56.12. Dividing this value with the sums for each criteria we got a weight of individual criteria (Table 2).

Factors	Normalized weights
Land Accessibility	0.24
Terrain Slope	0.08
Geotechnical Usability	0.29
Terrain Sinking	0.36
Terrain Aspect	0.03
Σ	**1.00**

Table 2: Calculation of average (normalized) weights

3.5 Creation of factor maps

Multi-criteria evaluation is realized using cartographic algebra on factor (criteria) maps in the GIS [11]. The following discussion describes the steps in the procedure of multi-criteria evaluation of land use for planning high-rise buildings in the municipality of Tuzla. The classification of terrain hights, and creating maps for the exposure factor (terrain aspect) and land slopes uses digital terrain model, which is obtained by inverse distance weighting interpolation of a set of elevation points (Fig. 3) [9]. On the basis of determined parameters (rank of horizontal and vertical angles) for each class of orientation and inclination in GIS, the factor (criteria) maps are created (Fig. 4). Assignment of criteria values of classes is automatic process that realizes by grid query (for the selection of class and entering the same attributes for all cells of the same class).

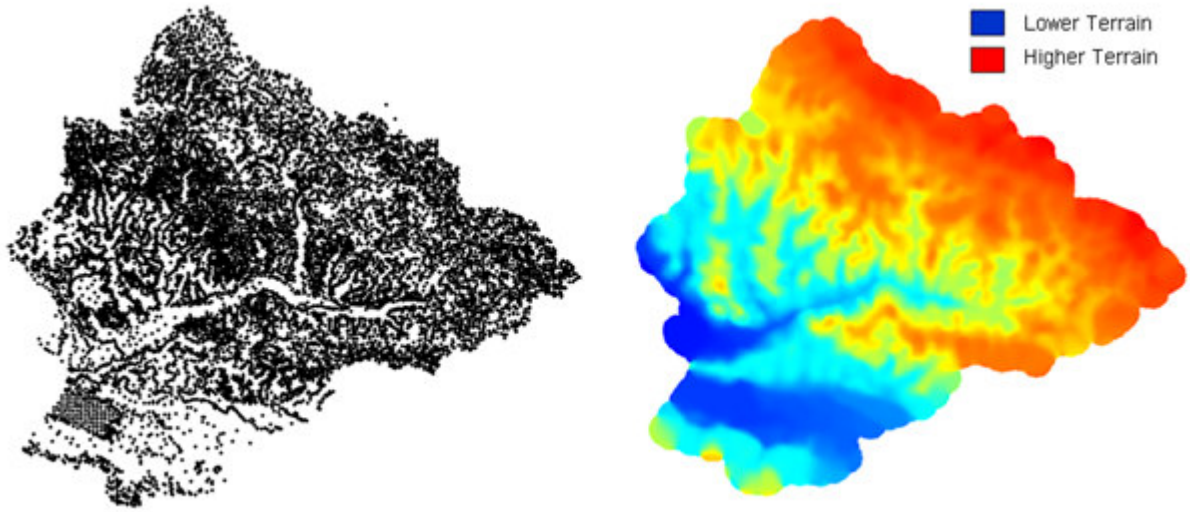

Fig. 3: Creating a DTM of Tuzla municipality (right) from a set of vertical points (left)

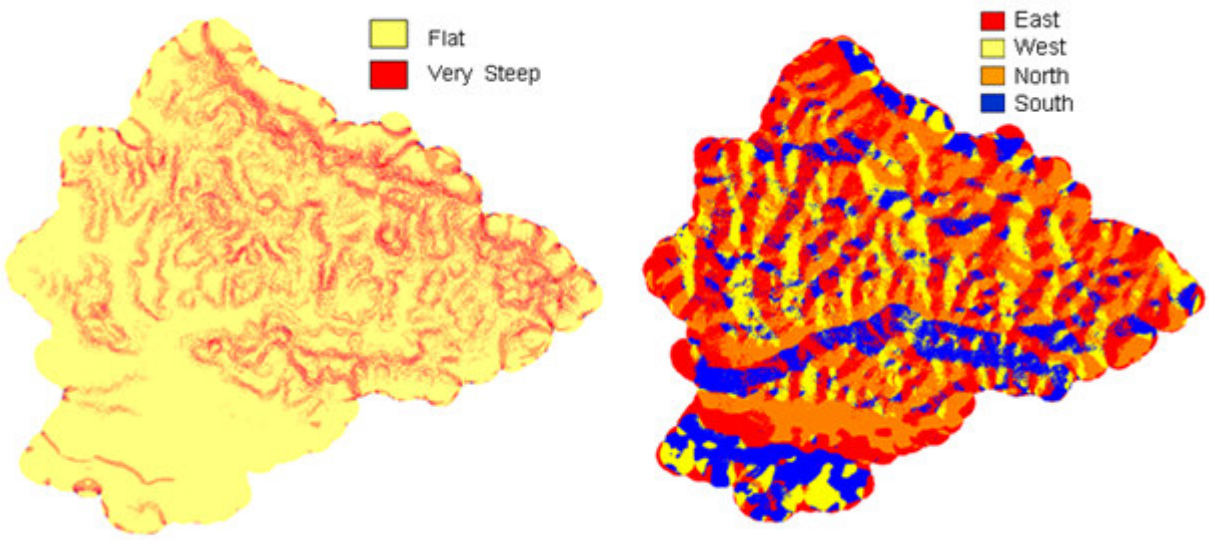

Fig. 4: Creating a land slope (left) and terrain aspect factor maps (right)

Assignment (scoring) of criterial values for certain classes of terrain slope and aspect criteria is described in Table 3. Entering chronometrical values over XYT file leads to the factor maps of land accessability (Fig. 5).

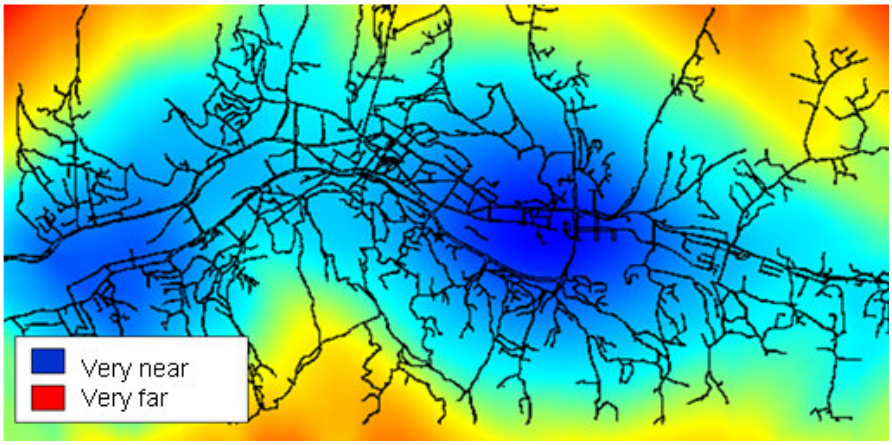

Fig. 5: Factor map of land accessibility

Assignment (scoring) of criterial values for certain classes of land accessabilty criteria is described in Table 3. Fig. 6 shows factor map of geotechnical zones created by existing digital geotechnical map of Tuzla urban area.

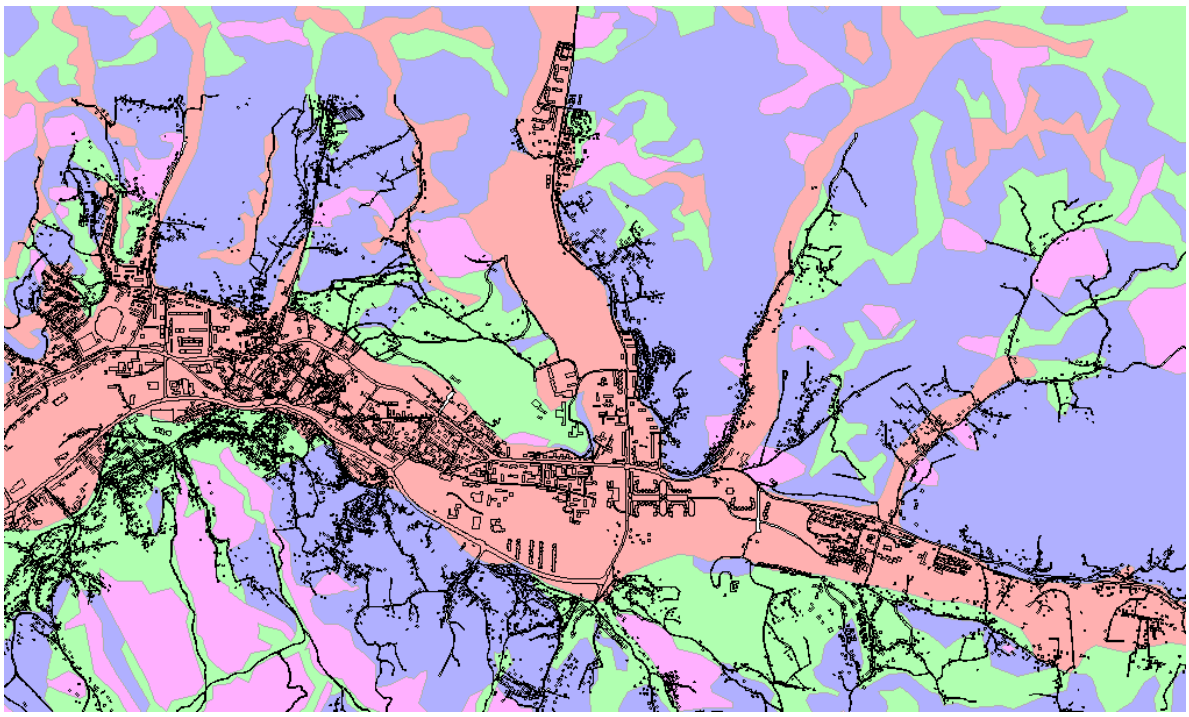

Fig. 6: Factor map of geotechnical zones: zone 1 (red color), zone 3 (green color), zone 3 (blue color), and zone 4 (purple color)

Assignment (scoring) of criterial values for certain classes of geotechnical sutability criteria is described in Table 3. As a criteria that affects the suitability of land for the construction of buildings in terms of terrain sinking it is used map with zones (Fig. 7) based on the geodetic observation intensity of surface deformation phenomena (caused by salt underground exploitation).

Assignment (scoring) of criterial values for certain classes of terrain sinking criteria is described in Table 3. Method of evaluation for each class is based on risk degree of surfice deformation in the period of terrain consolidation [13].

Based on the obtained criteria values (Table 3) and corresponding critera weight (Table 2), the GIS generated thematic map of land suitability for the specific purpose (the construction of high rise-buildings).

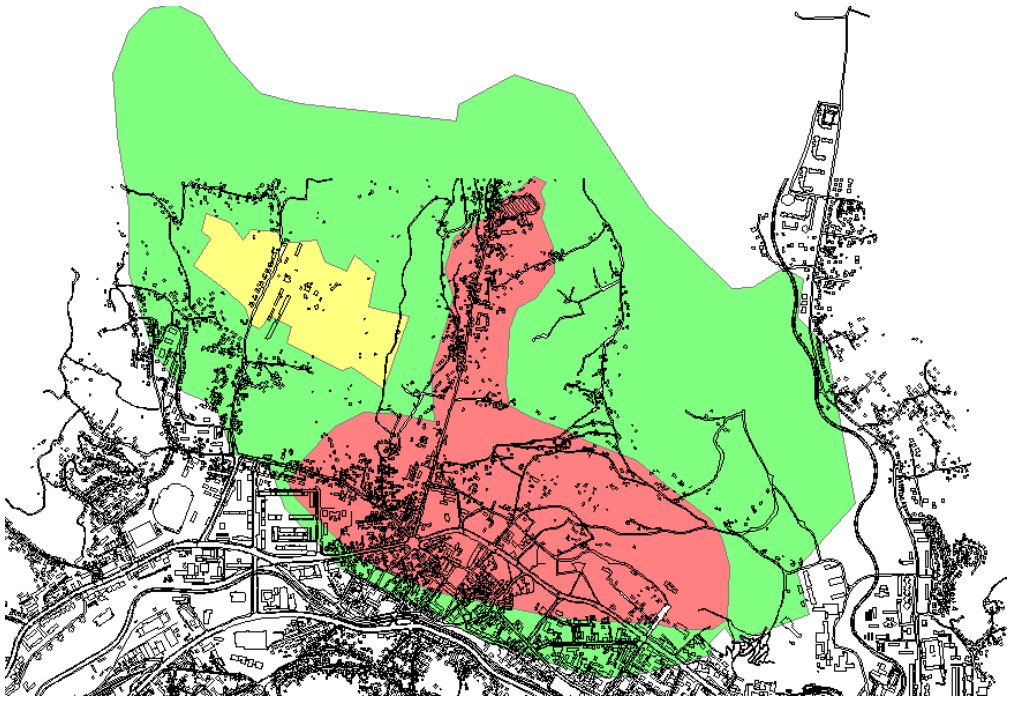

Fig. 7: Factor map of terrain sinking in Tuzla urban area: 1st zone (red color) , 2nd zone (yellow color), and 3rd zone (green color)

Terrain Slope Classes	Terrain Slope Description	Terrain Aspect Classes	Terrain Aspect Description	Land Accessibility Classes	Land Accessibility Description	Geotechnical Usability Classes	Geotechnical Usability Description	Sinking Terrain Classes	Sinking Terrain Description	SCORES (1-5)
flat	0-5%	South	135-225°	very near	0-5min	1st zone	very usable	4th zone	no risk	5
small inclination.	5-10%	-	-	near	5-10min	-	-	-	-	4
inclined	10-20%	East/ West	45-135°/ 225-315°	accessible far	10-15min	2nd zone	moderate usable	3rd zone	low risk	3
steep	20-30%	-	-	far	15-20min	-	-	2nd zone	moderate risk	2
very steep	30-45%	North	315-45°	very far	20-30min	3rd zone	less usable	1st zone	high risk	1

Table 3: Criteria values assignment (scoring)

3.6 Land classification for the planning of buildings

To get the final results of multi-criteria analysis it is necessary to perform aggregation of the weighted critera values by factor (criteria) maps and ranking (classification) of the land for a particular purpose. The total value of land for each grid cell is calculated on the basis of the following expression [12]:

$$\upsilon_z = (w_1 f_1 + w_2 f_2 + w_3 f_3 + w_4 f_4 + w_5 f_5 - \upsilon_{\min})/(\upsilon_{\max} - \upsilon_{\min}) \qquad (1)$$

- w_i presents weights for particular criteria (factors) i = 1 .. 5,
- f_i are assigned values (points) per class for the appropriate criteria, and
- $\upsilon_{\max}$ i $\upsilon_{\min}$ are the maximum and minimum value of the land critera value.

Table 4. ranks the values according to which land classification is made for the purpose of building construction.

Category of Area	Description	Rank
extraordinary suitable	area suitable for high buildings (multi-stores with 5 and more stores)	0.75 - 1.00
very suitable	area suitable for smaller buildings (multi-stores up to 5 stores)	0.50 - 0.75
suitable	area suitable for smaller individual buildings (up to 2 stores)	0.25 - 0.50
unsuitable	unsuitable area for buildings	0.00 - 0.25

Table 4: Land use classification for construction of multi-stores buildings

Based on the rank of values it is realized thematization and classification of the total land values in GIS generating map of land sutibility for construction of buildings (Fig. 8). To get the final land use maps it is necessary to apply restrictions which reduces the area with land unsuitable for building. The further discussion describes the approach to the introduction of restrictions in multi-criteria model.

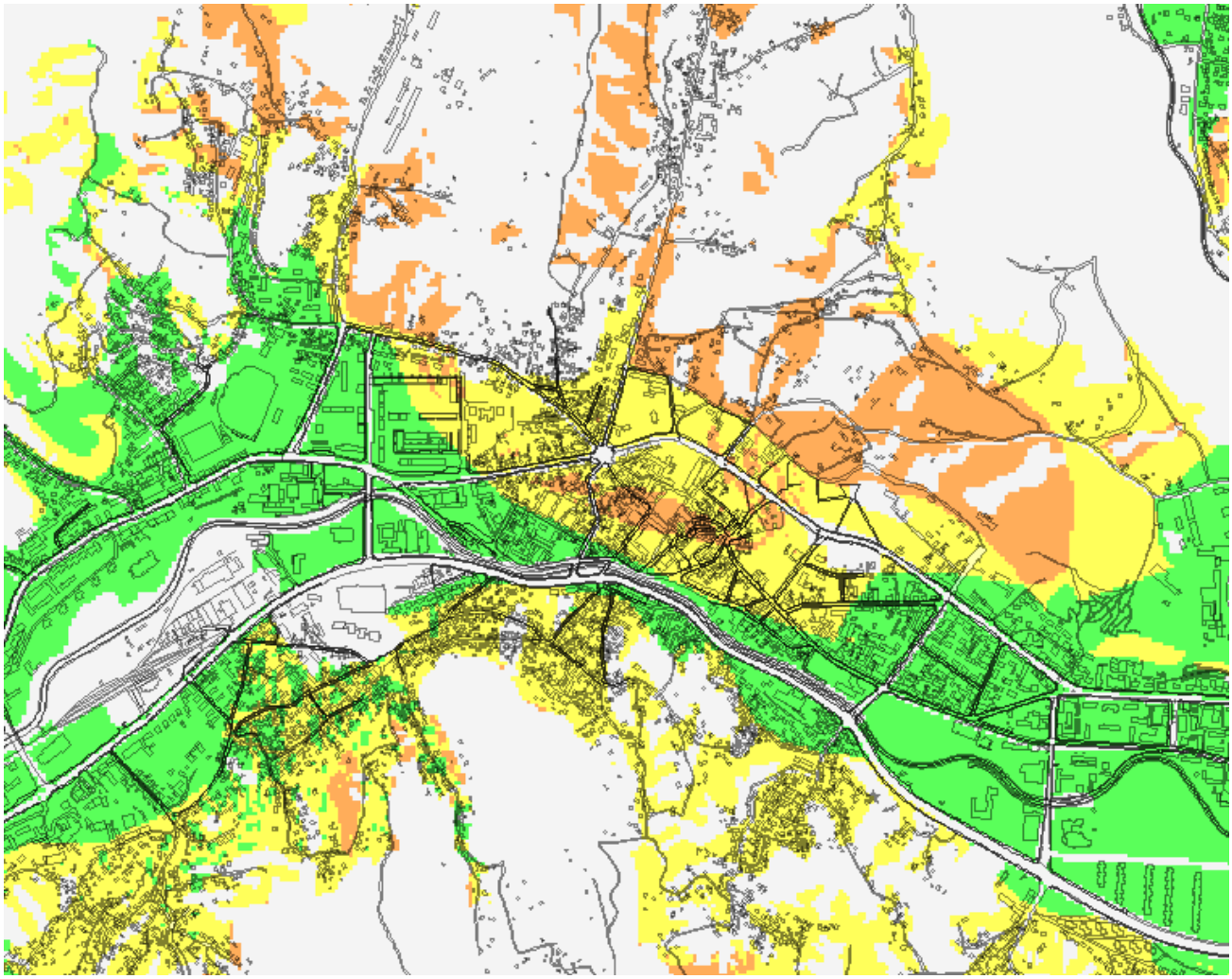

Fig. 8: Multi-criteria land use classification for buildings construction in Tuzla urban area (green – extraordinary suitable, yellow – very suitable, orange – suitable and gray – unsuitable area)

3.7 Application restrictions in multi-criteria model

Restrictions in multi-criteria model are applied as Boolean restrictions [8]. The procedure is reduced to multiplication land suitabilities (total land criteria values calculated by expression 1) and the restrictions according to the following expression:

$$\upsilon_{zo} = \upsilon_z * \Pi o_j \,, \qquad (2)$$

where oj is assigned a binary value for the j-th restriction (0 for elimination areas and 1 for other areas), and Π is the product of considered restrictions. There are the following restrictions applied in the study:

- landslides (active, passive and potential) (Fig. 9) [13],
- forest and agricultural areas (Fig. 10) and
- transportation infrastructure and water areas.

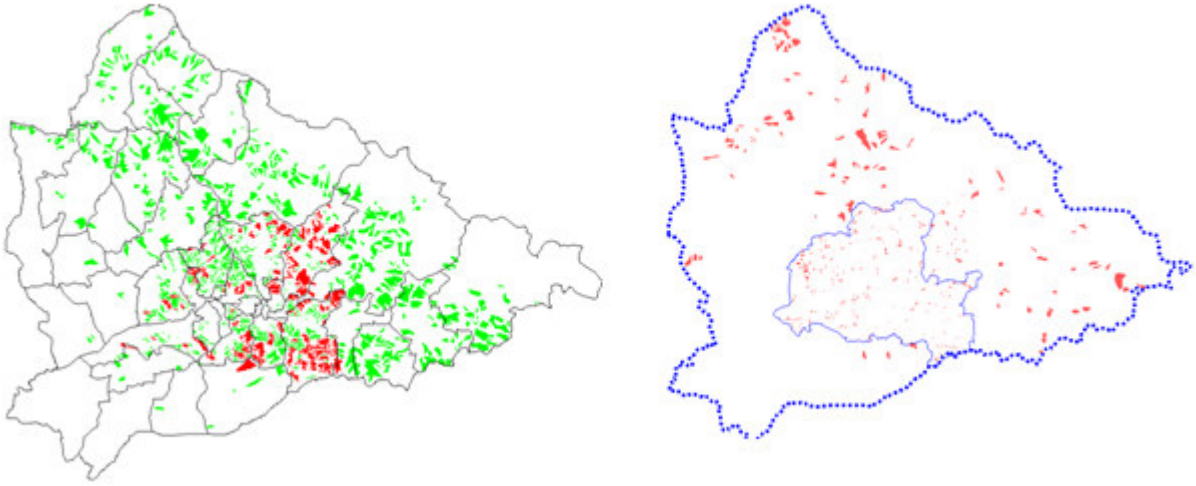

Fig. 9: Left: active (red color) and passive (green color) land slide areas; Right: potential (red color) land slide areas with administrative boundaries of Tuzla municipality

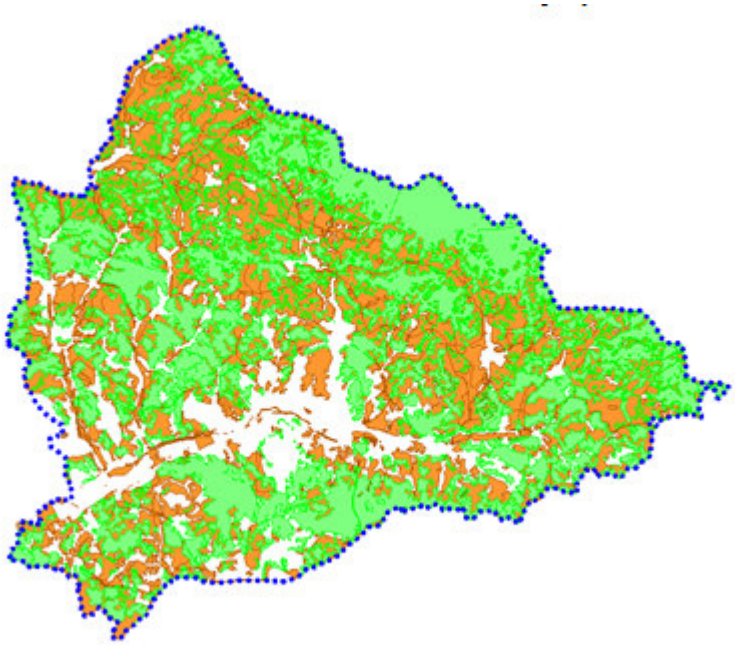

Fig. 10: Farmland (brown color) and forest areas (green color) with Tuzla municipality boundaries

By this way land use map of multi-criteria classification for buildings construction in Tuzla municipality is generated in GIS (Fig. 8).

3.8 Area balances

Table 5 shows area balances (in %) of land use classification. Area balances are commonly used as numerical quantifiers for comparative analysis of specific areas. Table 5 descriptions area distribution by individual classes (I to IV), and the impact of certain restrictions on the availability of land for construction high-rise buildings.

	Land Classes/ Restriction	I Extraordinary suitable for building in %	II Very suitable for building in %	III Suitable for building in %	IV Unsuitable for building in %	Total in %
	Without restriction	1.76	5.25	44.61	48.38	100
With restriction applied	Excluded active land slides	1.75	4.82	43.87	49.57	100
	Excluded active and passive land slides	1.71	4.28	39.65	54.37	100
	Excluded active, passive an potential land slides	1.69	4.19	38.70	55.42	100
	Excluded all kinds of land slides, forest and agricultural land, transportation and water areas	0.93	1.32	4.72	93.04	100
	Area differences with and without restriction applied	- 0.83	- 3.93	- 39.89	44.66	0.00

Table 5: Area balances (with and without restrictions)

4 CONCLUSION

Despite the large number of approaches and methods of land use planning, as well as significant progress in terms of application of information technologies, many issues related to the theory and practice of land organization are still open. The need for new methods and tools in spatial planning becomes particularly pronounced because of the problems caused by the trends of the time in which we live. These trends are related to the increasing shortage of land resources, demographic growth of the population, digital and information revolution, the development of traffic and transport, the growth of cities, the impact of humans on the environment and other phenomena. In other words, this is a period of very rapid changes, requiring fast reactions and responses. Pressure on land is not only evident through the needs of existing purpose, but also through increasing the number of activities and functions related to its use. To respond all challenges, urban planners needs new methods and techniques for analyzing and finding acceptable solutions.

As land is still very limited resource, it is important to maximize its potential, and optimize its use. Due to the complex needs and a large number of criteria (environmental, economic, sociological and natural) multi-criteria planning and analysis supports decision-makers in the many social activities related to environment, especially in the area of spatial planning. The methodology presented in the study for multi-criteria land use classification in GIS for building high-rise buildings based on the use of geospatial analysis tools and multi-criteria decision making methods, is used to solve the problem of evaluation and classification of land for the construction of high-rise buildings in Tuzla urban area. The results of the analysis clearly indicates the potential and restriction of areas for construction this kind facilities.

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Network Centric City. Computer Science Vision of Urbanization

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1 ABSTRACT

Any modern city in all respects is a complex phenomenon incorporating manifold of entities like governments (city and districts levels), plants, railway stations, transportation systems and many others. However, there exists one entity that from physical and informatics points of view may serve as a universal basis for the above manifold, and this is a computer network of the city. Indeed, everybody while pursuing certain objective can have an access to some storage of information, or to another townsman, or to other entities. Network is also a universal system for communication and control systems; on the .other hand, the network by itself is only the set of performance capabilities and nothing beyond.

City Network (CN) can be represented as a complex hierarchical system of different nodes. At that, each node is understood as a simple network's node or a local network or a system of local networks, that joints some subset of users or end clients. The fact that the CN structures and functions represent a real city life is not fantastic any longer.

The above assumption evidently leads to a consequence that Network Centric City (NCC) idea should be selected as a new subject of research and investigation. Obviously, NCC is not a simple network. So, the main idea of such representation of the advanced urbanization is to perceive global ideas and processes (business processes) underlying the city control and government system, population distribution, quality of life control and assessment, medical systems, transportation systems, ecological conditions' assessment, disaster prevention, etc.

The paper intends to look at the urbanization problems from computer science point of view. Up to date city is presented in the light of the network centric idea. Computer network at a physical level includes different networks at least as follows: optical networks, different kind of wireless networks, cell networks, etc. Different important problems of urbanization could be solved provided that a topology of city networks, their functions, descriptions, location and other data are available. Moreover, NCC can be used for future planning and urban development.

2 INTRODUCTION

The idea of considering a modern city as an element of the advanced ICT is not a novelty. Many ideas in this area have been evolved and appeared in print since the 70-ties of last century, so, an extensive literature is currently available. This issue also is actively discussed at the CORP conferences, and in this regard the below references give an outlook of the papers published during five last years in the CORP Proceedings. At that, it is worth noting that investigation of the modern city as an "electronic city" was carried out from the standpoint of townmen and/or city architects investigating the urbanization problems. Thus, reference [1] introduced a concept of "Network City". Many habitual attributes of a conventional city are allegorically represented by their electronic analogues like, for instance, [1]:

"bookstores ←→bitstores,

stacks (in libraries) ←→ servers,

galleries ←→ virtual museums, etc."

And Internet is considered as the network basis.

The other publication [6] notes that «It is incorrect to believe that websites represent a cyber city or a virtual-city because they can only represent a part and never the whole city. These websites, holding information about cities, are popularly known as cybercities, cyber cities, digital cities, e-towns, e-cities, informational cities, intelligent cities, telecities, virtual cities, virtual environments, virtual worlds, etc.» The above is difficult to argue with. Naturally the modern city can hardly be represented exclusively through the internet.

The following important comment [10] concludes that «In today's global economy, competition does not occur between countries, but between cities». Indeed, the up to date competition level first and foremost exists between megapolises rather than between countries. This is why many megapolises turn into centers of economics that forms the megapolis appeal in other aspects as well, e.g., Hong Kong, Singapore, Shanghai, New-York.

The idea of representing the modern city as a certain virtual network looks rather productive. So, networks of various types are developing amazingly fast due to their unlimited capacities to provide for a fast and efficient access to heterogeneous information and for various systems management. Here the wireless communications component of the virtual network takes on special significance. It is noted in [10] that «Some of the reasons cities cite for setting up their wireless infrastructure include:

- • Economic development
- • Social betterment
- • Government efficiency
- • Tourism and Marketing»

Thereby, the importance and promise of the wireless networks is accentuated.

Currently one might say that the network centric architecture of the modern city should be singled out for further discussion as an independent subject of inquiry. Notion of "Cyber citizen" (CbCz) is the most important component in the network centric concept. Modern megapolis does not exist without a man, thus, the NCC idea cannot be correct. CbCz is the main consumer of information, main source of information and plays a key role in NCC.

First and foremost NCC is aimed at providing for individual rights, political and religious liberties, ecological safety, for individual needs satisfaction and accounting for his/her opinion regarding the complete scope of the modern megapolis problems like ist vital activities and development; protection agaionstt terrorism, gangsterism and other infrigements of public and individual life. Economics, finance and manufacturing determine a potential of the modern city and form the basis for developing its other constituents including CbCz.

An extremely fast running of all processes, especially, in decision-making both at individual and governmental levels is the principle issue in NCC. At that, so called nonmaterial assets – information and knowledge- take on special value.

NCC is defined by forming a new sector in the megapolis vital activities that is informationware being realized through the megapolis information system (NCIS).

NCIS penetrates into all spheres of the moderm megapolis vital activities from individual to public and from informational to manufacturing.. Основной продукт NCIS major product are data, information and knowledge.

Information security along with megapolis protection against potential threats including the tightly bound informational and physical ones.

Finally, NCIS evolves two important constituents of an individual: consience and every day life. The individual evolution inevitably affects the modern megapolis as the habitat of other cathegory that is the megapolis modern information community.

Thus, under the angle of NCC idea the modern megapolis can be represented by three constituents: decision-making system and city management (NCDMS); system realizing the passed laws and managerial decisions (NCDRS), and system for information-ware of the two above systems (NCIS). Major objective of NCC idea is to assure high level of comfort for individuals living in the city or visiting it on business, for rest, tourism, etc.

3 NC INFORMATION SYSTEM

Generally speaking, the city information system could be considered as a certain system of elements: development or delivery of information resources (computers, software, telecommunications facilities, office equipment, non-electronic information resources, etc.); generation of data; information and knowledge

(science, education, ideology, politics, mass media, scientific and technical information services, observation and monitoring systems, internet); information services (education, libraries, museums, post, communications, financial activity, governmental activity, legal services). It is clear, that the collection of the above constituents will be somewhat different for each megapolis. However, the given collection is rather some system aimed at solving definite problems and meeting definite needs of the modern megapolis than just a collection. The following definition for the megapolis network centric information system is proposed in the above regard.

NCIS – is a system and a complex of interrelated organizational and technical measures intended for the acquisition, collection, transmission, processing, storing, layout, and representation of information, software, computer communications and equipment to be used at supporting decisions made in favour of the citizens, business and the city managerial bodies.

It would be quite appropriate to single out five relatively independent subsystems in NCIS:

- 1.information acquistion subsystem (sensors' system);
- 2.subsystem of information collection, processing, representation, storing, and output (data processing centers, information and knowledge storages, web sites, and other sources);
- 3.computer communications subsystem:
    - data transfer channels from the sensors' system (USB, KB, space, radio relay links, cell and satellite communications, telefone and fiber-optic lines, television and digital Telefone channels);
    - computer networks (local computer networks, Intranet, Internet).
- 4.software and computer hardware subsystem;
- 5.security and information protection subsystem.

Because of certain limits this paper will only discuss some of the above subsystems in detail.

3.1 Network subsystem (не вижу в предшествующей части)

Network subsystem is a global virtual network that uses all possible physical channels for information exchange, thus, covering the modern megapolis.

Note, that the modern megapolis represents "a state in miniature" and reflects the modern society structure. Aggregate of peoples' cumulative activity. Economics, politics, culture, education, science, security, medical care, ecology, etc. Information generation and consumption are the most important activities. Information is recognized as the most important resource, and new information technologies become basic technologies forming other activities based upon complex network architecture.

Modern city could be represented as some system that is penetrated by another important system – system of networks for exchange of data, information and knowledge. This is, in fact, a system of computer networks that supports solving problems of data exchange between all kinds of computer systems and citizens. Computer networks also provide for the city communications with the "outside world" within the same state as well as within the "world web". Computer network forms a basis for creating other advanced networks like television systems, cellular communications, various scales observation and monitoring systems, space systems and many others.

At that, up to now the physical networks used to develop spontaneously and to complpetely neglect any intercoordination and planning as needed for the city unified integrated network.. Moreover, a considerable set of physical networks is autonomous and not ideologically interrelated. The above is caused by many reasons including the fact that many physical and logical networks are commercial and, thus, compete with each other. Nevertheless, from the point of view of the unified city structure this situation cannot be acceptable since it generates many new problems and does not solve the old-established ones. Problems of ecology, electromagnetic compatibility, individual rights and other could be attributed as new problems. The problems of fighting against gangsterism, terrorism, street criminality, narcotism belong to the cluster of old-established problems.

Also a strong duplication of networks exists in some places, and their complete absence in other like the megapolis outskirts. In a consequance the megapolis faces an irrational use of active space, energy overrun,

noises generation, as well as other negative factors.Table 1 gives a retrospective of dynamics in growth of various St. Peterburg networks during several past years.

So, an effective planning and developing the computer networks system is the first priority task for the modern megapolis that requires a complex approch to its solving. At that an engagement of versatileprofessionals is a must as well as specifying the specialized research programs at the city governmental level.

#	Cathegories of computer (physical) networks run in St. Petersburg	2000	2003	2006	2009
1.	Networks, distributed computer systems under federal jurisdiction, Ministries and authorities.	5	6	12	16
2.	Networks, distributed computer systems under St. Petersburg Government, regional and municipal jurisdictions	3	8	21	24
3.	Commercial networks	11	26	58	76
4.	Specialized networks and distributed information systems (Universities' networks, networks of R&D institution, etc.)	5	12	18	22

Table 1.

3.2 Sensors' subsystem (в предшествующей части: sensors' system)

Under a certain angle of consideration the modern city could be represented as a systems of heterogeneous nature and purpose sensors..In this case the situation is pretty much similar to the network system situation.There exists a great number of various sensors that are not interrelated within a unified system due to the same reasons as in case of the network system (Fig. 1)

In the precence of advanced sensors' system many problems would be solvable at an absolutely new level. The tasks like ecological monitoring, weather status, situation in the streets and city districts on the whole, transportation system status and traffic flows as well as many other would be resolved at an absolutely new qualittaive level.

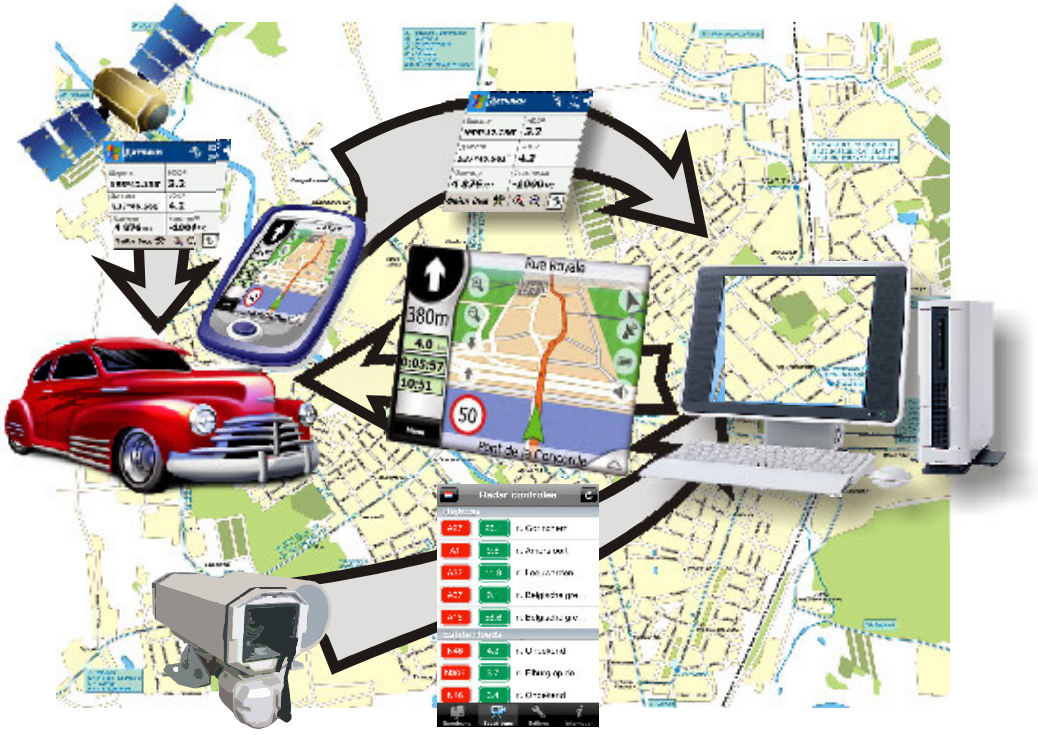

Fig.1 representation of th emodern city as a sensors' system

It is expected that in the nearest future human beings living or located within a city boundary will play a role of the main sensors. The human beings can and must be the main information sources regardring the environment as well the observation objects, at that, his/her level of health and psycho-emotional condition should be observed (Fig. 2).

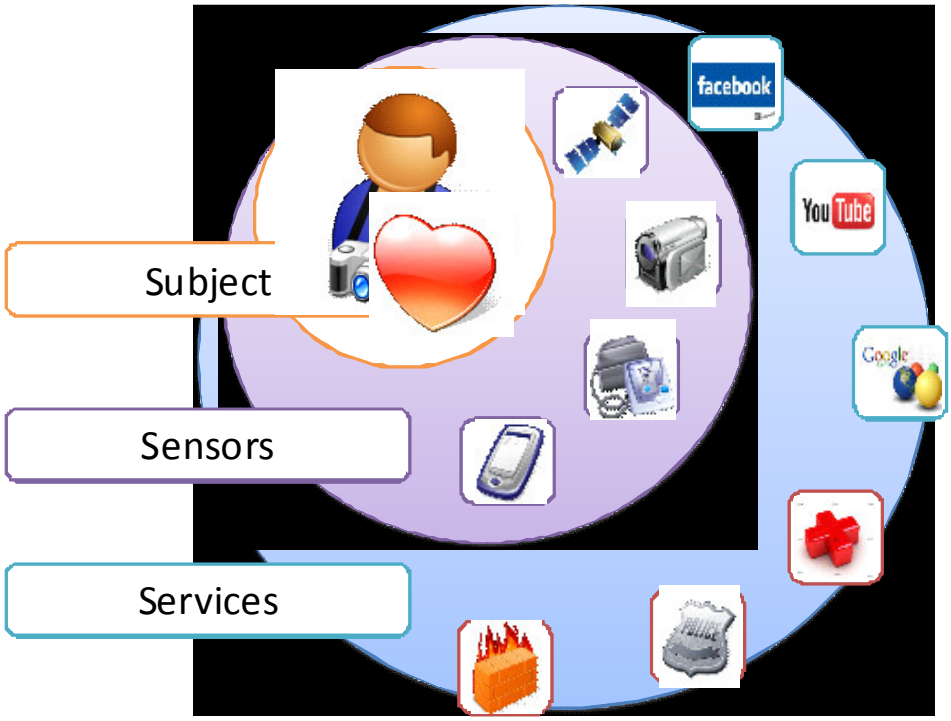

Fig.2 Human being – sensor and observation object in the modern city

For instance, in presence of proper sensors and matching monitoring system the preventive health care as well as acute care and medical treatment for the megapolis residents can acquire an effectively new level.

3.3 Selfsynchronization ???

Considering the fact that the modern megapolis is a strongly stratified envirinment any subsystem, city element (starting with its resident) from the computer point of view should possess an important property of self-synchronization. Here self-synchronization is understood as a capacity to enter the global network and to interract with its other members. It seems impossible in the present day reality to build a city where each resident, each social or other organization would be assigned strict regulations in behaviour and activities. This is why the property of self-synchronization supports a possibily of decentralized existence and management for all entities of computer network from the abstract to physical ones.

Thus, the information system (IS) builds a foundation for the modern megapolis, and all its activities and development are based on this foundation. Advanced IS lays the basis for a comfortable living and functioning of .CbCz, that is a computer mapping of a human resident..

4 NC DECISION MAKING SYSTEM

View on the modern city as on the sensors' system and global computer network puts in the forefront absolutely new requirements to the conventional city management problems and tasks as well as to the city development, reactions to man-caused and natural cataclysms.Presence of the distributed and advanced computer network and sensors' system gives unique opportunities in regard to a whole set of problems faced by the modern city as well as comprehensive facilities for optimizing all expenditures aimed at upkeeping the high habitational comfort.

On the other hand the above presence of advanced computer network and sensors' system generates a number of problems related to huge data flow and a need of making decisions in real time. The more data exist the more reliable is the knowledge of a real situation, on the other hand huge data flow generates a problem of data processing and interpretation. In the long run an uncontrolled data level brings the

investigated situation near the situation specified by the problems caused by data deficit. So, in the above case triggers the dialectic law: “everything and nothing are two extremities that converge”.

To solve the above problem a concept of data harmonization, integration and fusion could be used [16], that would allow for organizing a decision-making system at different hierarchical levels.. The concept of developing large-scale corporate systems and large-scale monitoring systems could be adopted by the given idea.

In addition to the substantiated development of different hierarchical levels the problem of making decisions at the given hierarchical levels takes on a special significance. Under the angle of the city management the considered hierarchical levels could be: house (community), residential area, district, city. The hierarchical levels could be easily singled out in a number of city services like police, health care, emergencies control, and other traditional city services. A near-term outlook would likely take a city resident and his/her “Cyber citizen” (CbCz) as an entry hierarchical level for the most city systems and services.

Problem of making decisions in the modern city is a nontrivial task as respects a definite individual [3] or various city services and systems. Accountibg for conventional mathematical methods of decision-making one cannot but admit that they have a limited range of applicability as well as a limited possibility of their use. In this regard lately the interest is attracted by the systems of artificial intellectuality that easily incorporte mathematical and simulation models and also allow using heuristics and expert knowledge, thus, targeting at a new quality in application of decision-making support systems. First and foremost, they exhibit high flexibility and customizability, almost unlimited capacity to be modifidied and evolved, as well as to be connected up with a wide range of models’ classes. At that, such systems can and must be available for an average resident being in possession of a regular mobile- or smart-phone.

5 NC DECISION REALIZATION SYSTEM

In a computer era the made decisions’ realization system functions in a highly variable situation. At that, depending on the made decision level, for instance, strategical, operational, tactical the time of decision obsolescence will significantly differ depending on the level. Note, that .costs of error will also be rapidly changing depending on the level, however, in a reverse order than the obsolescence time.

Control automation problems in organizational and technical systems, and modern megapolis could be considered among such systems, had been studied over 40 years ago, at the beginning of the seventies of the last century. The given idea was well formulated by D. A. Pospelov [17] and is known since as “situational control”. The above mention approach had specifically emphasized the fact that well developed mathematical apparatus and automatic control theory techniques are not applicable to for the case of organizational and technical systems. The ideas proposed by D. A. Pospelov were somewhat extended by the concept of “network centric war” formed in the USA at the end of the twentieth century and in the beginning of the twenty first [18].

The existing body of network centric ideas allow for forming an integral concept that regards the made decisions’ realization process at various levels in control and management hierarchy, particularly, at the level of the modern megapolis resident as the very essence of the modern megapolis.

In the nearest future the main features of the decisions’ realization in NCC will be as follows:

- high rate of decision-making as well as high rate of its realization;
- high degree of decentralization in decision-realization, and consequently, high level of self-dependence in decision-making at various hierarchical levels;
- adaptability of the made decisions under rapidly changing situation’s conditions;
- reasoning ability at the “situation” level rather than at “data and facts” level;
- common introduction of the artificial intellectuality means and techniques destined to avoid critical errors and obvious misoperations under rapidly changing situation’s conditions and source data deficiency. Potential advantages as stipulated by NCC concept realization cannot be implemented automatically, so, consolidation of the skilled professionals from many subject areas .as well as engagement of citizens and governments will be required.

6 CONCLUSION

Modern city is a global information system where the modern citizen plays a key role as a user and as an active participant. NCC concept assumes considering the urbanization problem from computer point of view, at that, not neglecting conventional approaches.

Under the ICT rapid development the role of computer sciences and professionals is expected to continuously grow. At that, ICT will be rapidly introduced to all spheres somehow related to the modern individual activities.

At arranging for planning and development of the projects for the new city's districts or remodeling the old ones it seems reasonable enough to invite professionals developing global computer networks and large-scale information systems. Modern society cannot advance without paying a close attention to developing in all spheres of modern megapolis life the information networks and decision-making support facilities and systems.

It looks like that the NCC concept would inspire the development and practical realization of modern megapolises structuring and development tasks.

It might be quite reasonable to represent the CNN concept by three basic subsystems.

Decision-making system and management (NCDMS). Legislative and executive authorities are ascribed to this system.

System realizing the passed laws and managerial decisions (NCDRS). Here the immediate performers who realize the made decisions and acts of law in practice are meant; first of all they include police, emergency services, medical care, economic subsystem, etc.

System of the two first systems information support (NCIS).

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"Neue Kollektive" – eine zentrale Herausforderungen für die zukunftsfähige Stadtplanung

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1 ABSTRACT

Im Jahr 2008 wurde ein vom Ökosozialen Forum Wien beauftragtes Projekt abgeschlossen, dessen Ziel es war, sich der großen Herausforderung „Alterung der Bevölkerung" interdisziplinär anzunehmen und gleichsam „mit den Augen eines jungen Forscher-/-innen-Teams" die Versorgungssituation älterer Menschen in der Stadt Wien „unter die Lupe" zu nehmen. Dem Leitbild einer „Stadt der kurzen Wege" folgend, bestand das Ziel der Forschungsarbeit darin, stadträumliche Spezifika zu verstehen und raumdifferenzierte Grundsätze zu erarbeiten, damit Wien auch in Zeiten demographischer Dynamik hinsichtlich der Versorgung seiner – nicht nur älteren – Bewohner/-innen „fit für übermorgen" bleibt.

Die empirische Forschung brachte hervor, dass sich die sog. älteren Menschen – statistisch gesehen beginnend mit dem 60. bzw. 65. Lebensjahr – längst nicht mehr in ein uniformes Schema hinsichtlich ihrer Charakteristika einfügen lassen. Zweifelsfrei können dieser Anspruchsgruppe eine Reihe an Gemeinsamkeiten zugesprochen werden, dennoch sind es die großen Heterogenitäten hinsichtlich deren Lebenslage – definiert als ein Bündel sozioökonomischer, demographischer sowie statistisch nicht messbarer Determinanten – die zu Herausforderungen in der (infrastruktureller) Angebotsplanung seitens der Stadtpolitik und -verwaltung führen.

Inwiefern – aufbauend auf den Ergebnissen der oben genannten Studie – eine zukunftsfähige Stadtplanung von „neuen Kollektiven" hinsichtlich deren Ansprüchen

an eine lebenswerte Stadt bei der Angebotsplanung auszugehen haben wird, möchte dieser Beitrag beleuchten.

Thematische Schwerpunkte dabei bilden die beiden Bereiche Versorgung mit Gütern und Diensten des täglichen Bedarfs sowie Erholung und Freizeitgestaltung.

2 FORSCHUNGSDESIGN DER STUDIE

Das Hauptanliegen der Forschungsarbeit „Stadt der kurzen Wege aus ökosozialer Sicht – Nahversorgung und Naherholung in Wien vor dem Hintergrund der Alterung" bestand im Aufzeigen und Verstehen der Zusammenhänge und Wechselwirkungen zwischen demographischem Wandel, Raumstrukturen und dem räumlichen Verhalten. Das Herausgreifen der Thematiken „Altsein und Älterwerden in Wien" diente dazu, zu zeigen, inwiefern räumliche Gegebenheiten für die Organisation und Bewältigung des Alltags älterer Menschen relevant sind und – im Allgemeinen – die Befriedigung der Bedürfnisse älterer Menschen beeinflussen. Daran anknüpfend war es Aufgabe auszuloten, welche Aspekte die Stadtplanung in den raumrelevanten Handlungsfeldern „Nahversorgung" und „Naherholung" im Hinblick auf die Personengruppe „60+" mitzubedenken hat.

Um die Komplexität des Themas zu veranschaulichen, wurde als Indikatorengruppe zur Bewertung der städtischen Versorgungsqualität die Personengruppe „60+" ausgewählt. Dies deshalb, weil sie die am stärksten wachsende Altersgruppe überhaupt darstellt und sich durch eine große Heterogenität hinsichtlich der Lebenslagen und den damit verbundenen Ansprüchen an den Stadtraum auszeichnet, die das Nutzungsmuster infrastruktureller Einrichtungen prägen. Aufgrund der gravierenden Unterschiede in der subjektiven Raumtüchtigkeit ist eine hohe Sensibilität innerhalb dieser Bevölkerungsgruppe gegenüber räumlichen Barrieren und Versorgungsdefiziten zu erwarten.

Innerhalb dieser Personengruppe erfolgte eine Fokussierung auf die rüstigen und mobilen älteren Menschen, weil sie aufgrund der (eigenen) Raumtüchtigkeit ihre Versorgung (noch) selbst übernehmen (können) und ihnen somit räumliche Aspekte im Alltag regelmäßig begegnen. Auf zuhause betreute immobile ältere Menschen wurde ergänzend eingegangen, sofern raumrelevante Aspekte für die an ihrer Betreuung Beteiligten (Angehörige, professionelles Personal verschiedener Trägerorganisationen) unmittelbar von Bedeutung sind.

Der Erforschung der Lebenssituation älterer Menschen mit Migrationshintergrund kam kein inhaltlicher Schwerpunkt zu. Erkenntnisse diese Bevölkerungsgruppe betreffend wurden – sofern sie im Laufe der Forschungsarbeiten gewonnen werden konnten – eingefügt.

Die Darstellung der Lebenssituation älterer Menschen konzentriert sich thematisch hinsichtlich der Nahversorgung auf die Versorgung mit Gütern und Diensten des täglichen Bedarfs sowie die (sozial-)medizinische Versorgung mit ambulanten Diensten und stationären Einrichtungen und hinsichtlich der Naherholung auf Außer-Haus-Aktivitäten in der Freizeit im Umfeld der Wohnung oder des Wohnorts an sogenannten „Orten im Freien".

Der räumliche Bezugsrahmen für die Untersuchung ist Wien. Da allerdings auf kleinräumiger Betrachtungsebene große Unterschiede hinsichtlich der soziodemographischen Struktur, dem infrastrukturellen Versorgungsniveau und der Stadtgestalt bestehen und auf diese raumspezifischen Differenzen innerhalb der Stadt hingewiesen werden muss, wurden drei verschieden ausgeprägte Stadträume als „reale" Belege (Beispiele) für die Untersuchung ausgewählt:

Das Beispiel „Wilhelminenberg" als ein Wohngebiet in Stadtrandlage und Wienerwaldnähe im 16. Wiener Gemeindebezirk, das durch Alterung der Bevölkerung gekennzeichnet ist.

Das Beispiel „Neubau" – ein Mischnutzungsgebiet in dicht bebauter Innenstadtlage im 7. Wiener Gemeindebezirk, das sich durch große Vielfalt an Nahversorgungseinrichtungen auszeichnet.

Das Beispiel „Hirschstetten" als ein Stadterweiterungsgebiet in Stadtrandlage nordöstlich der Donau im 22. Wiener Gemeindebezirk, das sehr gut mit (privaten und öffentlichen) Grünflächen ausgestattet ist.

Die Vielschichtigkeit und Komplexität des Projekts offenbarte sich bei der Suche nach geeigneten Methoden zur Operationalisierung der Fragestellung und der Festlegung und Chronologie der Arbeitsschritte.

Deshalb näherte sich das Forscher-/-innen-Team dem Thema durch die Formulierung von Vermutungen über Wechselbeziehungen zwischen demographischem Wandel – im Speziellen der Alterung der Bevölkerung – und stadtraumrelevanten Aspekten betreffend die Nahversorgung und Naherholung älterer Menschen an, die in weiterer Folge die Forschungsmethodik leiteten und letztlich mit den gewonnenen Erkenntnissen – Informationen von Älteren und Experten/-innen einerseits, Synthese der Ergebnisse durch die Forscher/-innen selbst andererseits – verglichen werden konnten.

Den Bearbeitern war die Notwendigkeit der Verschränkung von raum- und sozialwissenschaftlichen Aspekten bewusst. Weiters wollte man der inhaltlichen Komplexität durch Zerlegung der Forschungsfrage in Teilfragen begegnen und diesen dann wiederum spezifische Methodensets zuordnen. Neben quantitativen und qualitativen Methoden der empirischen Sozialforschung wie Befragung der älteren Menschen (und von Fachleuten) sowie Beobachtung von „Bewegungen im Raum" kam der Ortsbegehung, d. h. dem unmittelbaren Erleben „räumlicher Bedingungen und Umstände" durch die Bearbeitenden große Bedeutung zu. Die gesamte Erhebungsphase folgte dem Grundsatz des „so nah wie möglich am Menschen Seins" und des „problemzentrierten Arbeitens". Ergänzt wurden die so gewonnenen Erkenntnisse durch die Inhalte der bereits zu diesem Zeitpunkt vorhandenen Fachliteratur aus den Themenbereichen Raum- und Landschaftsplanung, Soziologie und Ökonomie.

Es wurden 19 Expertengespräche geführt, wobei die Gesprächspersonen aus folgenden Fachbereichen stammen:

- Mobile Dienste und teilstationäre sowie stationäre Betreuung älterer Menschen
- Soziologie
- Stadt- und Landschaftsplanung
- Integration älterer Menschen mit Migrationshintergrund
- Seniorenpolitik

Ältere Menschen um Alter von ab 60 Jahren wurden in den drei Untersuchungsgebieten in Form von Kurzinterviews spontan an ausgewählten Orten der Nahversorgung (347 Personen) und Naherholung (614 Personen) befragt.

Weiters gelang es, über Institutionen bzw. Einrichtungen und organisierte Treffpunkte älterer Menschen kooperative Ansprechpersonen in dieser Bevölkerungsgruppe zu gewinnen. Es wurden 67

Leitfadeninterviews geführt, in denen 72 Personen (Ehepaare wurden gemeinsam befragt) zu Wort kamen. Unter den 72 Befragten befinden sich zehn ältere Menschen mit Migrationshintergrund.

3 DIE ÄLTERE WIENER STADTBEVÖLKERUNG

3.1 Zentrale Bedürfnisse – der kleinste gemeinsame Nenner der Älteren

So vielfältig wie die älteren Menschen selbst sind auch deren Bedürfnisse. Viele der in den Gesprächen geäußerten Alltagsprobleme bezogen sich auf Versorgungsfragen, wobei zu beachten ist, dass jeweils die eigene Lebenssituation den Hintergrund der Ausführungen bildet und diese somit immer Schilderungen der subjektiven (Raum-)Wahrnehmung und des subjektiven Erlebens des Altseins in der Stadt sind.

Es darf angenommen werden, dass die hinter den Aussagen stehenden Bedürfnisse mit den Bedürfnissen von Personen in ähnlicher Lebenslage korrespondieren, besonders dann, wenn eine unzureichende Befriedigung der Grundbedürfnisse zu einer erheblichen Beeinträchtigung des Wohlbefindens oder der Gesundheit führt.

Zudem lassen sich Verschiebungen bezüglich der Prioritäten innerhalb des Bedürfnisspektrums im Zuge des Älterwerdens erkennen: Im Zuge des Älterwerdens kommt den Bedürfnissen nach Autonomie, Identität bzw. Identifikation mit der Wohnumgebung, Sicherheit, Zugehörigkeit und Partizipation große Bedeutung zu.

Das Bedürfnis nach Autonomie spiegelt sich in den Äußerungen der Älteren insofern wider, als der Wunsch nach Selbstständigkeit, Unabhängigkeit und Selbstbestimmung immer durch das Anliegen nach einem eigenständigen Leben so lange wie möglich zuhause zum Ausdruck gebracht wird. Eng damit verbunden ist der Wunsch, (auto-)mobil zu sein und zu bleiben, um auch weiterhin den Alltag unabhängig und flexibel gestalten zu können. Der (eigene) PKW stellt demnach einen wesentlichen Faktor der subjektiven Lebensqualität dar, vor allem für Menschen in jenen Stadtgebieten, wo die Versorgung mit Öffentlichen Verkehrsmitteln den Ansprüchen der Befragten nicht genügt.

An dieser Stelle ist anzumerken, dass die Möglichkeiten, die die Stadt älteren Menschen bietet, und die Herausforderungen, die sie im Gegenzug an sie stellt, von befragten Experten/-innen teilweise umfassender gesehen werden und Widersprüchlichkeiten zu den Anliegen Älterer zu erkennen sind.

So interpretieren die Expertinnen und Experten den Wunsch nach Selbstständigkeit, Unabhängigkeit und Selbstbestimmung als Herausforderung für die (zukünftige) Planung (sozial-)medizinischer Dienste, da seitens der Älteren professionelle Hilfe im mobilen und semistationären Bereich einerseits in sehr unterschiedlichem Maße tatsächlich in Anspruch genommen wird und mobile Dienste meist erst dann gerufen werden, wenn eine selbstständige Lebensführung wirklich nicht mehr möglich ist. Zudem besteht aus Sicht der Experten vielfach große Angst vor stationären Betreuungseinrichtungen, da sie aus Sicht der älteren Menschen mit der Forderung nach Selbstbestimmung unvereinbar sind.

3.2 Worin sich ältere Menschen ähneln

Aus dem Stellenwert der eben genannten Bedürfnisse im Leben älterer Menschen lassen sich demnach eine Reihe von Gemeinsamkeiten dieser – wie in weiterer Folge gezeigt werden wird – sehr heterogenen Altersgruppe erkennen. Homogenität der älteren Menschen besteht hinsichtlich der Bedeutung der Wahrung der Privatsphäre sowie des Versuchs des Erhalts gewachsener sozialer Beziehungen. Dazu zählen auch Ähnlichkeiten bezüglich der Wohnungswahl, der Wohnzufriedenheit und der Sesshaftigkeit sowie der Raumwahrnehmung und Sensibilität bezogen auf die Wahrnehmung räumlicher Veränderungen im Wohnumfeld. Bemerkenswert ist, dass (infrastrukturelle) Ausstattungsdefizite der Wohnumgebung von den älteren Menschen durch andere Faktoren vielfach kompensiert werden und deshalb dem positiven Raumempfinden nicht entgegenstehen. Auffallend ist weiters die Ansicht vieler Befragten, sich im Falle der eigenen Fahruntüchtigkeit in fußläufiger Erreichbarkeit vom Wohnstandort versorgen zu können, obwohl die Möglichkeiten dazu vor allem am Stadtrand meistens nicht gegeben sind. Dazu kommt, dass die Bereitschaft zu einem Wohnstandortwechsel seitens der Befragten sehr gering ist. Veränderungen im unmittelbaren Wohnumfeld wie etwa der deutliche Anstieg der Wohnbevölkerung (einschließlich des vermehrten Zuzugs von Menschen anderer Ethnien), bauliche Veränderungen sowie Veränderungen hinsichtlich der infrastrukturellen Ausstattung werden genau beobachtet. Positive Veränderungen werden wohlwollend zur Kenntnis genommen und negative Veränderungen leiten das wehmütige Zurückdenken an vergangene Tage ein.

Hinsichtlich der Versorgung schätzen die Älteren die Gewährleistung von Wahlfreiheit in Bezug auf Güter und Dienste des täglichen Bedarfs – so halten viele als „Schnäppchenjäger" gezielt Ausschau nach für sie passenden Angeboten – sowie (sozial-)medizinische Betreuung. Letzteres zeigt sich daran, dass pflegende Angehörige und die zu betreuende Person Wert darauf legen, die Trägerorganisation mobiler Dienste selbst auswählen zu können.

Älteren Menschen mit Migrationshintergrund sind tendenziell ein schlechterer Gesundheitszustand und das frühzeitige Einsetzen des Alterungsprozesses im Vergleich zu älteren Menschen ohne Migrationshintergrund gemein.

3.3 Indizien für die zunehmende Heterogenität der 60+

Aus der Befragung geht ein großer Facettenreichtum der untersuchten Bevölkerungsgruppe hervor, der sich primär aus der jeweiligen Lebenslage bestimmt. So spannt sich das Profil Älterer von den (genügsamen) Hochaltrigen, über die Hilfs- und Pflegebedürftigen und deren pflegenden Angehörigen bis hin zu den (finanziell) Unabhängigen, Flexiblen, (Auto-)Mobilen und schließt auch die immer größer werdende Anzahl an heute jungen rüstigen Seniorinnen und Senioren, „die das Leben zwischen 50 und 75 besonders genießen möchten" mit ein.

Dass subjektive Raumwahrnehmung und tatsächliches Raumverhalten nicht nur durch objektive (infra-)strukturelle Raumausstattungsqualitäten bedingt sind, sondern die Verzerrung der Wahrnehmung und Definition der eigenen Aktionsräume sehr stark von der subjektiven Raumtüchtigkeit abhängen, zeigt die folgende Abbildung. Sie zeigt das Ergebnis der Befragung rüstiger, (auto-)mobiler Senioren hinsichtlich der Frage, was sie unter Naherholung verstehen.

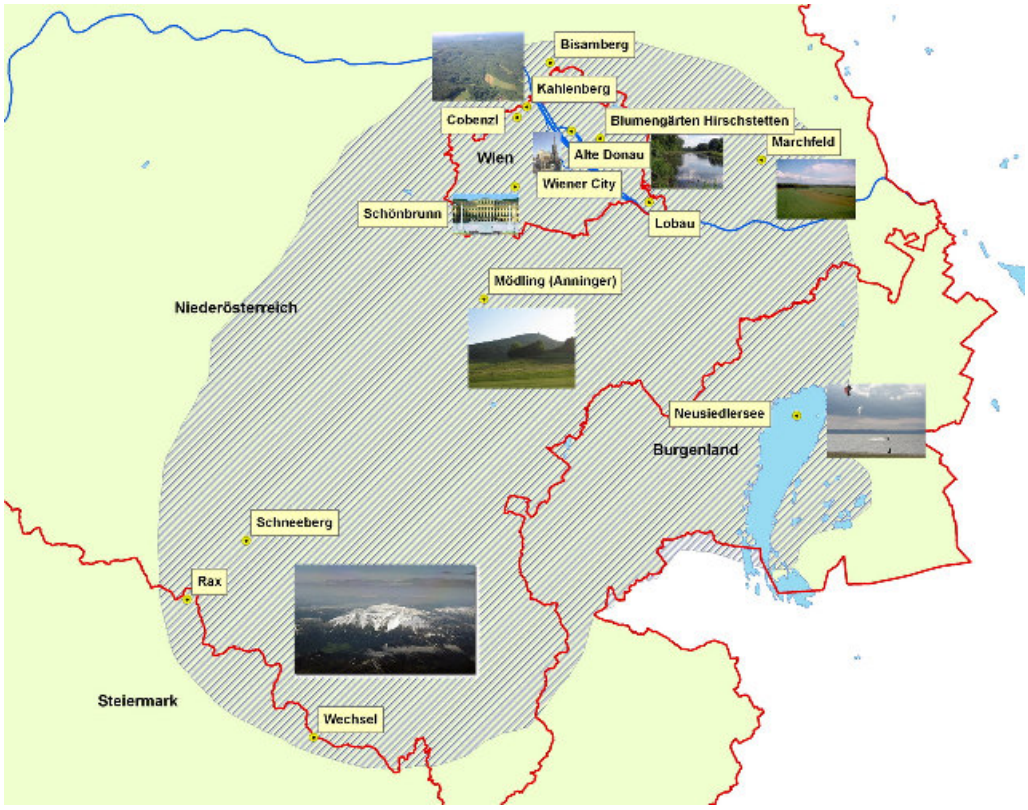

Abb. 1: "Naherholung"- eine Interpretation aus Sicht rüstiger, (auto-)mobiler Senioren

Die Heterogenität der Lebenslage gekoppelt mit gravierenden Unterschieden in den jeweiligen Bedürfnissen und dem Geltendmachen von Ansprüchen – die Gruppe der jüngeren Senioren/-innen zeichnet sich dabei durch „neuen" Mut und „neues" Selbstbewusstsein hinsichtlich der Artikulation von Wünschen aus – stellt die Stadt vor große Herausforderungen in der Angebotsplanung. Zu diesen zählen auch die sehr unterschiedlich ausgeprägte Bereitschaft der Älteren, sich mit dem „Altern und Älterwerden" rechtzeitig auseinanderzusetzen und im Bedarfsfall (organisierter externer) Hilfe tatsächlich in Anspruch zu nehmen.

Die Struktur und Organisation des Alltags variieren ebenfalls sehr, nicht zuletzt bedingt durch die sehr unterschiedliche Raumtüchtigkeit – ausgedrückt durch verschieden große Aktionsradien und damit

Erreichbarkeiten – der älteren Akteuren, den Zugang zu und Umgang mit Informationen sowie zur Erleichterung des Alltags die Nutzung neuer Technologien – um durch sie eventuell die Anzahl der zur Versorgung mit Gütern und Diensten des täglichen Bedarfs erforderlichen Außerhausaktivitäten zu reduzieren.

4 CHARAKTERISTIKA DER NAHVERSORGUNG UND NAHERHOLUNG ÄLTERER MENSCHEN IN WIEN

Das sich durch viele Gemeinsamkeiten und Unterschiede auszeichnende Profil der heute älteren Stadtbevölkerung formt auch die Ansprüche der Älteren an ihre Nahversorgung und Naherholung entscheidend mit. Dennoch lassen sich für beide Themenfelder aus der Befragung der älteren Menschen einige Kernaussagen ableiten:

So zeigt sich in Bezug auf die Nahversorgung mit Gütern und Diensten des täglichen Bedarfs, dass Einkaufen auch als Beschäftigung gesehen wird und deshalb für viele ein wesentlicher Grund ist, das Haus zu verlassen. Dazu gesellt sich eine sehr klare Zweigliedrigkeit des Einkaufsverhalten bei Lebensmitteln: zum Einen sind die kleinen, alltäglichen Besorgungen, zum Anderen die in größeren Zeitabständen stattfindenden Großeinkäufe (unter Nutzung des (eigenen) Autos) zu nennen. Parallel dazu wird das Vorhandensein von Fachgeschäften aus den Bereichen Fleisch, Obst und Gemüse sowie Backwaren sehr geschätzt. Die Befragten sind vielfach auch bereit, für bessere Qualität und besseren Service höhere Preise zu bezahlen. Allerdings wird die persönliche Ansprache beim Einkaufen seitens der Älteren nicht immer als wünschenswert empfunden, sodass die Anonymität der Supermärkte auch von Älteren durchaus geschätzt wird.

Dennoch wird die Monotonie großer Geschäftsstraßen vielfach als für das Einkaufserlebnis störend empfunden, da die Filialen großer Handelsketten das Angebot und Bild prägen.

Das Fehlen (geeigneter) Einkaufsmöglichkeiten sowie die körperliche Befindlichkeit der Älteren erfordern bei der Erledigung ihrer täglichen Wege die Hilfe Dritter. Dies sind meist die eigenen Kinder bzw. Schwiegerkinder. Diese Personen des Vertrauens begleiten die Älteren zudem, wenn Tätigkeiten zu erledigen sind, die vermehrte Aufmerksamkeit erfordern wie etwa Bankwege.

In Hinblick auf die medizinische Basisversorgung (Allgemeinmedizin, Apotheken) zeigen sich die befragten Personen zufrieden. Ein Manko stellt die Versorgung mit Fachärzten dar, da die Wahl vielfach nicht in Abhängigkeit vom eigenen Wohnstandort erfolgt, sondern vor allem vom (langjährigen) Vertrauen abhängt. Sofern institutionelle Angebote wie etwa Essen auf Rädern in Anspruch genommen werden, besteht der Wunsch nach möglichst großer Flexibilität.

Verflechtungen von Erledigungen des täglichen Bedarfs mit der Erholung dienenden Freizeitaktivitäten ergeben sich durch Wegeketten: Viele der Befragten genießen den Schaufensterbummel und das Flanieren, im Zuge dessen auch gerne Kleinigkeiten gekauft werden. Zwischendurch wird auch gerne das Kaffeehaus aufgesucht, auf einer Bank gerastet und das (innerstädtische) Treiben in den Straßen beobachtet.

Das Stadtzentrum spielt somit – gemeint ist hier im Konkreten die Wiener Innenstadt – eine wichtige Rolle in der Naherholung der Älteren. Ihre Atmosphäre und ihr Angebot lassen sich kaum kompensieren.

Hinsichtlich der Naherholung konnten aus der Befragung folgende Erkenntnisse gewonnen werden: Die Qualität des Naherholungsangebots im unmittelbaren Wohnumfeld wird – unabhängig davon, ob die Befragten es nutzen oder nicht – jedenfalls wahrgenommen. Vor allem im innerstädtischen Gebiet wird das Fehlen ausreichender Grünräume als Mangel empfunden und die Nutzbarkeit vorhandener Grünflächen in Frage gestellt. Der Nutzungsdruck auf die wenigen vorhandenen Möglichkeiten ist enorm. Neben dem eigenen Gesundheitszustand werden im innerstädtischen Gebiet häufig Konflikt- und Angstsituationen in den Park- und Gründflächen als Hemmnisse für die Nutzung und als wesentliche Einschränkung des eigenen Aktionsradius erlebt. Auch das zunehmende „Verbauen“ von Freiflächen wird bemängelt, ebenso deren schlechte Pflege bzw. durch fehlende Schneeräumung deren Nicht-Nutzbarkeit im Winter.

Für fast alle Befragten stellt neben dem Vorhandensein vor allem die (leichte) Erreichbarkeit vom eigenen Wohnstandort aus eine Bereicherung der Lebens- und Wohnqualität dar. Dies auch deshalb, weil Naherholungsgebiete vorwiegend als der Erholung dienenden Rückzugsräume gesehen werden und

sportliche Aktivitäten im Freien – mit Ausnahme des „mit dem Hund gehen" – sich an etwas weiter entfernten Zielen stattfinden.

Diese Tagesausflüge erfolgen zumeist in Begleitung der Familie oder Freunden bzw. werden auch von Vereinen wie etwa den Pensionistenklubs, den Naturfreunden und dem Alpenverein sowie den Pfarren organisiert. An den großen Wiener Naherholungsgebieten sind hierbei der Wienerwald, Schönbrunn, der Prater, die Lobau und der Bisamberg zu nennen.

Personen, die über private Außenräume (z. B. Kleingärten) verfügen, nutzen diesen bevorzugt und suchen die Innenstadt nur zur Befriedigung atmosphärisch-kultureller Bedürfnisse auf.

5 STADTSTRUKTUR UND VERSORGUNGSQUALITÄT

Die für das Projekt ausgewählten drei unterschiedlich strukturierten Beispielsräume zeichnen sich jeweils durch ihre Verschiedenheit hinsichtlich demographischer Struktur, Lage im Stadtraum sowie Topographie und bauliche Stadtgestalt aus. Daraus resultieren Differenzen bezüglich der Verkehrsinfrastruktur, der Qualität der Nahversorgung sowie dem Vorhandensein (öffentlicher) Grünflächen zu Zwecken der Naherholung. Kurz: Es bestehen Verschiedenheiten bezüglich der Versorgungsqualität hinsichtlich „Nahversorgung" und „Naherholung".

Während in den peripheren Stadträumen die Wohnnutzung und Grünflächen vorrangig sind und die Dichte der Versorgungseinrichtungen gering ist, ist im innerstädtischen Mischgebiet eine Konzentration aus „Wohnen" sowie „Gewerbe- und Dienstleistungen" gegeben. Daraus ergibt sich im Vergleich zu den beiden anderen Untersuchungsgebieten in „Neubau" eine ungleich höhere Anzahl an Nahversorgungseinrichtungen, deren Einzugsbereich teilweise (z. B. bestimmte Fachärzte) das gesamte Stadtgebiet umfasst.

Der Stadtraum am Übergang zu regional bedeutsamen Naherholungsgebieten umfasst - bedingt durch seine Nähe zum Wienerwald – zahlreiche naturnahe Erholungsgebiete, im innerstädtischen Mischnutzungsgebiet hingegen zeigt sich ein gänzlich anderes Bild: mangelnde Durchgrünung und wenige seitens der Befragten nutzbare Parkanlagen („Korridorfunktion"). Wiederum anders gestaltet sich die Situation der Naherholung in Stadtrandlage:: Hier befinden sich vielerorts große Agrar- und Gärtnereiflächen, die jedoch für die öffentliche Nutzung nicht zur Verfügung stehen. Dennoch gibt es hier zwei – über die Bezirksgrenze hinaus – sehr beliebte Naherholungsgebiete: die Blumengärten Hirschstetten und den Hirschstettner Badeteich.

Betrachtet man nun die Versorgungsqualität älterer Menschen, die auf die Nutzung öffentlicher Verkehrsmittel angewiesen sind bzw. ihre Wege zu Fuß zurücklegen, so zeigt sich, dass der innerstädtische Raum jener unter den drei ausgewählten ist, der eine gute Versorgung mit öffentlichen Verkehrsmitteln, eine ausgewogene räumliche Verteilung der Haltestellen und eine exzellente Bedienungshäufigkeit aufweist. Am Übergang zu Naherholungsgebieten hingegen ist – betrachtet man 300 Meter als fußläufig gut erreichbare Entfernung zwischen den einzelnen Haltestellen – unterversorgt. Ähnlich sieht die Situation in Stadtrand- bzw. Staderweiterungsgebieten aus. In beiden letztgenannten Stadträumen ist die Bedienungshäufigkeit tagsüber sehr gering. Ein wesentlicher Grund dafür könnte in der hohen Automobilität der (älteren) Bewohnerinnen und Bewohner liegen.

Deshalb ist es in den Stadträumen in Stadtrandlage und Stadterweiterungsgebieten sehr relevant, wo genau ein älterer Mensch wohnt: In einigen Gebieten gibt es kleine Nahversorgungszentren, die für jene, die in den Wohnhausanlagen in unmittelbarer Nähe wohnen, (fußläufig) sehr gut zu erreichen sind, während die „Hausbesitzer" in der Nähe des Hirschstettner Badeteichs entweder das Fahrrad oder das Auto nutzen müssen, um rasch die Versorgungseinrichtungen erreichen zu können.

Es lässt sich unschwer erkennen, dass jeder Stadtraum bedingt durch seine raumbezogenen Eigenschaften Stärken und Schwächen aufweist, die sich in Vor- und Nachteilen im täglichen Leben seiner (älteren) Bewohner manifestieren.

Für die Stadtplanung und Stadtentwicklung ist es nicht nur wichtig zu wissen, wo die (negativen) Knackpunkte bezüglich der Versorgungsfragen liegen, um diese zu entschärfen, sondern auch, welche Aspekte seitens der (älteren) Bevölkerung geschätzt werden, um diese möglichst zu stärken bzw. zu erhalten.

6 ROBUST IN ZEITEN DES WANDELS – GEDANKEN MIT AUF DEN WEG FÜR EINE FITTE STADTPLANUNG

Selbst wenn die Versorgungsqualität zwischen den unterschiedlichen Stadtraumtypen aufgrund deren Verschiedenheiten hinsichtlich siedlungs- und infrastrukturellen sowie sozialräumlichen, aber auch naturräumlichen Aspekten differiert, so ist unbedingt anzumerken, in Wien immer noch auf sehr hohem Niveau gejammert wird. Die Stadt hat bereits sehr viele Ideen – u. a. zur Gewährleistung der Barrierefreiheit sowie zur geordneten Nutzung vorhandener öffentlicher Grünräume durch unterschiedliche Anspruchsgruppen – umgesetzt.

Die Herausforderung, die einer zukunftsfähigen Stadtentwicklung inhärent ist, besteht darin, die Lücken und Unsicherheiten, die sich zwischen Fakten- und Vermutungswissen über (nicht) voraussichtliche Entwicklungen und Trends auftun, zu schließen und weiterhin handlungsfähig und damit robust in Zeiten des Wandels zu bleiben.

Um die Lebenssituation der heutigen und zukünftigen älteren Stadtbevölkerung weiterhin zu sichern und zu erhalten, wird es verstärkt erforderlich sein,

- sich der Gemeinsamkeiten und Verschiedenheiten in den Bedürfnissen und Anliegen der durch unterschiedliche Lebenslagen geprägte Anspruchsgruppen unter den Älteren anzunähern, um herauszufinden, wie die Angebotsplanung für diese „neuen Kollektive“ aussehen könnte.
- einen „objektiven Blick“ auf die tatsächliche Lebenssituation dieser Personengruppe im städtischen Kontext zu werfen, um die „Realität“ treffsicherer einschätzen und bewerten zu können.
- Handlungsoptionen und -prioritäten für unterschiedliche Stadtraumtypen auszuloten und in weiterer Folge festzulegen.

Viele der bisher angebotenen und umgesetzten Lösungsansätze weisen folgende Merkmale auf:

- Kleinräumigkeit und Loslösung von übergeordneten Entwicklungen
- Überschätzung der Partizipation und damit der bewusstseinsbildenden Maßnahmen im Allgemeinen
- Versuch durch Institutionalisierung teilweise Kompensation des Verlusts von räumlicher und sozialer Nähe
- sehr unterschiedliche Treffsicherheit der Maßnahmen

Zielsetzungen, die den Weg hin zu einer zukunftsfähigen Stadtentwicklung, weisen, umfassen folgende Überlegungen:

- Ausgangsbasis aller Überlegungen sollte die „Lebenslage“ („neue Kollektive“) werden, die zu einer gedanklichen Abkehr von einer Koppelung an das Alter führen sollte.
- Die Notwendigkeit des Angleichens der Geschwindigkeiten des „demographischen Wandels“ einerseits und des „stadtmorphologischen Wandels“ andererseits.
- Die Stadtplanung ist gefordert, sich wieder auf den menschlichen Maß(stab), v. a. bei Überlegungen hinsichtlich Dichtewerten, zu besinnen.
- Monotonien und „Übergrößen“ v. a. an den „Stadträndern“ und „Siedlungserweiterungsgebieten“ sollten vermieden werden.
- Damit einher geht das Überdenken von Atmosphäre und Image verschiedener (öffentlicher) Stadträume.
- Zudem sollten der Facettenreichtum und die Funktionsfähigkeit der Stadträume erhalten bleiben, was eine stadtraumdifferenzierte Betrachtungsweise notwendig macht.
- Es muss die Gestaltung von Durchmischung sowie Integration überdacht werden und letztlich wird es – aufgrund sich verändernder Raumsouveränitäten und Raumtüchtigkeiten der einzelnen Anspruchsgruppen unter den Älteren – vermehrt erforderlich sein,
- die Potenziale neuer Formen der Nahversorgung und Naherholung (Stichwort „Stufenbau der Grünordnung“) auszuloten.

Mögliche erste Schritte in diese Richtung könnten sein:

- Mut zur ehrlichen Auseinandersetzung mit der tatsächlichen Situation im (öffentlichen) Stadtraum zu zeigen
- seitens der Stadtverwaltung (bereits) ehrenamtlich tätige Personen stärker zu unterstützen
- bestehende Paradigmen zu reflektieren
- die (Interessen der) an Entwicklungsprozessen beteiligten Akteure zu analysieren und Prioritäten neu zu ordnen
- von ceteris paribus Bedingungen abzukehren und die Bedürfnisse, Nöte und Potenziale einer „Stadtbevölkerung im Wandel" zu identifizieren
- den Bedürfnissen jüngerer Bevölkerung wahrlich „mehr Raum" zu geben
- die Zukunftstauglichkeit "herkömmlicher" Lösungen zu überdenken und sich folgende Frage zu beantworten: „Würde ich die Lösungen, die ich anbiete, auch selbst nutzen?"
- den Versuch zu unternehmen, einfache" Maßnahmen ausprobieren

Das Forscher-/-innen-Team unternahm den Versuch, obige Gedanken auch konkret auf die drei ausgewählten Stadtraumtypen anzuwenden und leitete folgende Prioritäten und Zielsetzungen für die Stadtentwicklung in den beiden Handlungsfeldern Nahversorgung und Naherholung ab:

Für das Wohngebiet in Stadtrandlage und Wienerwaldnähe ergibt sich als wichtigste Priorität die Sicherung der hohen Qualität der Naherholung sowie die Mindestsicherung und – wo möglich – Verbesserung der Nahversorgung, die Schaffung eines alternativen Versorgungsangebots mit mobilen Services sowie die Sicherung der Erschließungsqualität mit Öffentlichem Verkehr. Dabei gilt es die Geländeneigung der Hanglagen zu berücksichtigen, die insbesondere für ältere Menschen Schwierigkeiten der Raumnutzung mit sich bringen.

An konkreten Maßnahmen im Bereich Nahversorgung kommen neben gezielten Förderungen für Klein- und Mittelbetriebe das Etablieren multifunktioneller stationärer Nahversorger und die Einrichtung temporärer Märkte in Frage, weiters das Forcieren (der Inanspruchnahme) von Zustelldiensten wie beispielsweise „Essen auf Rädern", der Zustell¬dienste von Supermarktketten und Lebens¬mittel¬einzelhandelsbetrieben, aber auch Apotheken¬zustelldienste.

Im Bereich Naherholung sind zudem die teils regional bedeutenden Naherholungsqualitäten in ihrem Bestand zu sichern und deren fußläufige Erreichbarkeit sowie jene mit öffentlichen Verkehrsmitteln zu verbessern und auf einen barrierefreien Zugang zu und bei den öffentlichen Verkehrsmitteln zu achten. Weiters sollten die vorhandenen (Groß-)Grünanlagen besser betreut werden z.B. durch Streuung und Reinigung der Wege besonders im Winter, rutschsichere Ausstattung der Wege sowie das Schaffen von Rast¬möglichkeiten (Bänke). Schließlich ist an das Errichten von Geländern an kritischen Stellen zu denken.

Die wichtigste Zielsetzung für die Stadtentwicklung besteht demnach in der baulich-räumlichen Integration der bestehenden Raumstrukturen, der Verstärkung des räumlichen Zusammenhalts sowie der Erhaltung und weiteren Gestaltung des hochwertigen naturräumlich-ökologischen Potenzials.

Im Mischnutzungsgebiet in dicht bebauter Innenstadtlage besteht die grundlegende Herausforderung in der Sicherung der bestehenden guten Nahversorgungsqualitäten, der Attraktivierung bzw. Anpassung des Angebots an die Bedürfnisse älterer Menschen sowie der Wahrung der Funktions- und Nutzungsmischung. Im Bereich Naherholung ist eine umfassende Verbesserung der Qualität durch gezielte Schaffung „grüner Netze" etwa in Form von Grünverbindungen und flächenhaften Grüngestaltungen möglich und nötig.

Hinsichtlich konkreter Maßnahmen im Bereich Nahversorgung bestehen vielfältige Handlungsspielräume in der „Revitalisierung" nicht mehr genutzter Erdgeschoßflächen: So könnten ehemalige, heute teils leer stehende Geschäftslokale eine Umnutzung zu „Orten der Begegnung" erfahren. Zusätzlich könnte im Zuge der Stadterneuerung und „Blocksanierung" ein Umbau zur Förderung intergenerationellen Wohnens stattfinden sowie Einheiten für betreutes Wohnen errichtet werden. Durch verbesserte Zusammenarbeit engagierter Wirtschaftstreibender könnte eine stärkere Bindung der örtlichen Kaufkraft gelingen. Das ökologische und Erholungs-Potenzial dieses Stadtraums kann durch gezielte Interventionen im öffentlichen und halböffentlichen Grünraum durch Schaffung neuer „grüner Lungen" oder die Förderung von Hofzusammenlegungen erfolgen. Zur Verringerung von Nutzungskonflikten in öffentlichen Grünräumen

bietet sich die Trennung in Funktionsbereiche sowie die Einsetzung einer generationen-übergreifenden Parkbetreuung (inkl. partizipativer Parkgestaltung) an. Darüber hinaus ist die Verbesserung der „angstfreien" Nutzbarkeit des öffentlichen Raumes mit Hilfe gestalterischer Maßnahmen, abgestimmte Ampelschaltungen und geeignete Querungshilfen zu forcieren.

An Zielsetzungen für die Stadtentwicklung ergeben sich demnach die Erhaltung, Ergänzung und Erneuerung der baulich-räumlichen Strukturen sowie die Erhaltung der Nutzungsmischung und der Nahversorgungsqualitäten, das bedeutet: ausgewogene und flächendeckende Grundversorgung in fußläufiger Erreichbarkeit. Weiters ist auf den Erhalt und Ausbau des kleinräumigen ökologischen Potenzials auf verschiedenen Maß¬stabsebenen zu achten.

Die zentrale Herausforderung für sich in Stadtrandlage befindende Gebiete besteht in der räumlichen Gestaltung der großen Naherholungspotenziale sowie der Mindestsicherung und Verbesserung der Nahversorgung, einschließlich der Sicherung der Erschließungsqualität mit öffentlichem Verkehr.

An Zielsetzungen für die Nahversorgung sind die Schaffung räumlich gut integrierter Versorgungsschwerpunkte und – fallsmöglich – die ausgewogene flächendeckende Grundversorgung in fußläufiger Erreichbarkeit ebenso zu nennen, wie der Ausbau dezentraler Nahversorgungseinrichtungen sowie die Kompensation der vorhandenen Defizite durch „neue" Services. Konkret bieten sich dieselben Maßnahmen wie für das Beispielsgebiet „Wilhelminenberg" an.

In Bezug auf die Naherholung ist abgesehen von der Sicherung bestehender Orte der Naherholung deren räumliche Vernetzung und altengerechte Verbesserung anzustreben. An konkreten Maßnahmen lassen sich etwa die Schaffung nutzbaren Grüns in Geschoßwohnbauten (Balkone und Loggien) nennen.

Die Zielsetzung für die Stadtentwicklung besteht einerseits in der baulich-räumlichen Integration der bestehenden Raumstrukturen im Sinne der Verstärkung des räumlichen Zusammenhalts durch eine behutsame Nachverdichtung und Vernetzung, andererseits in der Erhaltung sowie Gestaltung des naturräumlich-ökologischen Potenzials auf den verschiedenen räumlichen Maßstabsebenen.

7 KNACKPUNKTE ALS KONKLUSIO FÜR EINE ZUKUNFTSFÄHIGE STADTPLANUNG

Die Herausforderungen, die sich aus heutiger Sicht angesichts sich weiter ausdifferenzierender "Kollektive" innerhalb der Anspruchsgruppen (auch) unter den älteren Menschen für eine zukunftsfähige Stadtplanung ergeben werden, sind vor allem hinsichtlich ihrer quantitativen Ausprägung im Detail nicht absehbar.

Deshalb scheint es der Autorin zielführender, abschließend die „Hotspots" in Fragen zu formulieren:

Welche harten und weichen Standortfaktoren einer Stadt werden auch in Zukunft den Lebenswert welcher Anspruchsgruppen mitbestimmen?

Ist es denkbar, dass vor dem Hintergrund weiter abnehmender privater und öffentlicher Handlungsspielräume hinsichtlich der Angebotsplanung von den Paradigmen „Bringschuld der Stadt" und Qualitätssteigerung im Bereich „Betreuung und Pflege" abgekehrt werden wird? Welche Reaktionen seitens (bislang verwöhnter) Nachfrager werden zu erwarten sein?

Wie kann es gelingen, Lösungen zu kreieren, die aus heutiger Sicht nicht „modern" genug sind bzw. „altbacken" wirken? Oder: Wie ist es möglich, Ansätze zu verkaufen, die heute (noch) keine(r) will?

Was wird mit aufgeblähten Infrastruktursystemen passieren, wenn übergeordnete räumliche Entwicklungen „räumliche Nähe" wieder notwendig machen und immer weniger Systemerhalter großen diesbezüglichen Altlasten gegenüber stehen?

Wie kann es möglich sein, dass sich in ihrer Entwicklung weiterhin auf das Auto zentrierte Städte, im Krisenfall das Potenzial der Rückbesinnung auf räumliche Nähe erhalten können?

Wird Lebensqualität in der Stadt angesichts der aufgezeigten Entwicklungen langfristig vorrangig für folgende beiden „Kollektive" unter der Stadtbevölkerung – nämlich der finanziell unabhängigen Bevölkerung und (älteren) Menschen mit stabilen (familialen) Hilfs-, Obsorge- und Betreuungsnetzen – gegeben sein?

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Neue Strategien und eine Datenarchitektur für das Wissensmanagement in der urbanen Pflanzenverwendung

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1 EINLEITUNG UND PROBLEMSTELLUNG

Wissen und Erfahrungen über die fachgerechte Verwendung von Pflanzentaxa (Arten, Unterarten, Sorten, Hybriden etc.) in der urbanen Pflanzenverwendung werden aktuell weitestgehend in den Köpfen der jeweiligen Akteure (Landschaftsarchitekten, Ingenieure, Mitarbeiter von Garten- bzw. Grünfächenämtern der Städte und Gemeinen, Garten-Landschaftsbauer etc.) gesammelt und durch diese eher zufällig oder projektspezifisch ausgetauscht. Weiterhin dienen Weiterbildungsveranstaltungen und Fachtagungen sowie die einschlägige Fachpresse zur Verteilung von aktuellem Wissen in der Pflanzenverwendung.

Eine Emailbefragung von Landschaftsarchitekten und Mitarbeitern von Grünflächen- bzw. Gartenämtern zeigt bereits die deutliche Tendenz, dass in den Organisationen und Unternehmen weitestgehend keine von Personen losgelöste Konzepte existieren, um Wissen und Informationen über die fachgerechte Verwendung von Pflanzentaxa zu sammeln, zu generieren und bereitzustellen. Nur vereinzelt werden z.B. sogenannte Verwendungslisten gepflegt, die Akteuren einen gemeinsamen Zugriff auf zumindest einen Teil des in einer Organistaion existierenden Wissens erlauben. Eine detailierte Auswertung dieser Umfrage steht noch aus, in der die Frage nach der Existenz von Personen losgelösten Konzepten nur eine von ingesamt sechs bzw. sieben offenen Fragen darstellt. Auch sollten z.B. Medien genannt werden, die aktuell zur Erlangung notwendigen aktuellen Wissens genutzt werden. Hier wurde das Internet sehr häufig genannt, jedoch keine spezifischen Quellen angegeben, sonder eher als allgemeine Recherche dargestellt, die sehr mühsam ist. Weiterbildungsveranstaltungen bzw. Tagungen und insbesondere Printmedien werden seitens der Aktuere immer noch das größere Gewicht zum Transfer des Wissens beigemessen, wenn es um Formen und Konzepte geht, die nicht auf eine direkte Komunikation zwischen den Akteuren abzielen.

Dieses legt die Vermutung nahe, dass tradionelle Medien und der direkte Austausch von Wissen in der Pflanzenverwendung eine Qualität aufweisen, die digtale Medien, d.h. insbesondere Pflanzendatenbanken bislang nicht erreichen. Daher können Informations- und Kommunikationstechnologien (IKT) zum Austausch von Wissen über die fachgerechte Verwendung von Pflanzentaxa nur erfolgreich sein und fachlich zielführend genutzt werden, wenn die notwendigen Informationen in der selben Qualität transferiert werden können, wie es durch traditionelle Medien oder die direkte Kommunikation zwischen Akteuren möglich ist. Gehen bei der Sammlung, Generierung und Bereitstellung von Wissen mittels IKT Informationen bzw. Daten verloren, d.h. wird das Wissen nicht vollständig abgebildet, so können zukünftig auch die zahlreichen Vorteile aktueller IKT nicht für das Wissensmanagement in der Pflanzenverwendung genutzt werden.

Daher besteht die wesentliche Aufgabe eines aktuell an der Hochschule Anhalt (FH) im Rahmen einer Dissertation gegenwärtig durchgeführten Forschungs- und Entwicklungsprojekts darin die Informations- und Datenstruktur für eine möglichst vollständige Abbildung des Wissens über die fachgerechte Verwendung von Pflanzentaxa zu analysieren. Daraus wurden Strategien und ein Datenarchitektur für das Wissensmanagement in der Pflanzenverwendung abgeleitet. Diese sollen im Projekt als Grundlage zur weiterführenden Entwicklung eines detailierten plattformunabhängigen Basis- sowie Fachdatenmodells dienen und durch das vorgesehene Prototyping eines internetbasierten Informationssystems abschliessend evaluiert werden.

2 VORGEHENSWEISE UND METHODEN

Im Projekt wurden bisher folgende Arbeitspakete abgeleistet:

- 1)Geschäftsprozess- und Informationsflussanalysen,
- 2)Analyse aktuell verfügbarer Informatonssysteme (Pflanzendatenbanken),
- 3)Analyse der Daten- und Informationsstruktur sowie
- 4)Bestimmung von Strategien und Maßgaben sowie Modellierung der Datenarchitektur.

Folgende Arbeitschritte werden aktuell durchgeführt bzw. sind in Vorbereitung:

- 5)Entwicklung eines Basis- und Fachdatenmodells,
- 6)Prototyping eines Informationssystems sowie
- 7)Evaluierung des Prototyp.

In den folgenden Abschnitten werden die bereits maßgeblich abgeleisteten Arbeitspakte kurz erläutert.

2.1 Geschäftsprozess- und Informationsflussanalysen

Im ersten Arbeitspaket wurden durch eine Geschäftsprozess- bzw. darauf aufbauende Informationsflussanalyse die wesentlichen Bereiche und Akteure ermittelt, die an der Sammlung und Generierung des Wissens beteiligt sind bzw. für die dieses bereitzustellen ist. Dabei wurde sich nicht auf das Wissen über die fachgerechte Verwendung von Pflanzentaxa beschränkt, sondern auch der Lebenszyklus von Informationen über Vegetationselemente (z.B. Vegetationsflächen, Bäume, Hecken etc.) analysiert. Aus den ermittelten Geschäftsprozessen wurde ein Modell des Wissensraumes Pflanzenverwendung und des Informationsflusses im Prozesszyklus Grünflächenmanagement entwickelt. Geschäftsprozess- und Informationsflussanalysen sowie die Untersuchung von Informationslebenszyklen bilden die wesentliche Vorrausetzung zur Bestimmung der Daten- und Informationsstruktur in einem Fachgebiet bzw. entspechenden Organisationen. (ABECKER ET AL. 2002; HEINRICH & LEHNER 2005; HEINS & PIETSCH 2008, 2009, 2010; KRCMAR 2005; LEHNER 2008)

2.2 Analyse aktuell verfügbarer Informationssysteme (Pflanzendatenbanken)

Die Untersuchung von aktuell verfügbaren Datenbanken zur Bereitstellung von Wissen über die fachgerechte Verwendung von Pflanzentaxa galt der Ermittlung des Status quo der Wissensbereitstellung. Dazu wurden vorwiegend Desktop-Systeme, die per CD-/DVD-Rom auf einem PC installiert werden, und via Internet verfügbare Informationssysteme analysiert. Die in den Systemen bereitgestellten Informationen wurden gesichtet und systematisch katalogisiert. Das betraf Arten vor allem verwendungsbezogenen/ verwendungsorientierte Pflanzenmerkmale, die das Wissen in Form von Attributen zu einem Pflanzentaxon abbilden. Die Bezeichnungen der einzelnen Attribute, ihre Skalen und Skalenwerte wurden erfasst sowie grundsätzliche Eigenschaften der Systeme dokumentiert. Erste Hinweise für die grundsätzliche Struktur, d.h. wesentliche Elemente des Wissens erarbeitet. Es wurde somit die den aktuellen Informationssystemen zu Grunde liegende Daten- und Informationsstruktur ermittelt. (BALZER 2005; HEINS ET AL. 2010; HEINS & KIRCHER 2009, HEINRICH & LEHNER 2005)

2.3 Analyse der Daten- und Informationsstruktur zur Ableitung von fachtechnischen Maßgaben

Durch das zweite Arbeitspaket konnte der Status quo der Wissensbereitstellung ermittelt werden. Da jedoch wie Eingangs dargestellt davon auszugehen ist, dass die verfügbaren Informationssysteme nicht in der Lage sind das Wissen in der notwendigen Qualität zu erfassen, abzubilden und bereitzustellen, war es notwendig weitere Medien zum Wissenstransfer in der Pflanzenverwendung zu analysieren. Aus der Gesamtheit der wesentlichen verfügbaren Medien wurden fachtechnische Maßgaben zur zukünftigen Abbildung des Wissens in Informationssystemen abgeleitet. (BALZER 2005; BIETHAHN, MUCKSCH & RUF 2004; HEINS & PIETSCH 2009, 2010, HEINRICH & LEHNER 2005; PÜRNER 1994; REUSCH & WOLF 1994)

2.4 Bestimmung von Strategien und Modellierung der Datenarchitektur

In diesem Arbeitspaket waren auf Basis der Ergebnisse der vorangegangenen Arbeitschritte die wesentlichen Strategien zur zukünftigen Entwicklung von Informationssystemen für das Wissensmanagement in der Pflanzenverwendung zu bestimmen. Die wesentlichen Elemente (Daten und Informationen) zur Abbildung des Wissens und ihre Eigenschaften wurden anhand der Modellierung einer Datenarchitektur definiert (BIETHAHN, MUCKSCH & RUF 2004; HEINS & PIETSCH 2009, 2010, HEINRICH & LEHNER 2005).

3 ERGEBNISSE

3.1 Wissensraum Pflanzenverwendung und Informationsflüsse im Prozesszyklus des Grünflächenmanagements

Auf Basis der Analyse der Geschäftsprozesse und des notwendigen Informations- und Wissensflusses zwischen ihnen wurde für die Pflanzenverwendung bzw. das Management urbaner Vegetation das in Abbildung 1 dargestellte Modell entwickelt.

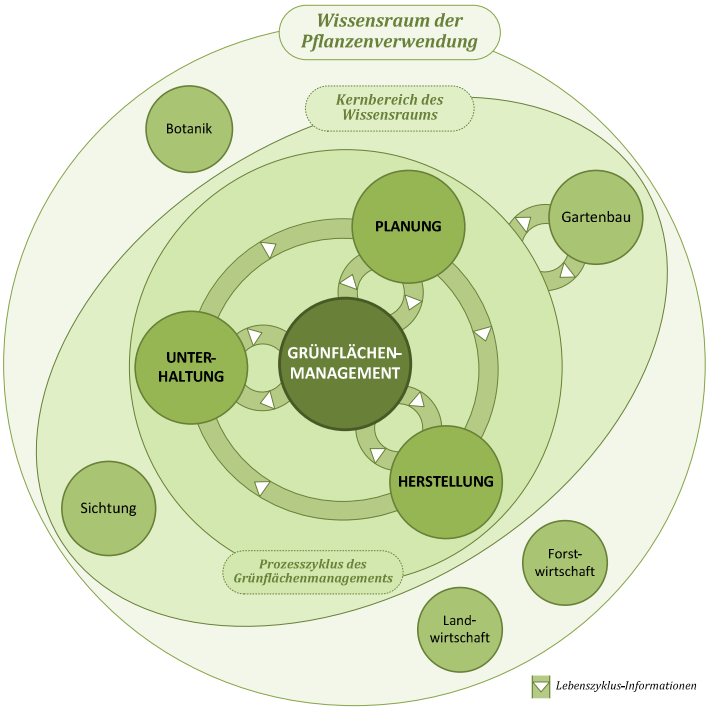


Abbildung 1: Modell des Wissensraums Pflanzenverwendung und des Geschäftsprozesszyklus Grünflächenmanagement (HEINS ET AL. 2010)

Auf Grundlage des Modells konnte ermittelt werden, dass bei allen weiteren Betrachtungen zwischen dem Informationsfluss zum Austausch von Wissen über verwendungsbezogene Pflanzenmerkmale und dem Fluss von Lebenszyklus-Informationen über konkrete Vegetationselemente/-klassen differenziert werden muss, obgleich diese semantisch miteinander verbunden sind. Diese semantischen Verknüpfungen sind jedoch bei der späteren Datenanalyse und Modellierung des Fachdatenmodells zu beachten, da wie sich zeigte daraus die Mindestinformationen zur Abbildung des Wissens abgeleitet werden können. In dem Modell (s. Abbildung 1) wird der Wissenfluss nicht gesondert dargestellt, da davon ausgegangen wird, dass dieser faktisch zwischen allen dargestellten Bereichen besteht bzw. erfoderlich ist. Lebenszyklus-Informationen über konkrete Vegetationselemente hingegen werden nur zwischen einigen Geschäftsprozessen ausgetauscht und daher im Modell gesondert abgebildet. Für das Projekt wurde die notwendige Differenzierung zwischen dem Wissen über die fachgerechte Verwendung von Pflanzentaxa (Pflanzeninformationen) und den Lebenszyklus-Informationen über konkrete Vegetationselemente (Vegetationsinformationen) an Hand der folgenden Definitionen vorgenommen (HEINS ET AL. 2010).

Pflanzeninformationen sind mehr oder weniger generelle Daten über die verwendungsbezogenen Merkmale eines Pflanzentaxons in einer Pflanzendatenbank oder einer -enzyklopädie, sowie weiteren Fachmedien. Auf Basis dieser Daten können z.B. die Pflanzenarten bestimmt werden, die zur Pflanzung bei bestimmten Standortverhältnissen geeignet sind.

Vegetationsinformationen sind die Daten, die über ein konkretes reales Vegetationselement in der Umwelt existieren, z. B. die Pflanzposition, die Pflanzenart und der Zustand eines Baumes oder beispielsweise die Pflegestufe, mit der eine bestimmte Staudenfläche zu pflegen ist. Diese Informationen werden heute bereits in zahlreichen Städten und Gemeinden in Grünflächeninformationssystemen (GRIS) für das Pflegemanagement und dessen Kostenkontrolle vorgehalten.

3.2 Status quo und Defizite vorhandener Informationssysteme

Durch die Untersuchung zahlreicher Desktop- und Internetsysteme zur Bereitstellung von Pflanzenwissen konnten wesentliche Bezeichnungen für verwendungsbezogene Pflanzenmerkmale, ihre Skalen und Skalenwerte sowie Datenarten ermittelt werden. Dabei wurden auch bestehende Defizite eruiert. Sie werden in den folgenden Abschnitten kurz erläutert und mögliche Optionen zu ihrer Minderung oder Beseitigung dargestellt.

3.2.1 Terminologiebrüche

Bei der Untersuchung der Informationssysteme wurde eine große Vielfalt an Begriffen zur Bezeichnung von Pflanzenmerkmalen (Attribute), Skalen und Skalenwerten ermittelt. Oft fehlte es an einer hinreichenden Definition der Attribute. Merkmale die originär aus der Botanik entstammen, wie z.B. Blattformen oder Blütenstände, weisen gegenüber verwendungsbezogegen Merkmalen (z.B. Ingenieurbiologische Bauweisen) eine bessere Systematik und Eindeutigkeit in der Bennenung auf. Die stichprobenhafte Analyse von Datensätzen in den Informationssystemen legt die Vermutung nahe, dass die Benennung von Attributen mit ähnlichen oder gleichen Begriffen nicht in jedem Fall auch eine einheitliche Definition der Begriffe oder der verwendeten Skala zu Grunde liegt. Das bedeutet, dass Nutzer mit zahlreichen Interpretationsspielräumen konfrontiert werden, die es ihnen überlassen, wie sie die Informationen zu bewerten haben. So wird das dichotome Attribut Bodendecker in einem Informationssystem für Pflanzenarten verwendet, die eine schnelle, relativ pflegeextensive Begrünung größerer Flächen ermöglichen. In einer anderen Datenbank hingegen ist in diese Variable auch eine ingenieurbiologische Wirkung bzgl. der Veringerung der Erosion impliziert, oder bezieht es sich ledigliche auf die Pflanzegruppe der Stauden beschreibt das Attribut z.B. die Wuchsform bzw. das Wuchsverhalten.

Oft bleibt daher unklar, wie die bereitgestelten Informationen durch die Nutzer fachgerecht zu interpretieren sind, um fachgerechte Informationen zu erhalten oder sich korrektes Wissen anzueignen. Die Harmonisierung der Begriffe, Skalen und Skalenwerte sowie ihre Benennung und eindeutige Definition ist daher eine weitere wichtige fachwissenschaftliche Aufgabe bei der Entwicklung einer integrierten Datenstruktur und Umsetzung eines Fachdatenmodells. Auch durch BOUILLON, BOISON, & SEYFANG (2002) wurde bereits die weitere Harmonisierung und Standardisierung der Terminologie für verwendungsbezogene Pflanzenmerkmale gefordert.

3.2.2 Nomenklaturbrüche

In der Botanik sind Nomenklatur und Taxonomie einem ständigen Wandel unterlegen. Aufgrund neuster wissenschaftlicher Erkenntnisse die Revision einer Gattung erfolgt, wie es z.B. bei der Gattung Aster (SCHMIDT 2004). Im Gegenzug ersetzt auch der Gartenbau bereits eingeführte Sortennamen gerne durch marketingfreundlichere Bezeichnungen. Daher existiert für nahezu jedes Pflanzentaxon eine Vielzahl an Synonymen. Für den Praktiker ist es mühsam ständig die neuen Taxa-Bezeichnungen zu lernen, und die ständig notwendige Anpassung von IT-Systemen, z.B. Warenwirtschaftssystemen in Gartenbaubetrieben oder von Pflanzendatenbanken, erzeugt in der Praxis lediglich Kosten.

3.2.3 Semantische Brüche

Unter dem Punkt semantische Brüche sollen alle Aspekte erläutert werden, die Defizite hinsichtlich einer vollständigen Abbildung des Wissens in den analysierten Informationssystemen aufzeigen. Das betrifft im Wesentlichen die das entstehen bzw. die Existenz semantischer Brüche, insbesondere durch:

- •fehlende Plausibilitätsprüfungen bzw. semantisch unverknüpfte Attribute,
- •unvorteilhafte Daten- bzw. Informationsstrukturen oder
- •fehlende (unvollständige) Daten und Informationen.

Bei der Analyse von Informationssystemen wurde ermittelt, dass bei Attributen zur Abbildung von Pflanzenmerkmalen, zwischen denen aus fachlicher Sicht semantische Beziehungen existieren, weitestgehend keine Abbildung dieser in den Informationssystemen erfolgt. Dadurch entstehen inkonsistente Daten, die zu unvollständigen und fehlerhaften Übertragung von Wissen führen können. Beispielweise war in einem Fall das Attribut „Schnittverträglichkeit“ nicht mit den Verwendungsattributen „Formschnitt“ oder „geschnittene Hecke“ verknüpft. Deutlich wurde dieses dadurch, dass für zahlreiche Pflanzentaxa zwar eine

Verwendung für Formschnitt oder eine geschnittene Hecke angegeben wurde, jedoch das Attribut „Schnittverträglichkeit“ nicht mit „Ja“ belegt war. Aus fachlicher Sicht ist jedoch die Schnittverträglichkeit eine wesentliche Voraussetzung zur Verwendung eines Pflanzentaxons für den Formschnitt oder in einer geschnittenen Hecke. Ein weiteres Beispiel für eine semantische Beziehung sind die Attribute „Salzverträglichkeit“ und „Straßenbegleitgrün“. Das heißt es erfolgt durch derartige Informationssysteme keine Prüfung der fachlichen Plausibilität der eingegebenen Daten, was die Qualität des abgebildeten Wissens verringert, aber auch eine automatisierte Ableitung einzelner Merkmale bei der bestimmten Ausprägung anderer verhindert. Dieses erhöht ggf. wiederum die aufzuwendenden Ressourcen zur Pflege und Aktualisierung der Informationssysteme.

Pflanzennamen	Licht	Nährstoffgehalt	Sommerfeuchte
Stachys byzantina	vollsonnig	sehr arm bis arm	trocken bis frisch
Stachys byzantina 'Cotton Boll'	vollsonnig	sehr arm bis arm	trocken bis frisch
Stachys byzantina 'Sheila McQueen' -> Stachys byzantina 'Co	vollsonnig	sehr arm bis arm	trocken bis frisch
Stachys byzantina 'Silver Carpet'	vollsonnig	sehr arm bis arm	trocken bis frisch
Stachys grandiflora 'Superba'	sonnig bis leicht schattig	normal bis hoch	trocken bis sehr frisch
Stachys lanata -> Stachys byzantina	vollsonnig	sehr arm bis arm	trocken bis frisch

Abbildung 2: Informationen über die Standortansprüche/-toleranzen von Pflanzentaxa in der Pflanzendatenbank PLANTUS (Screenshot) (BÖDECKER & KIERMEIER 1998)

Die Ermittlung unvorteilhafter Daten- und Informationsstrukturen, die aus fachlicher Sicht keine vollständige Abbildung des Wissens ermöglichen, bilden ein weiteres Defizit. So werden in nahezu allen Informationssystemen, die Daten über den durch ein Pflanzentaxon physiologisch tolerierten Bereich von Standorteigenschaften unabhängig voneinander vorgehalten. Jede Standorteigenschaft wird dort durch die Angabe der tolerierten Ausprägungen separat auf einer Skala betrachtet (s. Abb. 2). Informationen über eine differenzierte Bewertung bestimmter Kombinationen von Standortparametern werden nicht abgebildet, obwohl das „Gesetzt der relativen Standortkonstanz“ besagt, dass die Ausprägung einer Standorteigenschaft einerseits den physiologisch tolerierten Bereich anderer Standorteigenschaften zusätzlich begrenzen, andererseits aber die suboptimale Ausprägung einer von mehreren Standorteigenschaften durch besonders vorteilhafte Ausprägungen anderer essenzieller Standorteigenschaften kompensiert werden kann (BORCHARDT 1999; HEINS ET AL. 2010; WALTER & BRECKLE 1999). Für die Pflanzenverwendung ergeben sich aus dem Gesetz erheblich mehr Verwendungsmöglichkeiten als für viele Arten in gängigen Pflanzendatenbanken recherchierbar sind. Es können aber auch viele Unsicherheiten bei der standortgerechten Auswahl von Pflanzentaxa daraus resultiren, die zu Planungsfehlern führen. Es liegt auf Basis der aktuell nutzbaren Daten an der Interpretation des Nutzers eines Informationssystems, ob er eine bestimmte Kombination von Standortparametern als optimal ansieht. Die Entwicklung einer geeigneten Strategie zur Beseitigung dieses Defizits und ihre Umsetzung in ´der Datenarchitektur war daher ein weiterer wesentlicher Punkt der folgenden Arbeitschritte.

Durch zahlreiche Fachexperten wird immer wieder bescheinigt, dass sich das Wissen über die fachgerechte Verwendung von Pflanzentaxa nur sehr schwer verallgemeinern lässt, sondern immer einen Bezug zur Region oder dem Ort in bzw. an dem die Erfahrung gesammelt wurde besteht. Verfügbare Informationssysteme verallgemeinern jedoch sehr stark und eine räumliche Bezugsgröße für das bereitgestellte Wissen ist z.B. Mitteleuropa. In der Praxis vertrauen daher die Akteure lieber auf ihre über Jahre oder sogar Jahrzehnte gesammelten Erfahrungen, da die räumlichen Bezugsgrößen in den Informationsystemen zu groß gewählt sind. Eine Erfassung und Bereitstellung einer stärkeren räumlichen Differenzierung für das bereitgestellte Wissen ist in den aktuell verfügbaren Informationssystemen nicht möglich bzw. informationstechnisch nicht vorgesehen. Daher wird eine grundsätzliche Strategie zur stärkeren räumlichen Differenzierung von Pflanzenwissen erarbeitet. Bei der Entwicklung des Datenarchitektur wird diese Maßgabe ebenfalls berücksichtigt und entsprechende Vorrausetzungen geschaffen, um die fehlenden Daten und Informationen für den räumliche Bezug eines Datensatzes über verwendungsbezogene Pflanzenmerkmale anzugeben. Weiterhin betrifft der Punkt fehlende Daten und Informationen auch die Integration eines Attributes zur differenzierten Bewertung (optimal bis ungünstig) bestimmter Kombinationen von Standortparametern, die in Informationsystemen bislang auch nicht möglich ist. Es sind keine Informationen über ungünstige Standortfaktoren verfügbar bzw. nur aus der Interpretation heraus, dass alle nicht angegeben Ausprägungen von Standortparametern ungünstig sind.

3.3 Fachtechnische Maßgaben für das Wissensmanagement

Aufbauend auf die Ergebnisse der vorangegangenen Arbeitschritte wurden durch eine umfasendere Daten- und Informationsanalyse Maßgaben für das Wissensmanagement in der Pflanzenverwendung formuliert. Dabei wurde deutlich, dass eine Zusammenführung vorhandener Methoden und Vefahren der Wissens- und Informationslogistik im Grünflächenmanagement bzw. in der Pflanzenverwendung möglich ist, um bereits einige aufgezeigte Defizite zu mildern oder sogar zu beseitigen. Weiterhin wurden die Struktur und grundsätzliche Elemente des Pflanzenwissens ermittelt, charakterisiert und darauf aufbauend als Datenarchitektur modelliert.

3.3.1 Basis- und/oder Zielvariablen (Basisattribute und abgeleitete (derived) Attribute)

In Abschnitt 3.2.3 wurde dargestellt, dass zwischen verschiedenen Attributen zur Beschreibung von Pflanzen- bzw. Verwendungsmerkmalen semantische Beziehungen bestehen, die in Pflanzendatenbanken bisher nicht abgebildet werden können oder abgebildet werden. Als Beispiel wurden die Variablen „Schnittverträglichkeit“, „geschnittene Hecke“, und „Formschnitt“ angeführt. Für die Datenarchitektur bedeutet dieses, dass zwischen Basis- und Zielvariablen (derived attributes) zu unterscheiden ist. Ein abgeleitetes Attribut kann dabei auch gleichzeitig als Basisvariable für eine weitere Zielvariablen fungieren. Weiterhin kann auch die spezifische Kombination der Ausprägung mehrerer Basisvariablen die Ausprägung einer Zielvariablen bedingen. So ist beispielweise die Ausprägung „Ja“ des dichotomen Attributs „Schnittverträglichkeit“ eine Vorrausetzung dafür, das bei einem Pflanzentaxon die Variable „geschnittene Hecke“ mit „Ja“ ausgeprägt sein kann.

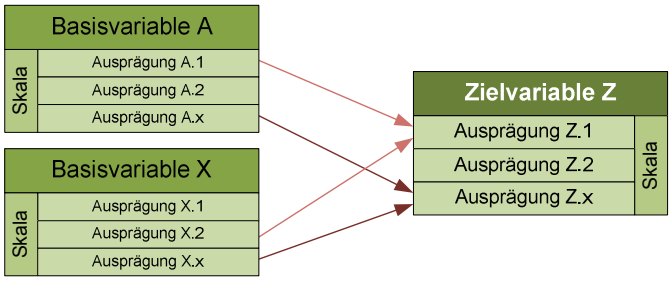


Abbildung 3: Abhängigkeit zwischen der Ausprägung von Basis- und Zielvariablen zur Umsetzung fachsemantischer Beziehungen

3.3.2 Verwendungseignung und Objektarten des Grün- bzw. Freiflächenmanagements

In vorhandenen Pflanzendatenbanken werden für Pflanzentaxa Verwendungseignungen angegeben. So ist ein bestimmtes Taxon z.B. als Straßenbegleitgrün geeignet, andere für geschnittene Hecken, zur Pflanzung auf Spielplätzen oder in Parkanlagen. In Grünflächeninformationssystemen (GRIS) werden Informationen zu Grün- und Freiflächen einer Kommune auf Basis eines Objektartenkatalogs gesammelt und bereitgestellt. In dem Leitfaden zur Erstellung und Fortschreibung eines Grünflächeninformationssystems (GALK-DST 2009) oder dem OK Frei (FLL 2009) existiert eine hierachische Systematik für Vegetationsklassen (z.B. Sträucher, Hecken, Beete). Die Klasse Hecken ist wiederum in die Unterklassen „Freiwachsende Hecken“ und „Formhecken“ untergliedert. Dieses ist nur ein Bespiel dafür, dass die Systematik einer Grünflächendatei in besonderer Weise mit den Verwendungseigenschaften korrespondiert, die für ein Pflanzentaxon in bestehenden Pflanzendatenbanken angegeben werden können. Jedoch ist die Terminologie nicht standardisiert. Weiterhin existiert in den Leitfaden zur Erstellung und Fortschreibung eines Grünflächeninformationssystems noch eine übergeordnete Systematik, die ein eigenes System darstellt. Sie wird dort als Objektdatei bezeichnet und enthält z.B. die Klassen Grün- und Parkanlagen, Spielplätze, Straßenbegleitgrün etc., Hausgärten können ebenfalls in diese Liste eingereiht werden.

Zur Angabe der Verwendungseignung eines Pflanzentaxons müssen drei Sachverhalte unterschieden werden: 1. Urbane Einrichtungs- bzw. Freiflächentypen, 2. Die Klasse (Typ einer Vegetationsfläche bzw. eines -elements und 3. Funktionen und Dienstleistungen einer Vegetationsklasse. Beispielsweise würde ein Pflanzentaxon für eine Formhecke auf einem Spielplatz geeignet sein, wenn es keine giftigen Pflanzenteile besitzt und schnittverträglich ist. Eine Kombination der drei Daten-Elemente soll in der zu entwickelnden Datenarchitektur als Anwendungsfall bezeichnet werden (s. Abb. 4).

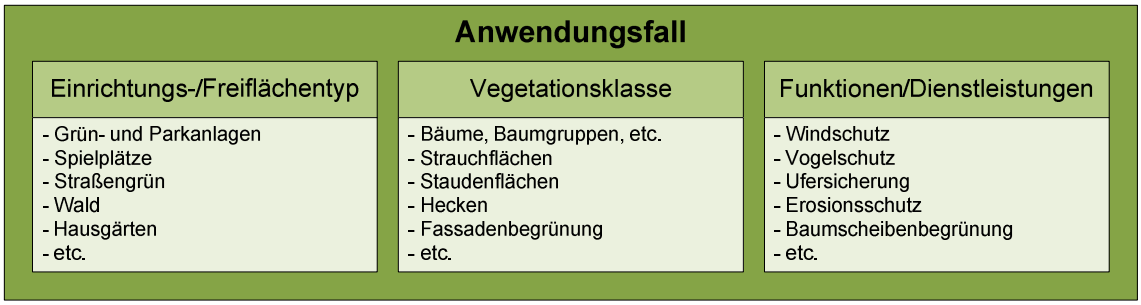


Abbildung 4: Datenelemente/-architektur eines Anwendungsfalls in der Pflanzenverwendung

3.3.3 Bewertung der Kombination von Standortparametern und der Verwendungseignung

Die Eignung eines Pflanzentaxons für einen bestimmten Anwendungsfall lässt sich aus verschiendenen Basisvariablen ableiten, die dafür eine bestimmte Ausprägung haben müssen. Diese Eignung wird in verfügbaren Pflanzendatenbanken als dichotome Variable mit „Ja“ oder „Nein“ angegeben. Diese Form wird auch in die Datenarchitektur umgesetzt werden, da die Einführung einer mehrstufigen Skala, z.B. des Parameter „bedingt geeignet“ bei Nutzern nur zu Verwirrungen führen würde.

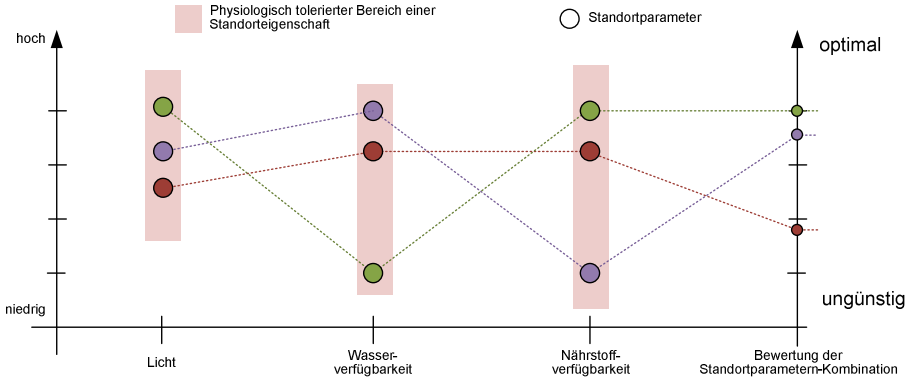


Abbildung 5: Fiktive Bewertung der Lebensbedingungen für ein Pflanzentaxon anhand der Bewertung der spezifischen Kombinationen von Standortparametern (HEINS ET AL. 2010)

Eine Bewertung der Ausprägung von Standortattributen (Bodenfeuchtigkeit, Licht etc.) ist aktuell nicht realisiert. In den Datenbanken werden die einzelnen Standorteigenschaften separat betrachtet (siehe 3.2.2) und die Angabe ungünstiger Standortbedingungen ist nicht möglich. Diese Informationen fehlen gänzlich, obwohl dieses Wissen in der Praxis ggf. bereits gesammelt wurde. Es ist somit nicht nachvollziehbar ob ein Pflanzentaxon bestimmte Standortparameterkombinationen nicht toleriert, weil diese in einem Informationssystem nicht aufgeführt sind oder weil keine Erkenntnisse darüber vorliegen. In die Datenarchitektur ist daher die Bewertung von spezifischen Standortparameter-Kombinationen zu integrieren hinsichtlich der Lebens-/Wachstumsbedingungen für ein Pflanzentaxon (siehe Abb. 5).

3.3.4 Differenzierung der Ausprägung von Pflanzenmerkmalen

Je nachdem an welchem Standort ein Pflanzentaxon gepflanzt wird oder für welchen Anwendungsfall dieses zum Einsatz kommt, können die Ausprägungen von Pflanzenmerkmale entscheidend von denen des Naturstandortes abweichen. In der Datenarchitektur muss daher zwischen unabhänhigen (statischen) und abhängigen (dynamischen) Attributen unterschieden werden. So erreicht z.B. ein Taxon an seinem Naturstandort eine durschnittliche Wuchshöhe von 25 m. Wird das Taxon als Straßenbaum gepflanzt, wird diese Wuchshöhe auf Grund der extremen Standortbedingungen gff. niemals erreicht werden. Die unterschiedlichen Angaben in verschiedenen Pflanzendatenbanken, sowie weiteren Medien legen die Vermutung nahe, dass hier je nach Kenntnissstand die Wuchsgröße vom Naturstandort oder für eine bestimmte Verwendung angegeben wurde. Verwendete Bezugsgrößen (Anwendungfall, Standort etc.) eines Pflanzenmerkmals fehlen jedoch oft völlig. Pflanzenattribute, die in ihrer Ausprägung in besonderer Weise vom Anwendungfall oder weiteren Größen beeinflusst werden können, werden in der Datenarchitektur als dynamische Attribute bezeichnet.

3.3.5 Räumliche Differenzierung von Pflanzenwissen

In 3.2.3 wurde bereits erläutert, dass eine räumliche Differenzierung der Ausprägung von Pflanzenmerkmalen in bestehenden Pflanzendatenbanken nicht oder nur sehr eingeschränkt möglich ist, obwohl sich bestimmte Erfahrungen nicht für eine sehr große geographische Bezugsgröße (z.B. Mitteleuropa) verallgemeinert lassen. Die Kategorie „Lokalsorte“ bei der Staudensichtung (HERTLE 2010) zeigt, dass bestimmten Taxa nur für ein begrenztes geographisches Gebiet hervorragende Verwendungseigenschaften bescheinigt werden. Auch die Straßenbaumliste der GALK (GALK-DST 2006) weist immer wieder Angaben zu regionalen Ausprägungen von Pflanzenmerkmalen aus (z.B. Anfälligkeit für Krankheiten). Eine konkrete Benennung von räumlichen Bezugsgrößen erfolgt jedoch nicht. In die Datenarchitektur ist daher eine Komponente zu implementieren, durch die eine räumliche Verortung (bzw. Klassifizierung) von Pflanzenwissen erfolgen kann. Eine flächendeckenden Systematik für Raumklassen in der Pflanzenverwendung wäre darauf aufbauend eine hervorragende Grundlage zur Ermittlung der Möglichkeit zum synchronen oder asynchronen Austausch von Pflanzenwissen zwischen verschiedenen Orten bzw. Regionen (s. Abb.6; HEINS ET AL. 2010).

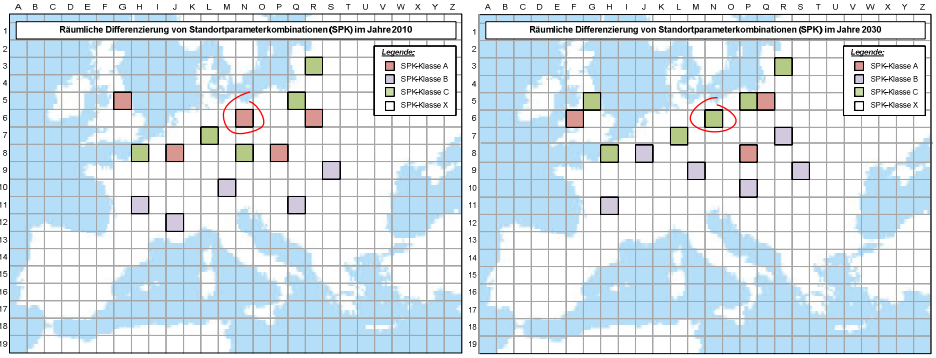


Abbildung 6: Fiktive, vereinfachte Darstellung der asynchronen Änderung von Raumklassen der Pflanzenverwendung in unterschiedlichen Regionen im Laufe des Klimawandels

4 FACHTECHNISCHE STRATEGIEN UND DATENARCHITEKTUR

Im Folgenden werden als Zusammenfassung der bisherigen Forschungsergebnisse die Strategien zur Umsetzung zukünftiger Pflanzendatenbanken benannt und kurz erläutert. Zusätzlich wird noch darauf eingegangen, in welchem Maße diese im Projekt umzusetzen sind und damit gleich ein Ausblick auf das weitere Vorgehen gegeben. Die modellierte Datenarchitektur stellt einen wesentlichen Meilenstein der bisherigen Forschungsaktivitäten dar, auf den zielführend die weiteren geplanten Arbeitsschritte abgeleistet werden können.

4.1 Fachtechnische Strategien

4.1.1 Eindeutiger Identifier für Pflanzentaxa

Eine zentrale informationstechnische Verwaltung, Pflege und Bereitstellung der Taxonomie und Nomenklatur ist eine wichtige Maßgabe, um zukünftig nutzerfreundliche Informationssysteme zu entwickeln. Die Einführung eines einheitlichen Identifier (World-Wide-ID) für Pflanzentaxa unabhängig von wissenschaftlichen oder sonstigen Bezeichnungen; sowie ggf. Entwicklung eines zentralen Web-Service. Ein Webservice, der die Informationen im ZANDER (SEYBOLD et Al. 2009) mit den Artikelstämmen (BSG 2010), z.B. nach der Art und Weise des „Universal Biological Indexer and Organizer (uBio)“ (MBL 2010) verknüpft, wäre hier eine zukunftsfähige Option. Die Bezeichnungen für ein Pflanzentaxon sind lediglich Attribute dieses Fachobjekts. Die Entwicklung eines entsprechenden Webservice wird nicht in diesem Projekt abgeleistet werden können, jedoch sind die Möglichkeiten einer zukünftigen Einbindung derartiger Services bereits im datentechnisch vorzusehen. Die Umsetzung eines entsprechenden Systems ist nicht Bestandteil dieses Projekts, wird jedoch aktuell als weiterführendes Vorhaben vorbereitet.

4.1.2 Bewertung von Standortparameter-Kombinationen

In zukünftige Pflanzendatenbanken ist die Bewertung von Standortparameter-Kombinationen daten- und softwaretechnisch vorzusehen. Die Bewertung muss weiterhin mit einem räumlichen Attribut verknüpft

werden, damit die Möglichkeit geboten wird, eine räumliche Bezugsgröße für die Gültigkeit dieses Wissens anzugeben.

4.1.3 Einführung des Attributes Anwendungsfall

Verwendungseigenschaften bzw. -eignungen werden in zukünftigen Pflanzendatenbanken als Anwendungsfall definiert. Ein Anwendungsfall wird durch die Ausprägung der Attribute Einrichtungs-/Flächentyp, Vegetationsklasse und Funktion/Dienstleistung charakterisiert. Diese Attribute wie auch der Anwendungsfall selber sind Zielvariablen (derived attributes), die eine semantische Verknüpfung zu der Ausprägung von Basisvariablen besitzen.

4.1.4 Statische und dynamische Attribute

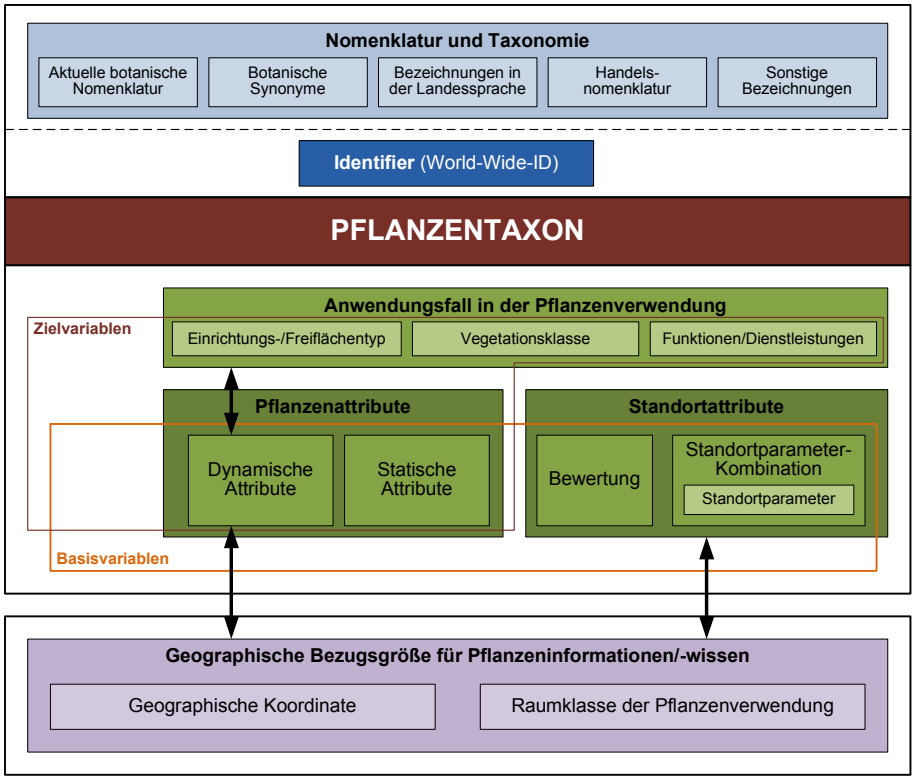
Es ist zwischen statischen und dynamischen Attributen (Pflanzenmerkmalen) zu unterscheiden. Dynamische Attribute müssen eine Verknüpfung zu den Attributen besitzen, die einen Einfluss auf Ihre Ausprägung haben können. Das sind insbesondere der Anwendungsfall und eine geographische Bezugsgröße.

4.1.5 Terminologie und Abbildung der Semantik

Alle Attribute und ihre möglichen Ausprägungen auf einer Skala sind eindeutig zu benennen. Es ist weiterhin festzulegen, ob es sich um ein Basisattribut oder ein abgeleitetes Attribut (derived attributes) handelt. Die semantischen Bezüge zwischen Attributen und ihren Ausprägungen sind datentechnisch zu definieren und umzusetzen. So ist z. B. an Hand eines Entscheidungsbaumes festzulegen, welche Vorrausetzungen (Ausprägung von Attributen) erfüllt sein müssen, dass ein Pflanzentaxon für einen bestimmten Anwendungsfall geeignet ist. Das bedeutet. dass die Ausprägung von Basisattributen hinsichtlich der daraus abzuleitenden Ausprägung weitere Attribute möglichst eindeutig zu definieren ist.

4.2 Datenarchitektur

Auf Grundlage der hergeleiteten Maßgaben und der aufgestellten Strategien wurde ein Modell zur Abbildung von Pflanzenwissen in der Pflanzenverwendung und im Grünflächenmanagement entwickelt (s. Abb. 7). Diese Datenarchitektur ist ein wichtiger Meilenstein und eine wesentliche Grundlage zur zielführenden Ableistung der nächsten Forschungs- und Entwicklungsschritte. Das sind insbesondere die Entwicklung und datentechnische Umsetzung eines detailierten Fachdatenmodells sowie das Prototyping eines zukünftigen Informationssystems für das Wissensmanagement in der Pflanzenverwendung.



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New Challenges in the transition of industrial areas within the Vision of Istanbul Metropolitan Plan for 2023

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1 ABSTRACT

Istanbul has always been the core of different civilizations in history. As the capital city of the Ottoman Empire, Istanbul's modern place within the world economy began in the late eighteenth century with the disintegration of the Ottoman Empire and the growth of modern European capitalism. Throughout its history, Istanbul has played a primary role in its region. In the 19th century and into the 1920s, the city was a center for transportation, bonded warehouses, trade and stock exchange.

Between 1923-1950, the city of Istanbul loses its administrative and economical power due to the new status of Ankara as -the new capital of Turkey- and new economical decisions.

After the 1960s, Istanbul has become a Metropolitan City, which is the window opening of Turkey into the global market and carrying the burden of national economy. Istanbul is in the Marmara Region which is the most developed & modern part of the country. Istanbul is the city where the largest industrial companies of Turkey are accommodated.

International capital sees Istanbul as likely to be the command and control center for the Balkans, the Middle East, the Black Sea Region, and some of the Central Asian Republics of the former Soviet Union. From this point of view, it has a strategic geographical location which promotes competitive economy at EU level.

In this paper we study the relationships between industrial decentralization process and the vision of Istanbul Metropolitan Plan for 2023.

The focus of the research case is the relocation of the shipbuilding industrial site in Istanbul Metropolitan Area.

These kinds of industrial regeneration projects in Istanbul should be seen as a means not only to convert the areas into more attractive spaces but also to regenerate the economy of both the city and the local region. However, creating new functions and land uses will re-image the city and have effects on the local labor market, and also cause challenges to communities in the new location.

Keywords: Industrial regeneration, vision of the Istanbul Metropolitan plan, public-private partnerships, shipbuilding industries.

2 URBAN DEVELOPMENT AND INDUSTRIALIZATION

Urbanization is the most prominent of the contemporary economic and social phenomena. Since the first settlements appeared, the most complex organism created by humankind has been city. The urban population quadrupled since 1950. Therefore, it is possible to call this age as the age of “urban revolution” [UN, 1987].

Before the Industrial Revolution in the 19th Century, cities had been places in which agriculture and trade were prevalent. Humankind - especially after the Industrial Revolution- started to change the nature of its relationship with the nature which had existed from ancient cities until medieval trade cities in favor of himself.

Industrialization, which is an “activity that creates city” [E.Tümertekin, 1994], had two kinds of influences on settlements. The first one was that old cities having traditional textures have expanded with the effect of industrialization. The second influence was the emergence of new cities. Settlements that used to contain a few houses have transformed into industrial cities. The city of Istanbul can be given as an example of the cities that expanded with the effect of industrialization. Istanbul has become a “monstrous industrial city” [M.Güvenç, 1993] with the effect of industrialization especially after 1950.

Since industrial operation requires large numbers of labor force, industrialization, at first, emerged as a process of large concentration of population. Along with the increase in population, specialization of labor and the emergence of the division of labor is one of the effects of industrialization. In addition, rapid

industrialization and population growth, mechanization of agriculture, concentration of production and consumption in big cities have created several problems for the social and physical environment.

The geographical position of the city plays an essential role not only in the location of industrial operations but also in covering inhabitants' needs. In this respect, along with the geographical conditions of the city, the conditions related to the social, economic and transportation order that emerge within the city and its hinterland are of importance. Within this web of relations, the city put a planned growth on the agenda in that period. The aim of physical planning which enables the best allocation of economic investments in space is to determine the best relations between all functional elements of the newly developed or transformed urban space. In other words, its aim is providing the best site selection for new investments, allocating new transportation networks, new housing areas and new industrial operations in the correct way, and organizing the growth of cities and regions.

Though the view of physical planning in its narrow sense on the city is explained in this way, in the recent two decades, the idea that the city based only on economic growth is not sustainable and the ecological and social developments should also be taken into consideration has become prominent.

Along with the developments in the essential logistical activities such as raw material supply, product distribution and food transportation, the presence of social and ecological problems brought about by industrialization and urbanization rendered the notion of sustainable development prominent. Assessing the reactions given firstly by the nature itself and then by social groups to the environmental problems created by the growth based only on industry has become important issues.

Urban development is generally observed before the emergence of a healthy and diverse economical base which would provide housing areas, infrastructure and employment. In many places, problems are related to the inconsistencies between agricultural and urban development strategies which do not conform to industrial development.

The network composed of the city and its countryside encompasses the all aspects of the environment of social life. At the international level, prominent cities of the world form a network in terms of the site selection of investments and the production and selling of many products and services. These centers become the first ones to join this network through airports, railroad terminals and ports, and their communication facilities. New technologies come to these areas first. Cities, only when they are strongly attached to this network, can attract investments intended for global markets and production goods.

As a result of the competition created by the possibility to access to global markets, economies rapidly cease being industry-based and start to concentrate on services sector.

Places where the production will be performed during the process and the roles that the actors of the process should undertake are defined within these relations. Especially firms' site selection decisions have started to have implications beyond national urbanization/settlement policies.

Within the framework of the relations between global powers and local dynamics, spatial policies intended for urban territories have brought about the process of organizational restructuring. [P.Healey, 2004]

"Globalization is often seen as a process of homogenization. While this idea can be admitted in the cultural sense, it is difficult to argue the same in the economic sense. The primary reason of the emergence of global markets which enable free movement of capital and other production factors between countries is different characteristics of different geographies. Globalization of economic activities becomes possible since employee wages, specializations, production infrastructures, political and economic risks in different geographies become available to the whole world." [M.Godinez, 1999]

The desire of capital groups for opening to other countries –search for new markets- has brought about new production relations.

International capital's desire for creating new markets has created a new structuring. International capital establishes connections with firms in several countries. It creates a main power in the center and small components connected to that center. Within this formation, international financial centers –with their several historical characteristics- direct world markets. [S. Sassen, 1999]

Globalization ignores the nation state and attaches importance to cities and regions. Therefore, national and international economies are turning into regional metropolitan-based economies. [L.Berg, E.Braun, J. Meer, 1996]

In conclusion, cities in this new competitive atmosphere try to take decisions for their futures under;

- Economic globalization
- Transition to the information society
- Metropolitan competition
- Regional integrations
- Serious environmental problems.

There are some strong indications of radical changes in urban employment patterns as well. In many "mega-city regions" around the world, deindustrialization and disappearance of basic industrial sectors and rise of professional services have placed serious challenges of the politicians' agendas in closing the skill gap between old-fashioned and new job areas (Hall, 2009). The major reflection of this transition in spatial arena is mostly the relocation of old industrial facilities and low value added services to the periphery of the metropolitan areas.

According to Healey (Healey, 2008) as well, city-regions are now becoming "critical institutional arena" in the allocation of growth-promoting development investment of the governments'. In such a policy shift, the main objective is not "leveling up" the regions but instead, creating a competitive environment within the regions to enhance the 'economic dividend' to maximize the public welfare.

It is not possible to consider the Istanbul Metropolitan Area separate from these developments. It will be accurate to examine the vision of the 1/100,000 scaled Istanbul Metropolitan Plan, which was approved in 2009, related to industrial areas and -in particular- to shipbuilding regions within the framework of urban/regional competition. Main discussion topics could be; spatial size, site selection, hinterland, technological innovation, environmental conditions, technical and social infrastructure, institutional capacity, political atmosphere, legislation, economic development, its relations with the city and region in which its located.

2.1 The Shipbuilding Sector in the EU Negotiation Process

The European Union is an important social, economic and political area in which Turkey has desired to join since the Ankara Agreement signed in 1963. Although the process has provided Turkey with the membership status, there is a controversy on the date Turkey will become the full member of the EU. Especially in recent days, it is being noticed as the chapters of the accession process come up that the membership process is a very difficult path.

However, Turkey is recently making increasing efforts to reach the norms and standards of the EU in terms of development dynamics. One of the negotiation chapters in Turkey's accession process is on "Enterprises and Industrial Policies". [URL-1] Despite a competitive industrial sector is targeted, the Turkish shipbuilding sector's share in the world is below 1% [URL-2].

The shipbuilding sector is one of the important and strategic branches of industry for EU member and candidate countries. More than 300 shipbuilding zones exist throughout the EU. Around 40 of these shipbuilding play an active role in the global market for large sea-going vessels. The shipbuilding sector in the Europe creates 140.000 direct and 400.000 indirect jobs.

Around 80% of the world shipbuilding sector is concentrated in Japan, South Korea, China and EU countries. [URL-3] This situation causes the development of a strategy directed especially towards the Asia-Pacific countries in the EU. In general, the EU has already defined the strategy to form "the most competitive economy of the world" with the Lisbon Declaration.

The EU's target for shipbuilding zones is as follows; "The EU is seeking to rationalize the shipbuilding industry by means of a controlled cut-back in capacity (a quantitative adjustment). While the workers made redundant should be retrained, the EU should obviously maintain some reserve capacity for strategic, social, economic and industrial reasons. Assistance for existing shipbuilding should concentrate on modernizing and

diversifying production machinery and on improving productivity and competitiveness (a qualitative adjustment).” [URL-4]

Therefore, what needs to be understood is that, in order to improve competitiveness, objectives that are in accordance with the EU and aimed at ensuring the modernization, efficiency and rationality of shipbuilding zones should be set.

2.2 Development Plan IX (2007–2013) and the Shipbuilding Sector

When settlements are planned in countries who principally adopted the development plan and making legal regulations accordingly, the area is assessed by considering employment possibilities in that area and the natural and cultural characteristics of the environment. The area is generally assessed with its characteristics, its importance and potential in the country, its functions, and the quality and potential of the future labor. Decisions related to the development of a specific region in plans depend on the region’s natural characteristics, social structure, and economic activities located in it.

Turkey has already included the principle of planned development in its legal regulations and prepared development plans accordingly, the first of which was prepared by the State Planning Institute (SPI). Today, the Development Plan IX which covers the period of 2007–2013 is in effect.

The legal and institutional structure of a plan hierarchy starting from macro plan principles that define the order of the country and direct investment decisions has already been established in order for Turkey to develop through regional-level studies and decisions in line with Turkey’s general settlement objectives.

High level plan principle decisions are determined through five-year development plans and during these plans are prepared; Special Expert Commission Reports give advices to the state sector and investors about the priorities and characteristics of the main principles in plans and special investments

In this respect, the shipbuilding activities located in the Istanbul Metropolitan Area and the shipbuilding and shipping sectors in the city of Yalova were analyzed and assessed in terms of high-level country plan decisions.

The SPI Development Plan IX (2007–2013) Shipbuilding Industry Special Expert Commission Report examines the current situation of Turkish Shipbuilding.

When the SPI Development Plan IX (2007–2013) Shipbuilding Industry Special Expert Commission Report (2006) is analyzed, it is stated that previous decisions are prevailing and new decisions will follow the same direction.

In the period of the Five-Year Development Plan VIII (2000–2005), it is stated that, based on the rapid increase in shipbuilding in the world and Turkey which started in 2002–2003, the capacity of shipbuilding has rapidly increased in the years of 2003–2004 (Fig. 1). Therefore, the Development Plan IX recommends several visional improvements towards increasing the global competitiveness of this intense activity in the sector.

The target “Establishment of higher capacity shipbuilding in order to increase shipbuilding competitiveness” was included in the Shipbuilding Industry Special Expert Commission Report.

	2003				2004			
	Delivery	%	New-Order	%	Delivery	%	New-Order	%
Turkey	155.440	0.29	400.000	0.38	293.000	0.51	650.000	0.70
World	53.100.00	100	104.700.000	100	57.400.000	100	93.100.000	100

Fig. 1: Values –in DWT- of delivered ships and new orders taken in the years of 2003–2004 in the world and in Turkey (Source: SPI, 2006)

As the above figure suggests, amounts of new orders and deliveries have increased both in numbers and proportion in recent years. It is inevitable for this increase to bring about capacity increase. Similarly, the projection that belongs to the period of the Development Plan IX suggests a linear increase in production until 2013 (Fig.2)

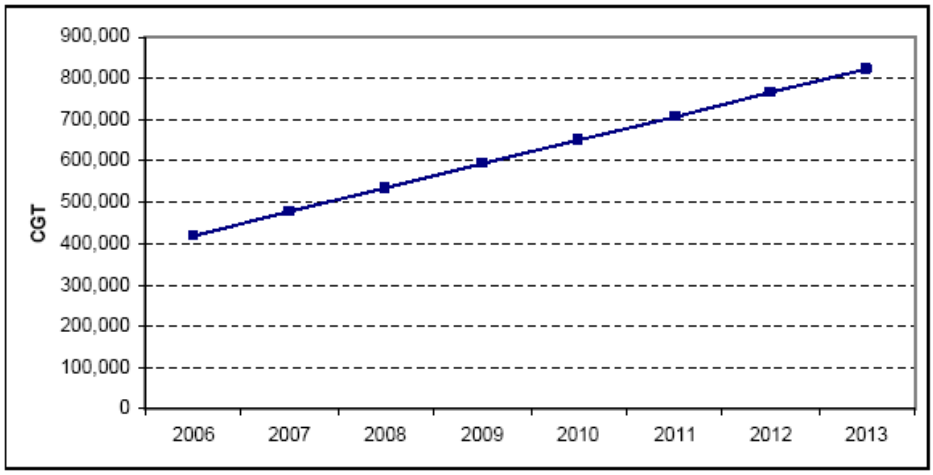

Fig. 2: The projection of ships that will be constructed in Turkish shipbuilding between the years of 2006–2013 in CGT. (Source: SPI, 2006)

Shipbuilding in Turkey operating in shipbuilding sector can be grouped under three headings: private sector shipbuilding, public sector shipbuilding and military shipbuilding. The most prominent one of the areas around which private sector shipbuilding clustered is the Tuzla District in the Marmara Region.

The Tuzla Private Sector Shipbuilding Zone was formed after; Tuzla-Aydınlı Cove was assigned as the "Shipbuilding and Subsidiary Industry Zone" by the decision of Council of Ministers Nr. 6/12421, dated September 22, 1969, sites were allocated to the entrepreneurs who would invest in the Tuzla Shipbuilding Industry Zone and the easement right were granted by the Ministry of Finance for 49 years.

Currently operating in the zone are 31 shipbuilding oriented firms, 13 wet docks, 1 dry dock, and 7 wood-fiberglass-steel vessel factory. In this zone, it is possible to construct ships up to 80,000 DWT and to dry-dock ships up to 300,000.

Due to increasing shipbuilding demands, firms who could not increase their capacities in Tuzla started to search for new shipbuilding areas. In order to meet the national and international demands in the coming period, creating these new investment areas is very important in terms of not only the added-value but also the employment opportunities it will create. The Shipbuilding Industry Special Expert Commission Report indicates that the cost of labor within the Main Entry Costs for 10000 DWT Chemical Tank Ship is around 20% of the total costs. Creating and developing new shipbuilding zones for the added value and employment opportunities it creates is included in development plans and reports (Fig.3).

Therefore, in the SPI Development Plan IX (2007–2013) Shipbuilding Industry Special Expert Commission Report (2006), "New Shipbuilding Areas and Places Demanded by Entrepreneurs" are specified. Among them, the demands analyzed and approved for Yalova are as follows;

"Shipbuilding Demands in Yalova:

- 1. Sefine Shipbuilding Co. Inc..; It is targeted to employ 750 workers and construct maximum 6,000 DWT ships.
- 2. Yalova Altınova Shipbuilding Entrepreneurs Corporation; It is targeted to employ around 4,000 workers in the shipbuilding to be established in the region by the firm composed of 40 persons/firms.
- 3. Gemak Shipbuilding Industry and Trading S.A.; It is planned within the scope of the project to employ 1000 workers and the yard to have maximum capacity to build 75,000 DWT.
- 4. Bayrak Shipbuilding Co. Inc..; It is planned within the scope of the project to employ 100 workers and the yard to have maximum capacity to build 15,000 DWT.
- 5. Boğaziçi Shipbuilding Co. Inc..; It is planned within the scope of the project to employ 1500 workers and the yard to have maximum capacity to build 50,000 DWT, the annual capacity to be 250.000 DWT/year, maintenance capacity to be 80,000 DWT, annual maintenance capacity to be 2.500.000 DWT/year.
- 6. Kaptan Marine Construction; Shipbuilding between 5,000- 100,000 DWT is targeted."

These demands imply an investment which is of capacity to employ around 8000 workers.

Fig.4: Illustration of new shipbuilding zones in Turkey. (Source: SPI, 2006)

2.2.1 Istanbul Metropolitan Plan and Shipbuilding Zones

The 1/100,000 scaled Istanbul Metropolitan Plan was approved on 15.06.2009. It is necessary to consider the developments with the metropolitan plan and changed legal regulations. After several regulations such as the 5216 Metropolitan Municipalities Law, 5393 Municipality Law and 5302 Special Provincial Administrations Law, Istanbul's city boundaries and Istanbul municipal boundaries are overlapped. Although this situation offers opportunities to the Istanbul Municipal Administration to control urban development dynamics, the possibilities to evaluate the city within its region are still limited. The lack of regional development and regional planning and the administrative approach which handles all investments at the city level are the main factors behind this situation.

Shipbuilding areas appear under the heading of industrial areas in the Istanbul Metropolitan Plan Report.

The item 7.4.5 of the report is about shipbuilding areas. The report states the following about Istanbul shipbuilding areas;

"Shipbuilding in Istanbul are composed of three main groups; private sector shipbuilding (The Shipbuilding Zone in Tuzla-Aydınlı Cove), public sector shipbuilding (Haliç and Camialtı Shipbuilding) and military shipbuilding (in Pendik). In the shipbuilding area in Tuzla which does not have the possibility to expand, does not have adequate infrastructure and causes environmental pollution; construction, modification and maintenance of transport and passenger ships, and yachts will be performed. Shipbuilding activities within this area will be rendered healthier and the volume will be reduced in the short and medium term, and these activities will be restructured in the long term by partially altering the function of the area. In the shipbuilding development area in Pendik-Güzelyalı located in the western side of the Tuzla Shipbuilding Zone and illustrated with the symbol "TG" in the plan, the production of only yachts will be performed and social and cultural facilities will exist. The Haliç (Golden Horn) Shipbuilding Zone (Taşkızak, Aynalıkavak, Camialtı and Haliç Shipbuilding) which has historical and architectural value will partially maintain its shipbuilding function through the maintenance and modernization of city line ferries and IDO (Istanbul Seabuses and Fast Ferries Inc) ferries; in addition, it will serve the function of a touristic museum in which shipbuilding techniques from past to present are taught and exhibited." [İBB, 2009]

It is understood from the plan that Tuzla, which is the only private sector shipbuilding area in Istanbul, will be rehabilitated, its volume will be reduced in the short and medium term, and its function will be altered in the long term. The Metropolitan Plan implies that the Pendik area, which once specified as the shipbuilding development area, will be used only for the construction of yachts. However, ship orders that Turkey receive are concentrated on ships that transport burden and chemicals.

The Istanbul Metropolitan Plan covers a total area of 545.300 ha, and a part of only 190 ha of this total area is designated for shipbuilding. These numbers are the indicator of the fact that the shipbuilding areas in Istanbul operate in inadequate spatial conditions.

When considered in this respect, the decision of the Istanbul Metropolitan Plan on shipbuilding areas is as follows;

- Creating areas for reinforcement services and cultural facilities in Haliç, Taşkızak and Camialtı shipbuilding.
- Rehabilitating the shipbuilding area in Tuzla.
- Forming the recommended shipbuilding development area in the Pendik-Güzelyalı District.

After these decisions, private firms operating in shipbuilding sector started to search for new shipbuilding areas in neighboring cities which have strong interactions with the Istanbul Metropolitan Area. Shores of Yalova, which is a city located in the southern part of Istanbul and was once a district of Istanbul, started to become the new investment sites for shipbuilding firms. This situation has created a dispute between residents of shores of Yalova and investors who are in search for a second shipbuilding area within Istanbul's area of influence.

2.2.2 Yalova Master Plan and Shipbuilding Zones

In line with the directive principles set by the Undersecretariat for Shipbuilding Sector and Maritime Affairs and in line with the investment principles set by the Five-Year Development Plan IX; establishment of shipbuilding investments in Yalova is projected in the settlement decisions of the 1/25.000 scaled Yalova Master Plan.

In the 1/25.000 scaled Master Plan; in line with the shipbuilding activities projected in the Five-Year Development Plan IX (2007–2013), approximately 4500 meters of shoreline within the boundaries of the city of Yalova is designated for shipbuilding sector. In addition to shipbuilding zone the plan also offered a special landfill zone on the seashore to create sufficient place for shipbuilding related services.

It is seen that the area between the sea and the Karamürsel – Yalova Highway is designated for the function of "Shipbuilding Area", and the two sides of the highway are designated for "KSA-Urban Service Area".

When the plan is considered as a whole, it is observed that the eastern part of the plan (the east of Yalova city centre) is designated mostly for industry, urban service area, development housing area, shipbuilding, airport, dock; and the western part of the plan (the west of Yalova city centre) is designated mostly for tourism and tourism + housing. It was observed that the assessments done within this context were documented by the Environmental Impact Assessment Positive Report.

Land reclamation works for shipbuilding activities have been approved by the Ministry of Public Works and Settlement. The 1/25.000 scaled Master Plan has been approved by the City Council Decision after assessments through the relevant investor and ministry opinions.

This region is an attractive region for investors due to the facts that the government grants investment allowances and tax exemptions for shipbuilding works in this region, that the Marmara Region has skilled labor power and specializations on ship construction, and that several special expert groups exist in the region.

The Shipbuilding Industry Special Expert Commission Report particularly indicated that, in terms of safe and efficient working conditions Tuzla Ship Construction Areas located in the Istanbul Metropolitan Area is seriously inadequate.

The demand for the sector's output mainly comes from abroad. It is observed that, due to the region's skilled labor potential based on expertise and the suitability of the sea shore, the shipbuilding investment decisions which will provide employment to the region are in conformity with macro plan decisions.

The Tavşanlı Municipal Council's decision Nr. 2005/22 and dated 01.07.2005 reads as follows for the 4500-m coastline; "our municipality has decided by the majority of votes that the area in which the properties numbered … are located shall be rendered a non-housing area and the municipal plan shall be changed as a yacht and shipbuilding area …". With this decision, investments for around 36 shipbuilding started in the region. As can be seen in the decision of the municipality, the coastal area which was once designated for

housing was rendered as a shipbuilding area. This amendment was taken to court by the local people and non governmental organizations. Arguments of those who object to the amendment are centered on several points;

- High number of workers will come to the region after the establishment of shipbuilding areas and the local social structure will change accordingly,
- The coastal part which is used for second-houses will no longer be used for this purpose,
- The local people's relationship with the sea will end,
- Shipbuilding firms will spread into other areas,
- Other industrial activities will settle in the region which will be an inconvenient case for Yalova which is located in a first-degree seismic zone.

3 LEGAL REGULATIONS IN TURKEY RELATED TO COAST USE AND THE SHIPBUILDING SECTOR

Within the framework of decisions on the definition and use of shores in Turkey, the following comments can be made about the Yalova Shipbuilding Zone.

Different courts understood coast in different ways. While the 7th High Court made the decision that "Coast is a public good of social-character", the 4th High Court decided that "Coast is an economic resource".

While determining how the society uses (mode of use) and realizes (mode of realization) this resource, the factors that should be taken into consideration are the connection of the coast with the built-up area, its position, the character of the infrastructure needed to realize it, its accessibility, its geometry, and the ecological character of the environment. This assessment should be based on the contemporary planning approach and be done through Ecological, Social and Economic parameters in line with the Sustainable Planning approach.

In the Coast Law Nr. 3621 and dated 4.4.1990, The "Aim" part in the first article is as follows:

Aim:

Article 1 - The purpose of this regulation is to set the procedures for the settlement of shoreline in seas, natural and artificial lakes, and streams, for the use and protection of the shores and to set planning and implementation procedures for lands acquired by filling and saving, and for the coast-lines that are the extensions of the seas and the streams.

The scope defined in the second article is as follows;

Scope

Article 2 - This regulation covers the seas, natural and artificial lakes, and streams and shorelines, opportunities and provisions of using these facilities for public-interest, the procedures for planning and construction in the coasts and shores, acquisition and use of land by filling and reclamation, the procedures which define the establishment, powers and duties, working principles of the Shoreline Adjustment Commission and the explanatory notes for enforcement of Law.

As is seen, the coast law includes terms of protection and use for the public interest in the areas defined as coast.

In addition, the law states that structures and facilities that can not be constructed elsewhere due to the characteristics of the activity such as shipbuilding, workshop for separating ship apart, water products production and raring facilities, yacht port, shelter fishermen and yacht docks can be constructed.

It becomes evident after assessing the situation about the shipbuilding areas in Yalova with respect to the regulations about the definition and use of coast that important issues are;

- 1. The shipbuilding area is supposed to satisfy the demands related not only to ship construction but also to ship maintenance and repair,
- 2. Shipbuilding do not create an intense traffic burden for the environment it is located in as Container Harbors do, and therefore, the function of a shipbuilding should not be confused with the function of an harbor,

- 3. When selecting location for shipbuilding, it is needed to prefer locations where ship traffic is intense and skilled labor exists by considering the possibility of need for repair,
- 4. Moreover, due to the location of the new shipbuilding area, it requires security organizations such as marine fire department, and therefore, it should be linked with the shipbuilding in Tuzla and Gölcük,

In this respect, designating the sea side of the shipbuilding zone as shipbuilding reclamation area conforms to city planning principles when considered according to macro plan principles and the characteristics of the region. There exist several main approaches and principles used in development of urban areas.

The idea that growth and development of a city is dependent on several principles is discussed in the planning literature. Some of these principles which are included in the public development planning law require plans to be consistent with and linked to each other. This can be briefly explained with the principle; 'Integrity should be established between the micro and macro plans for the area that is planned to be developed and the structure of long-term plans' (principle of consistency between plans).

It is observed that the shipbuilding area seen in the 1/25.000 scaled Yalova Master Plan has been developed as part of the Five-Year Development Plan IX and the Shipbuilding Industry Special Expert Report prepared by macro scale SPI and ratified by Turkish Grand National Assembly.

In order for the shipbuilding sector to maintain its functions such as training, maintenance, repair and construction; by considering the measures related to the shipbuilding sector taken in the 1969 Program, the area was designated as the "Private Sector Ship Industry Area" by the decision of Council of Ministers Nr. 6/12421 and dated 22.9.1969; with the determination of the Aydınlı Harbor near Tuzla Istanbul as the shipbuilding industry area for the private sector. Since that year, the Pendik District has been concentrated on shipbuilding sector and its supplier industry.

However, since the designated area is not adequate in terms of changed demands and conditions; demands for the maintenance and repair of the coast for shipbuilding and naval vessels, or in other words, demands for the economic use of the coast have increased.

It is known that plots have been classified as shipbuilding area, boat yard and mounting area in the construction plan prepared for Tuzla. In the Pendik District, areas for vessels' maintenance, installation and repair facilities are limited. New areas are highly needed additional to the current shipbuilding areas operating with excess capacity due to increased demand.

For the rapidly developing maritime sector, in order for the private sector which is rapidly advancing and increasing capacity to satisfy the production demand coming from abroad and to realize increasing maritime investments in rational environments, shipbuilding activities are not included but only an area for the Istanbul Harbor is designated in the Five-Year Development Plan, the Shipbuilding Industry Special Expert Commission Report and the 1/100 000 scaled Istanbul Metropolitan Plan

Planning works related to ship construction, on the other hand, are observed mostly in macro scale 1/25.000 scaled plans for Sakarya, Zonguldak (Ereğli-Alaplı) and Yalova.

Geographical closeness of technical infrastructure, railways and highways necessary for the maritime sector, easy accessibility to energy, appropriateness of the sea in terms of its harbor and berthing, developed industry and supplier industry related to the maritime sector, and the district's status as the center of maritime education of the country indicate the fact that the region strongly supports this sector.

Since the investments planned in the city of Yalova are in conformity with the maritime sector and since this potential and labor force is very close to the skilled labor in the metropolitan area which is at one-hour distance, this proposed area is open to easy development.

When assessed through the macro plan principles, presence of qualified labor in the region and the current industrial positioning, it is concluded that the area designated for shipbuilding function by the 1/25.000 scaled Yalova Master Plan based on the SPI decisions is a very suitable area for large-scale shipbuilding, maintenance and repair.

4 CONCLUSION

- In the vision of the Istanbul 1/100.000 scaled Metropolitan Plan for 2023, while a transition to an economy established upon trade and services based on science and technology is projected, no assessment exists on industrial infrastructure.
- Functional changes are projected for the near future about Istanbul shipbuilding areas.
- However, there is no decision on how and under what conditions this transformation will be actualized.
- Private sector operating in the shipbuilding industry started to search for new areas in conformity with the national decisions in the region along with the Tuzla Shipbuilding Area which fails to meet the demand.
- Within this context, the coastal part of the city of Yalova was selected for shipbuilding investments.
- In the Yalova 1/25.000 scaled Master Plan, 4.5 km sea front was designated as shipbuilding area. New discussions arose after the designation of these areas as shipbuilding areas which were once designated for housing.
- Controversies between local administrations, investors and NGOs were taken to court.
- The decisions that court will make will be highly determining in terms of increasing the country's competitiveness and utilizing the added-value to be created for national and regional economic development.
- However, in the planning process in which community involvement and negotiation processes are inadequately functioning; it is apparent that these discussions will not yield desired results and there exists a need for a sustainable metropolitan strategy and an innovative planning approach in order to increase the country's competitive capacity.

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New Communication Tools and eParticipation: Social Media in Urban Planning

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1 ABSTRACT

The Internet and new Web2.0 tools are changing the way we communicate in an unprecedented way. Weblogs, Microblogs (like Twitter), and social media in general enable worldwide, real-time, multimedia communication with low barriers to entry. But in what ways are urban planners taking advantage of these new communication channels? This paper discusses these new opportunities as well as the barriers they present, and it makes recommendations for using social media in the urban planning processes.

It begins with a theoretical overview about participation in urban planning, eParticipation, and social media. In its second part, the paper analyses six real-world projects to study their social media strategies. Those examples will be used to identify best practices and reflect on the usefulness and effectiveness of various social media channels in the context of the planning projects to which they are applied.

2 THEORETICAL OVERVIEW

2.1 The Internet and Changes in communication

Technological development over the last decades has radically changed our communication patterns and led to the creation of what has been called the Network Society (CASTELLS 2000a). The Internet and the rise of information and communications technologies (ICT) are the basis for a new technological paradigm which has caused a fundamental shift in our society toward “The Internet Galaxy” (CASTELLS 2005). “Mass communication used to be predominantly one-directional. However, with the diffusion of the Internet a new form of communication has emerged, characterized by the capacity of sending messages from many to many, in real-time - or chosen time, and with the possibility of using point-to-point communication, narrowcasting or broadcasting, depending on the purpose and characteristics of the intended communication practice” (CASTELLS 2009, 55).

With the rise of the Internet in general and more recently with the emergence of Web2.0 - web applications that facilitate interactive information sharing, interoperability, user-centered design, and collaboration on the World Wide Web - the costs of global publishing have collapsed (SHIRKY 2008, p. 9). Easy-to-use communication and publishing technologies have caused a shift from predominantly one-to-many to many-to-many communication, challenging the dominance and even the existence of “old” media like television, newspapers, and radio. Today, the Internet provides a low-threshold method of communciation between nearly everybody, worldwide. Whereas real-world communication is limited by distance and time, online tools enable many forms of instant, global, and nearly permanent communication, so that ommuncations are stored online and easily acessible over the long-term by a broader audience (SHIRKY 2008, 87 ff.). “We are living in the middle of a remarkable increase in our ability to share, to cooperate with one another, and to take collective action, all outside the framework of traditional institutions and organizations” (SHIRKY 2008, 20 f.). Never before have people enjoyed the ability to collaboratively collect, analyze, and publish information on such a mass scale.

But, “the invention of a tool doesn't create change; it has to have been around long enough that most of society is using it. It´s when a technology becomes normal, than ubiquitous, and finally so pervasive as to be invisible, that the really profound changes happen, and so for young people today, our social tools have passed normal and are heading to ubiquitous, and invisible is coming” (SHIRKY 2008, 105).

Although the Internet at first was mostly used as an information medium, our developed societies now embrace it as a participatory medium through which to connect, communicate, discuss, and participate in nearly every realm of daily life, from home, to work, to politics. The Internet of today has become “one of the most powerful organizing tools in history” (Bittle et al. 2009, 1).

3 EPARTICIPATION AND WEB2.0 IN URBAN PLANNING

3.1 Web2.0 and social media

The term Web2.0 essentially reflects the current state of the Internet as a truly interactive medium. It describes the shift from top-down, one-way communication to a vastly more participatory medium. Through this 2.0 version of the Internet, users take part in the production of online content: They publish their thoughts on blogs, upload and share videos and photos, and connect with friends using social networks like Facebook, all of which are typically easy to access and free to use. These many-to-many communication tools are commonly referred to as social media, "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content" (KAPLAN 2010).

Web2.0 has kicked off the digital decade (LOBO 2009) and today a vast majority of people use the Internet as a part of their everyday life. In the United States, 74% of citizens use the Internet (Pew Research Center 2010); in Germany, nearly 70% are regular users (Initiative D21 2009, 10). Furthermore, statistics reveal a penetration of nearly all social groups and ages. Today, the Internet is a communication medium used by the majority of citizens in western societies.

3.2 eParticipation

Recently, our field became embroiled in a heated discussion as to whether the Internet could be used to conduct meaningful public participation. Today, we have mostly moved past this discussion, as many successful participatory projects online have been conducted and online engagement approaches have become a valuable tool. Though it's true that varying degrees of computer skills still require face-to-face alternatives, eParticipation is here to stay. In fact, the amendment in 2004 of the German Town and Country Planning Code (§3 in combination with §4a BauGB) has only emphasized the importance of digital technologies in public participation processes (STREICH 2005, 154).

eParticipation refers to the participation of citizens and stakeholders in decision-making through the instrument of information and communication technologies, mainly in government and governance. "eParticipation describes efforts to broaden and deepen political participation by enabling citizens to connect with one another, and with their elected representatives and governments, using Information and Communication Technologies (ICT). Thus, eParticipation can satisfy both the citizens' need for being both heard and involved in the democratic process, and governments' need to devise new mechanisms for promoting and encouraging public consultation" (Tambouris 2007, 5).

eParticipation offers new and effective ways to present, discuss, and visualize ideas and proposals. The digital infrastructure allows planners to easily save and aggregate datasets for ex-post analysis (statistics about activity, collaboration, interaction, group-processes, etc.) and to publish the results.

3.2.1 Different levels of interaction

To categorize and analyze the different categories of interactivity, we will refer to the three different levels as defined by the OECD (OECD 2001):

- Information: A one-way relation in which information is produced and delivered
- Consultation: A two-way relation in which feedback from the users to the project is provided
- Participation: A relation or partnership that allows diverse discussion to shape plans and develop new concepts

The pressing question today is how are planners leveraging the power of social media for urban planning processes? Because urban planning has always been based on the gathering and exchange of information and—as a democratic process—on communication between different stakeholders, a change in the method of communication has a significant impact on decision-making throughout the process.

3.3 Popular Social Media Channels

3.3.1 Twitter

Twitter (www.twitter.com) is a microblogging-service that allows users to publish short messages—140 characters or fewer. It launched in 2006 as a simple way publish and share SMS (short text messages) via the Internet (SARNO 2009). Users have to sign up for an account to publish updates or "tweets," which are publicly accessible the instant they are sent. Updates can be sent via phone, Web interface, or a variety of third party applications, including other Web applications. Others can subscribe to (that is, "follow") the stream and answer (via @useraccount) or forward interesting messages (a so called retweet, or RT) to their followers. Limited by the number of characters, messages typically contain snippets of information and a link to other URLs for more information. Group discussions reference a shared hashtag—each user includes the agreed upon hashtag (#hashtag) in their posts and others can simply follow all posts that contain this piece of information. This naming convention allows groups to easily interact without much coordination, for example at conferences or around elections. All that is required is an agreement on a shared hashtag. Because updates are publicly accessible and the method of networking with others by simply following, responding, and interacting with them openly is a simple one, Twitter has become popular as a simple tool for projects to interact with their respective target audience.

Other similar providers exist, for example the open-source service identi.ca, which supports the OpenMicroBlogging-standard (http://identi.ca/), but none has reached Twitter's popularity.

3.3.2 Facebook

Facebook (www.facebook.com) is a Social Network Service (SNS) that allows friends to communicate and share information, images, and videos. Every user creates a profile, with his or her name, age, interests, and other personal information and then posts status updates or images about their life. By default, profiles and updates are only available to friends and not to the general public. Users add friends to their account by searching for their names or through others they are already friends with (their Social Graph). Once the other person accepts the virtual friendship, both users have access to each other's information and both of their social graphs or networks have grown. Friends can communicate via messages, status updates (visible on their "wall," a real-time activity-stream), and chat. They can also share photos and post events. It´s easy to use and free. Compared to Twitter, user information is typically closed and only accessible to friends, though

Every user has the option of creating or joining public groups. Normal groups allow users who are not friends to collaborate with others who share an interest in the same topic. Pages, or fan groups, are typically organized by one user and are used to represent an NGO, organization, or similar institution. Ordinary users demonstrate their support or interest by becoming "fans." Both types of groups allow group administrators to send messages to all of their members and to use other organizing features. Most groups are member-focused, whereas the communication in fan groups is more one-directional (from organization to fan).

Other popular SNS are Myspace, LinkedIn.com, and Xing.com.

3.3.3 Flickr

Flickr is an image-sharing Web site, which today hosts more than 4 billion photos[1]. Flickr was developed to share personal photographs with others online (SHIRKY 2008) and can be described as an online community of photo enthusiasts. It is also used by bloggers to host images which they embed on their Web sites. Users sign up and create an account with some personal information that is accessible as a public profile to others (similar to Twitter). Uploaded photos can be organized with tags to enable easy searches by topic (e.g. subject, event) and can also be geo-referenced. This makes Flickr a powerful photo-collaboration tool. For example, images from the same event by various photographers can be accessed via a simple tag search. The same is now possible with maps, whereby Flickr allows users to browse pictures that have been taken in their neighborhood. Flickr offers a free account with limited data and an unrestricted pro-version.

Other popular photo-sharing Web sites include Photobucket.com, Picasa, and Panoramio.com.

[1] http://blog.flickr.net/en/2009/10/12/4000000000/

3.3.4 Youtube

Youtube is a video-sharing Web site where users can upload and share their own videos. The platform is open for everyone to watch or contribute videos. Users have to register in order to upload videos and create a personal profile (similar to Twitter and Flickr), a so-called channel. Youtube can be regarded as an online community, because user can pick favorite channels of subscribe to other users. The service allows users to upload unlimited videos and or to integrate videos to other Web sites (for example, their blogs or Twitter or Facebook accounts) through a piece of html code or via URL.

Other popular video-sharing services include Blip.tv, DailyMotion.com, Vimeo.com, and Brightcove.com.

3.3.5 Overview

All of the services outlined above have become quasi-standards in their particular niche. They share a set of commonalities, like free use, an easy learning curve, and the ability to comment on others' content.

	Twitter	**Facebook**	**Flickr**	**Youtube**
Learning Curve	Easy	Easy	Easy	Easy
Cost	Free	Free	Free (limited webspace)	Free
Ability to Comment	Anyone on their own page	Only Friends	Anyone	Anyone
Detail of Personal Profile	Low	High	Medium	Medium
Public Access to Profile	Yes	Limited	Yes	Yes
Level of Connectivity	High	High	Medium	Medium
Real-time Status Updates	Yes	Yes	No	No
Barriers to Registration	None	None	Yahoo-account needed; Cost for pro account	None

Fig. 2: Overview of the different Social Media Services used in the researched projects (own depiction).

4 EXAMPLES OF PLANNING PROJECTS LEVERAGING SOCIAL MEDIA

To analyze the use of the new social media channels in Urban Planning, we will take a closer look at six examples. We have selected these examples because we feel that they best exemplify today's use of social media in planning projects. We chose three top-down-initiated projects and three bottom-up projects to compare the differences. Because the sample is so small, the results are intended to give a general overview, rather than scientific results. This said, we do feel there's a need for more research in this realm, and we hope that our paper will in some small way inspire further discussion. To our knowledge, there have been no other attempts to analyze the role of social media in urban planning. There are, of course, a number of excellent examples of how to use dedicated online platforms for public participation. However, our paper will focus solely on the use of social media channels for public participation. It is not our intent to analyze the outcomes of eParticipation in urban planning in general.

To get a better sense of how and how effectively social media channels are used in each planning project, we analyzed a set of indicators that include the number of followers/fans/subscribers, the activity of the host (posts, video-uploads, photo-uploads, moderation of discussions), and the responses of participants (comments, video-uploads, photo-uploads, participation in discussions). The different levels of interactivity were classified into three categories: high, medium, and low. Interactivity is understood as the bi-directional communication between different project team and their participants.

4.1 Top-down examples:

In the following pages, we present three top-down initiated projects and then contrast these with a trio of bottom-up projects, all of them initiated by different groups or organizations.

4.1.1 GO TO 2040: Metropolitan Chicago's official comprehensive regional plan

Fig. 3: Screenshot of the main Web site of the GO TO 2040 project

GO TO 2040, the official comprehensive planning campaign for metropolitan Chicago, was launched in August 2009 by the Chicago Metropolitan Agency for Planning (CMAP) and makes extensive use of Social Media to support the planning process. The GO TO 2040 processes aims to "develop a preferred future scenario," which is "based on residents' feedback...and on quantitative analysis of...regional indicators." The preferred future scenario is used to develop strategies for the official comprehensive regional plan for metropolitan Chicago.

To get involve residents in the process and to attract them to the many workshops in the region, the project uses a variety of social media channels in addition to its main Web site. These channels include Blog, Twitter, Facebook, Flickr, and Youtube, all of which are linked from the campaign's Web site. According to Anne Holub from the CMAP, the biggest challenge "was acquiring new followers across social networking platforms" (HOLUB 2009).

	Twitter	Facebook	Flickr	Youtube	Weblog
Followers/Fans	661 followers, featured on 83 lists	277 Fans	36 contacts	5 subscribers	Not available
Project Activity	772 tweets, direct responses to followers	3 uploaded videos, 1 photo album	6 albums (135, 113, 41, 30, 25, 23 visits)	33 uploaded videos (up to 982 views)	Not available
Responses	Many @responses, many RTs, shared links and direct interaction	Few comments and votes on the wall	Few comments	No comments	Few comments
Fan Activity	n/a	2 uploaded fan photos, 0 fan videos	n/a	4,491 visits	Not available
More	n/a	Event calendar	n/a	n/a	Addthis.com bookmarks
Summary of Interactivity	High	Low-Medium	Low	Low	n/a

Fig. 4: Overview of analysis of the grade of interactivity (own depiction).

4.1.2 East Baton Rouge Comprehensive Plan, futurebr.com

Fig. 5: Screenshot of the project's main Web site

The "FUTUREBR" Web site was launched in December 2009 to support the Comprehensive Planning process for East Baton Rouge (EBR), Louisiana, which replaces the old comprehensive plan. A project of the City of Baton Rouge and the Planning Commission of the City, it seeks "to shape future growth in the city and parish over the next 30 years. This project is based on an inclusive, parish-wide process to craft a new vision, policy framework, and implementation strategies that reflect the needs and aspirations of parish citizens. FUTUREBR will guide the physical development of the city and provide a framework within which

individuals, businesses and public officials can make decisions that are consistent with the community's vision for the future."

Participation is open to residents and organizations in the region, which can take part in online discussions or workshops. The project has a central Web site, a blog with project updates, and a social media presence on Twitter and Facebook. Furthermore, visitors can subscribe to newsletters and notifications via Email.

	Twitter	**Facebook**	**Blog**
Followers/Fans	18 Followers, featured on 1 list	247 group members	Not available
Project Activity	0 tweets	9 videos, 11 photos, No answers to the discussion	6 posts in 4 months (from Dec. 2009 to Mar. 2010)
Responses	No @ responses, 2 tweets about the project	- 7 foreign posts at the wall - 1 post at "discussions" and 0 responses	No comments allowed
Fan Activity	n/a	- 2 fan photos - 1 discussion started	n/a
More	n/a	n/a	n/a
Summary of Interactivity	Very low	Medium	Very low

(Disclaimer: This project just got underway, and it is likely that these numbers will increase.) Fig. 6: Overview analysis of the grade of interactivty of the project FUTUREBR (own depiction)

4.1.3 PLANitulsa – planitulsa.org

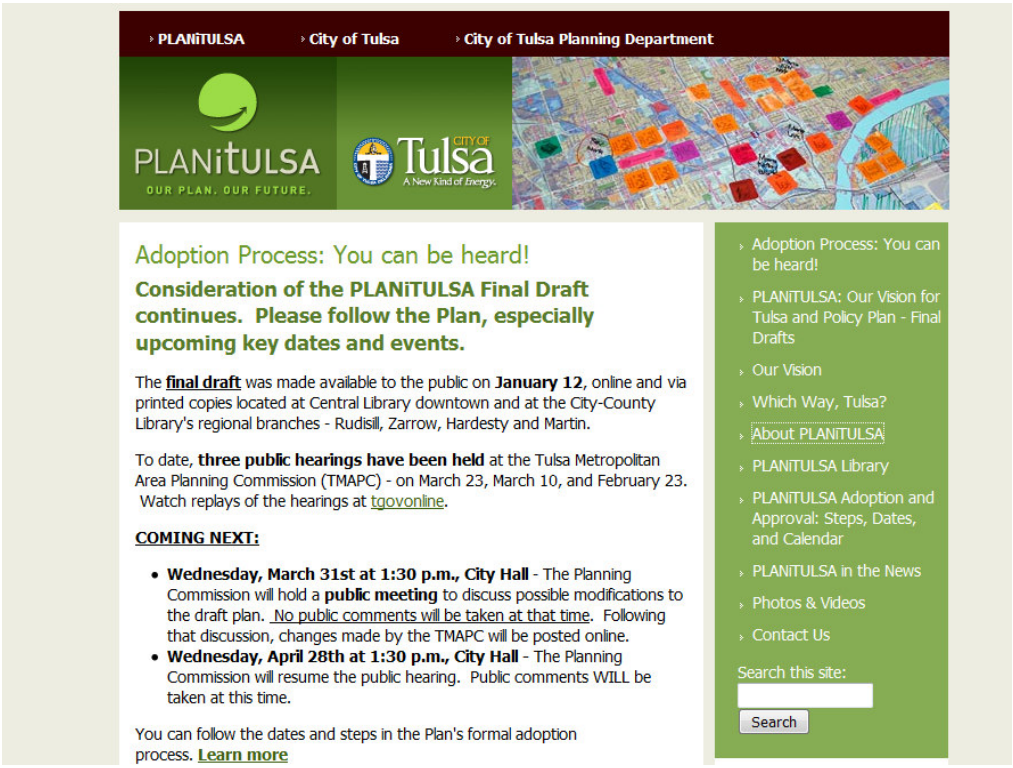

Fig. 7: Screenshot of the main Web site of PLANiTULSA.

PLANiTULSA is a project by the City of Tulsa, Oklahoma, to update the city´s Comprehensive Plan. The "Vision for Tulsa lays out concepts for how the City of Tulsa will look, function, and feel over the next 20-30 years. This vision is the guiding document for Tulsa's comprehensive plan update, PLANiTULSA, and

describes the kinds of places, economy, housing and transportation choices, parks, and open spaces that the city's policies should be designed to create." The planning department of Tulsa launched the Web site in April 2008, hoping to involve residents in the process through the Web and public workshops. Social media channels on Twitter, Facebook, and LinkedIn were used to engage and inform residents.

	Twitter	Facebook	LinkedIn
Followers/Fans	2100 followers (But this is the city's account, not the project's)	923 fans	107 members
Project Activity	0 tweets, no interaction with followers	6 moderated discussions with responses from project members	5 moderated discussions
Responses	2 @responses, some retweets of the project	Few votes and comments on the wall	9 comments to discussions
Fan Activity	A few followers used the hashtag #PLANiTULSA to send updates from meetings	0 fan photos, 0 fan videos	None
More	n/a	Event Calender	n/a
Summary of Interactivity	Low	High	Low

Fig. 8 Overview analysis of the grade of interactivty at project PLANiTULSA (own depiction)

4.2 Bottom-up examples:

4.2.1 Megaspree

Fig. 7: Screenshot of the main Web site of the bottom-up movement Megaspree.

Megaspree is a bottom-up citizen initiative formed in 2009 when its founders were organizing a protest march against the Mediaspree project, a large waterfront real estate development in East Berlin, Germany. The movement criticized the lack of social infrastructure and public spaces, as well as the project's planned displacement of subculture and low-income residents. The biggest success of the citizen movement was a public petition for a referendum in 2008, which was initiated by Mediaspree-Versenken[2], during which more than 30,000 citizens of the district of Berlin Kreuzberg-Friedrichshain voted 87% against Mediaspree. The movement is probably one of the most successful citizen-activism projects in Berlin in recent years. The initiative used a number of social media channels to engage its supporters: blogs, Twitter, Myspace, and Facebook.

	Twitter	**Facebook**	**Blog**	**Myspace**
Followers/Fans	220 Followers	2892 fans	Not available	2312 friends
Project Activity	131 tweets, no interaction with followers	- 6 videos - 8 albums	30 posts in 9 months (from Jul. 2009 to Mar. 2010)	Blogposts, 3 videos
Responses	No @responses, no interaction with followers	A lot of comments on the wall	Few comments	A lot posts, but only few about the project
Fan Activity	n/a	- 12 fan photos - 1 fan videos	None	Some votes, few comments
More	Using Twitter API to allow citizens to tweet visions and fears (barely used)	n/a	n/a	n/a
Summary of Interactivity	Low	Medium/High	Low	Low

Fig. 8: Overview analysis of the grade of interactivity at project Megaspree (own depiction)

4.2.2 Canal Connection, canalconnection.com

Fig. 9: Screenshot of the main Web site of the bottom-up movement Canal Connection.

[2] Translates to "Sink Mediaspree"

Canal Connection is an interesting example of a citizen-driven project in support of urban development. In Oklahoma, MAPS 3 is a tax-increase initiative to fund future development projects, started with recent MAPS initiative funding. The Canal Connection initiative aimed to add a canal extension and bridge to the proposed MAPS 3-funded convention center, to connect it to their neighborhood. “Bricktown is the face of Oklahoma City, and must be tied to future downtown development conveniently and safely.” The project is coordinated by the “Bricktown Association in cooperation with multiple groups” and has organizational support of three local associations. The Bricktown Association “operates as a voluntary association whose primary goal is to promote the businesses in and around Bricktown and the entertainment district as a whole.”

	Twitter	**Facebook**	**Blog**
Followers/Fans	199 Followers, featured on 13 lists	7665 fans (Not just project related – Bricktown Association)	Not available
Project Activity	12 tweets, 1 @responses, no interaction with followers	Many comments and votes	No comments allowed
Responses	2 @responses, 1 RT	3 albums	Rarely used, just 6 blog posts overall
Fan Activity	n/a	2 fan photos	None
More	n/a	Event announcements	n/a
Summary of Interactivity	Low	Medium	Low

Fig. 10: Overview analysis of the grade of interactivty at project Canal Connection (own depiction)

4.2.3 Chattanooga STAND, chattanoogastand.com

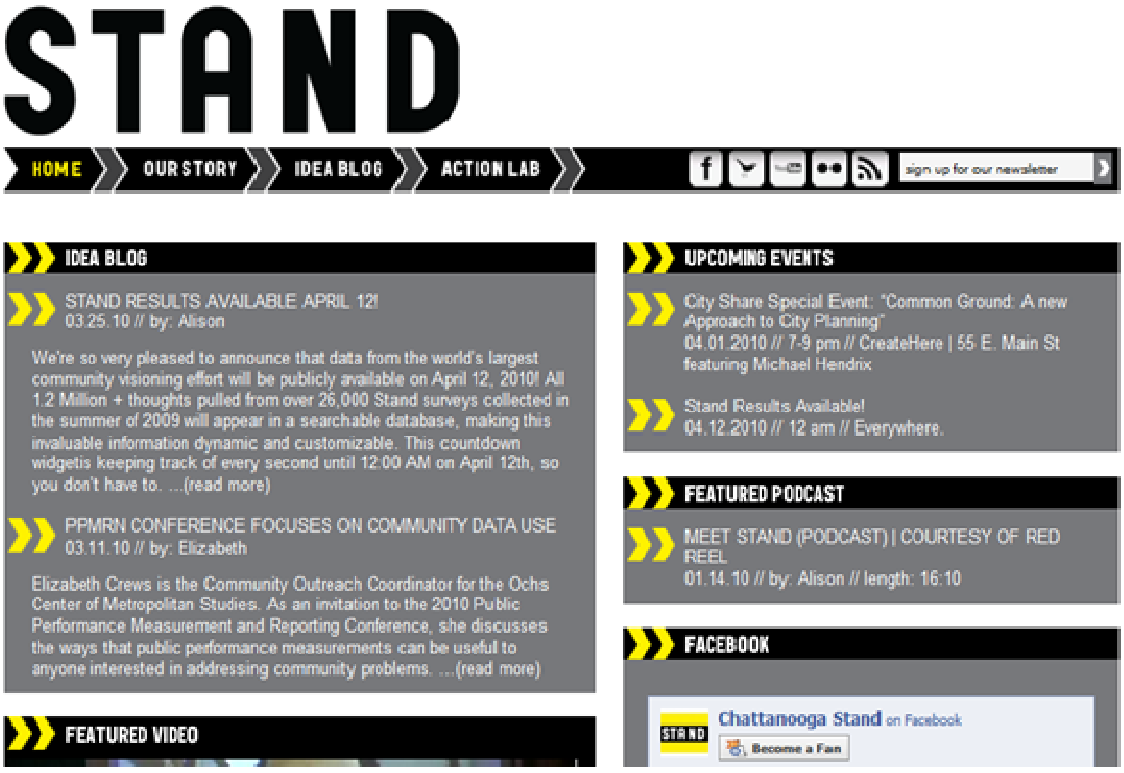

Fig. 11: Screenshot of the main Web site of the bottom-up project STAND

STAND is a community visioning effort "to engage community members to express their ideas for the future, organize around common purposes and translate vision into action." In 2008, different groups of citizens launched STAND "with a four-question survey and an initial goal of collecting responses from residents across the Chattanooga region," which ended up netting more than 26,000 responses. "The results of Stand's survey effort will be released to the public in early 2010. From there, STAND will encourage, enable and facilitate as many people in as many places as possible in creating their own changes to benefit not only those who filled out a survey, but the entire region—and like-minded cities everywhere."

	Twitter	**Facebook**	**Youtube**	**Flickr**	**Idea Blog**
Followers/Fans	537 Followers, featured on 26 lists	1,714 fans	0 subscribers	1 contact	Not available
Project Activity	566 tweets, many @responses and direct interaction with followers	Some comments and votes on the wall	no comments	no responses	no comments
Responses	Many @responses, many RTs, shared links and direct interaction	34 albums, 8 videos, no discussions	3 uploads	1 group (2 members)	42 posts in 11 months
Fan Activity	n/a	2 fan photos uploaded	Views: 656, 16, 12	n/a	n/a
More	n/a	Event calendar	n/a	Integration of Flickr photos on the Web site via Flickr feed	Additional Action Lab Blog with integrated videos from createhere.org (via vimeo.com)
Summary of Interactivity	High	Medium	Low	Low	Low

Fig. 12: Overview analysis of the grade of interactivity at project STAND (own depiction)

5 CONCLUSIONS

Each of these projects deploys a different (though often overlapping) set of social media channels and each has its own way of utilizing those channels. Variations in the level of interaction (comments, votes, discussions, fan uploads) and the spread of the participants (number of fans, lists, subscribers, followers) are enormous, not just from project to project, but also between the different channels within each project. Twitter and Facebook are the most commonly used channels and most effective tools. The following diagram summarizes the different uses:

	Top-down	Bottom-up
Twitter	Most commonly used as a push medium for updates, but used effectively by Goto2040 to build a participant base.	Most commonly used as a push medium for updates. But more willingness to explore using them for more interaction and embracing of user-submitted content (e.g. using the API)
Facebook	Used for the same updates as on Twitter, but with added functionality like Events. Barely used as a platform for discussion.	Used for the same updates as on Twitter, but with added functionality like Events. Barely used as a platform for discussion. Pages of the bottom-up projects typically have higher numbers of fans indicating support for the project, than top-down-projects.
Flickr	A hosting service for photos, but not as a platform for interaction.	Only used in one case as a hosting service for photos.
Youtube	A hosting service for videos, but not as a platform for interaction.	Not used at all.
Weblogs	A push-medium for news. Few actually allow comments.	A push-medium for news. Few actually allow comments.

Fig. 13: Difference between use of Social Media in Top-down vs. Bottom-up projects.

Referring to 2.2.3, the different social tools are analyzed according to their levels of interaction and how they were used and implemented in the various projects.

	Information (provide updates, information)	Consultation (interact with project, provide feedback)	Participation (shape plans)
Twitter	6 projects	2 Projects	-
Facebook	6 Projects	5 Projects	-
Flickr	2 projects	-	-
Youtube	2 projects	-	-
Weblogs	6 projects	2 Projects	-

Fig. 14: Social Media at the different levels of interaction

5.1 Observations

On average, the greatest focus and highest activity and interaction in all of the aforementioned projects was seen on Facebook and Twitter. This is probably due to the high level of connectivity and the real-time aspect, as illustrated in Fig. 2. The examples show that Twitter is typically used as a push medium for project updates, probably because of its ease of use and the brevity of its messages. And, as Goto2040 and STAND demonstrate, a pro-active networking approach to using Twitter can generate support for projects in various ways. We've seen participants retweet event announcement, ask questions, and even provide positive feedback or quotes, like this one in Tulsa: "PLANiTULSA named best thing about 2009 by Urban Tulsa! http://bit.ly/58Ur7I." One thing we were missing is the use of a hashtag to exchange ideas around a project. Only PLANiTULSA had a few instances in which users provided event updates via hashtag (and these entirely user-created, inasmuch as the project didn't have a Twitter account). The effective use of hashtags could greatly improve the use of Twitter as a participatory medium.

Facebook offers more traditional ways of interaction and was used as a two-directional channel through which participants commented, voted, and started discussions. Such interactions were typically limited in

scope and intensity, though this is quite typical for Facebook. Indeed, fan pages and groups are often merely regarded as a way to show support or opposition for a given cause by joining, and not as a vehicle for sustained participation. This can also be seen by the higher numbers of fans for citizen-activism projects, compared to their official counterparts. Nonetheless, offering a fan page can be an effective means of gathering support, with the added benefit that event announcements and project updates can be easily broadcast to all fans. On the other side, Facebook is more personal in nature, which has implications for its use for planning projects. Though the group and fan pages on Facebook offer the greatest variety of tools for organizers (discussions, links, the ability to upload photos and videos, integration of other content), comments were often superficial and discussions were barely used. Additionally, Facebook users are often careful about protecting their privacy and typically share with their circle of friends rather than with the whole world, which limits the platform's use for general networking.

Overall, both Twitter and Facebook offer excellent ways to reach out to citizens and direct them to a project's Web site for deeper engagement or participation. Because Twitter and Facebook are somewhat limited both in the scope of activities they offer as well as the kinds of tools they offer, they tend to serve best as a kind of point-of-entry through which more vigorous and serious participation can be accessed. For their part, Goto2040 and STAND both demonstrated how providing URLs to surveys with compelling calls-to-action not only brought followers to their Web sites to participate but also, through retweeting, reached a far greater audience by bridging networks to connect with participants who might otherwise never have taken part.

The other channels didn´t attract discussion or high interactivity. Flickr and Youtube seem to be used mainly as hosting platforms, offering free Web space for videos and photos and providing easy ways to integrate them into the main Web site or to link to them. Even though all of these services provide the tools for feedback, they are rarely used by participants. None of the projects made use of a common tag to encourage citizens or participants to share photos in a common pool. We've seen this technique effectively used in other projects, and it's another low-barrier way to engage some of the more active citizens in a community.

Whether any of these channels can help projects to become more inclusive with diverse participation can't be answered by this analysis. Most likely, the answer would be some form of "it depends." We do want to point out, though, that the connections made by some of the projects that actively used Twitter seemed interesting. By using Twitter search tools to directly target users, projects seemed to interact with local decision-makers, journalists, bloggers, and other observers that all act as influencers within their own networks. Perhaps more than any other tool, Twitter enables this kind of open-networking and might ultimately lead to more inclusive participation by connecting different local networks. Interestingly, LinkedIn might work in a similar fashion, but was only used by one project.

To our surprise, more than one project provided a blog that did not allow visitors to comment. In a way then, these platforms had much in common with the news sections of Web sites as was typical in the 1990s, and technically we wouldn't consider those updates to be a blog. But this raises the question: How can organizers track, moderate, and answer comments or feedback from a large variety of channels? Rarely did the various projects seem to have an overarching strategy for how all these social media channels work together. We wonder how many of them first identified the overarching goals and objectives, and only then picked their social media channels and created an engagement plan that addresses these issues (more on this subject below). Ultimately, it's necessary to fine-tune the channels and how they interact to keep feedback manageable. For example, why offer a discussion board on Facebook if nobody is expected to use it? Or, perhaps worse, offer one that no staff member is assigned to monitor or post responses to? Within this logic, it might make sense to offer a "blog" that simply provides updates without allowing comments and to sync it to Twitter and Facebook. It keeps the overhead down and limited staff resources can be used to focus on more important channels or activities.

Overall, the most important channel for online communication in each of the projects we looked at seems to be the central Web site, which links and connects with all the other social media channels. The main Web site can be connected with other tools, to post and distribute information to all other channels in order to make the process of keeping users up-to-date as easy as possible. And though all the new social media channels we looked at are worthwhile and are increasingly important, traditional online communication tools like blogs and newsletter signups remain an important cornerstone for any outreach effort.

5.2 Recommendations

Though the further integration of social media may have become an increasingly mainstream priority, proven strategies for doing so are not easy to come by. It all comes down to this: Social media strategy must have a defined goal. Whether this is to educate citizens about the tradeoffs and alternatives of a planning project, to identify local connectors and network with them, or to collect feedback about different alternative scenarios, in order to be successful the outcomes must be defined and quantifiable. After the goal is defined, the timeframe and target audience of a social media campaign should become clearer. Will this be a short-term campaign, or something more permanent? And depending on the audience, various social media technologies should be weighed as to which is most appropriate in attaining the identified goal.

One thing that becomes obvious when taking a closer look at the various planning projects is that it's one thing to create project Web sites or Social Media accounts, but it's a totally different story to actually get people to visit them and get engaged. To avoid non-participation, we recommend creating an Engagement Plan[3], a document that to outline a project's strategy for getting an audience to participate well before its Web site and social media accounts are launched. The elements of an Engagement Plan should include:

Channels: Which complementary on- and offline channels will the project use to let people know about or contribute to the project? How will the project tie them together? How will the project keep them updated, facilitated, and responsive?

Activities: What will the project ask people to do on its site and elsewhere? Without a clear indication of what is expected, nobody will actually begin. For example, if a project wants its audience to use Flickr, perhaps it could offer a photo contest? What incentives can the project provide to reward participation?

Roles and responsibilities: Who is responsible for content creation, animation, promotion, outreach, tech support, and other functions? Is someone at the project prepared to provide the first comments, videos, etc. until such time as a community forms around the project?

Timeline: What needs to happen and when (including dependencies and periodic evaluation of success metrics)?

Use Policy: What principles should the project team keep in mind in order to define a consistent voice and approach for the project (SAMUEL 2008).

Before implementing a new engagement plan, addressing the maintenance of the campaign is critical. Leveraging the power of social media for a project requires a lot of detailed, time-consuming work.

6 OUTLOOK

With the widespread adoption of mobile devices and the mobile Internet, new services are emerging that bring social media directly into our neighborhoods. Smartphones like the iPhone provide a new platform for location-based-services and mobile participation processes, while becoming more widely used. Mobile applications amplify participation in a spatial and temporal dimension and will widen the range of possible uses for urban planning and design. Whether traveling in the metro or sitting in a coffee shop, participants not only can read or post updates but they will also be able to interact with the built environment and others around them in real-time. As an example, new location-aware social media applications like Foursquare and Gowalla are paving the way for online engagement around any given city. Both services offer a check-in system through which users share their current locations, interact with other users, and earn badges for visiting a certain number of places. Users who check in most frequently become the "mayor" of a location. And this is just the start of what will surely become the widespread adoption of location-aware services. Indeed, even as we prepared this article, Twitter opened its Geo-API and it is expected that Facebook will roll out similar features in the near future[4]. This offers two interesting angles for our planning professions:

- By aggregating user locations that will soon be widely available, planners will be able to analyze mobility and usage patterns of neighborhoods, identifying clusters and areas of decline.
- By working with services like Foursquare, Twitter, and others, planners will be able to create their own games and provide engaging channels for citizens to get engaged. The oft-hyped crowd-

[3] http://www.socialsignal.com/blog/alexandra-samuel/engagement-planning
[4] http://mashable.com/2009/12/25/foursquare-gowalla/

sourcing only works if there's a fun, entertaining side to collecting data or mapping neighborhoods. Location-aware games could provide a venue to get citizens involved early in the planning process.

Armed with new social media tools and access to information, citizen planners will soon join professionals in our search for the liveable cities of tomorrow.

To advance the use of social media in Urban Planning, exchanging ideas, experiences, and lessons learned is critical. Therefore, we invite you to provide your feedback and share your own experiences with us and others in the comments section at http://engagingcities.com/post/484625327/corpsocialmedia

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New Prospects for Urban Planning Service Systems with Use of GIS Tools and New Data Sources Linked to Reference Databases

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1 ABSTRACT

Spatial management at present has the opportunities to obtain support by information in unusual scale. Such prospects are open by using the tools of urban spatial information system and possibility of linking the reference data with new sources of information emerging in the development of e-administration. As the examples of establishing such a link, and of the variety of analysis made available consequently, two cases of processing data from thematic databases based on Wroclaw urban spatial information system are presented.

2 INTRODUCTION

Development of e-administration reveals chances, often unconsidered, of achievement of new dimension in analyses, planning and management of urban systems. They let us open ways of acquiring and processing of detailed information with spatial reference from the sources of data, which were inaccessible until now. If, as it often happens, the particular information concerns individuals (e.g. inhabitants, investors, clients, vehicles), their activities and registered events, but the database includes whole population or its significant representation, then it represents the ideal base for analyses and modelling of phenomena and processes, for construction of models of city or its subsystems. Research of human behavior can allow to adjust better for requirements of communities, but also it enable determination of spatial policy towards prevention of undesirable spontaneous processes.

One possible kind of the source of information are the existing formal registers (such as the records of inhabitants' accommodation, or records of economic activity), due to the mandatory recording of the different types of activity or of use of services of state or communal administration. These data include information of the registered events' addresses, which allow for allocation of its spatial reference, with proviso that the conformity with reference data is improved.

Furthermore, information may be acquired from electronic systems of services, emerging in process of development of e-administration, like the further presented system of recruitments to schools in Wrocław. The key factor is that data should be acquired by imposing the appropriate way of registering the information.

Efficiency of preparation of input data for analyses depends on conformity of address data model, on improvement of reference data, on making the addresses dictionaries available, and consistent adjustment of registers (or other thematic bases) to the created standards and dictionaries. In the context of the present state of address information incompatibility it is essential to apply the emergency mechanisms of adjustment of the incompatible data.

3 CREATION OF PREMISES FOR PLANNING OF SYSTEMS OF URBAN SERVICES ON EXAMPLES OF DEMOGRAPHIC ANALYSIS AND OF PROCESSING THE DATABASE OF SCHOOLS AND THEIR PUPILS IN WROCŁAW

For the presented examples of analysis the reference data (address database) modernized in the process of extension of Wrocław urban spatial information system (SIS) has been used, along with reports from two bases in the form of table including address information, namely: registers of inhabitants accommodation, and database of electronic system of recruitment in schools via the Internet.

Moreover, the analysis referred to the division to the urban units, which are used in monitoring and planning the development of the city, as well as to other thematic layers of SIS (e.g. landuse - current status and projected development, model of transportation network, characteristics of the cost of displacement).

Reports from the registers of inhabitants accommodation allowed for examination of demographic and spatial structures and of internal migrations of inhabitants of Wroclaw. The yearly examined data concerned the inhabitants of Wroclaw, domiciled in permanent or temporary residence in the time-span of the last decade, taking into account the age and gender structure, as well as the migration of residents, with

recognition of the age and gender distinction as above. The data were aggregated to address point.
Geocoding of information on place of residence and its change as well as examining the spatial relationships with other characteristics of the places (e.g. distance from the city center, type of residential area), provided new information on the demographic and spatial structure of population, trends and dynamics of migration processes within the city and beyond its borders.

Additional information was gained from the joint analysis of information about migrants person, which embraced the origin and destination place of migration characteristics, and migrations' length. Received information both provides characteristics of particular sites, and allow to define the quantitative indicators, which form the basis for the forecast elaboration.

The demographic analyses and forecasts are object of interest of the majority of the municipal authority's Departments, as a base for definition of needs for publics services (health, social care, education), and of requests for media (water, heating, gas, internet).

The size of the age groups population as forecast for the subsequent years, and the observed differences in their density in different areas, are essential for planning of the number, of the spatial distribution, and of the time-related changes of particular types of services.

Fig.1 and 2 illustrate the examples of such demographic analyses (Brzuchowska J. ,2009).

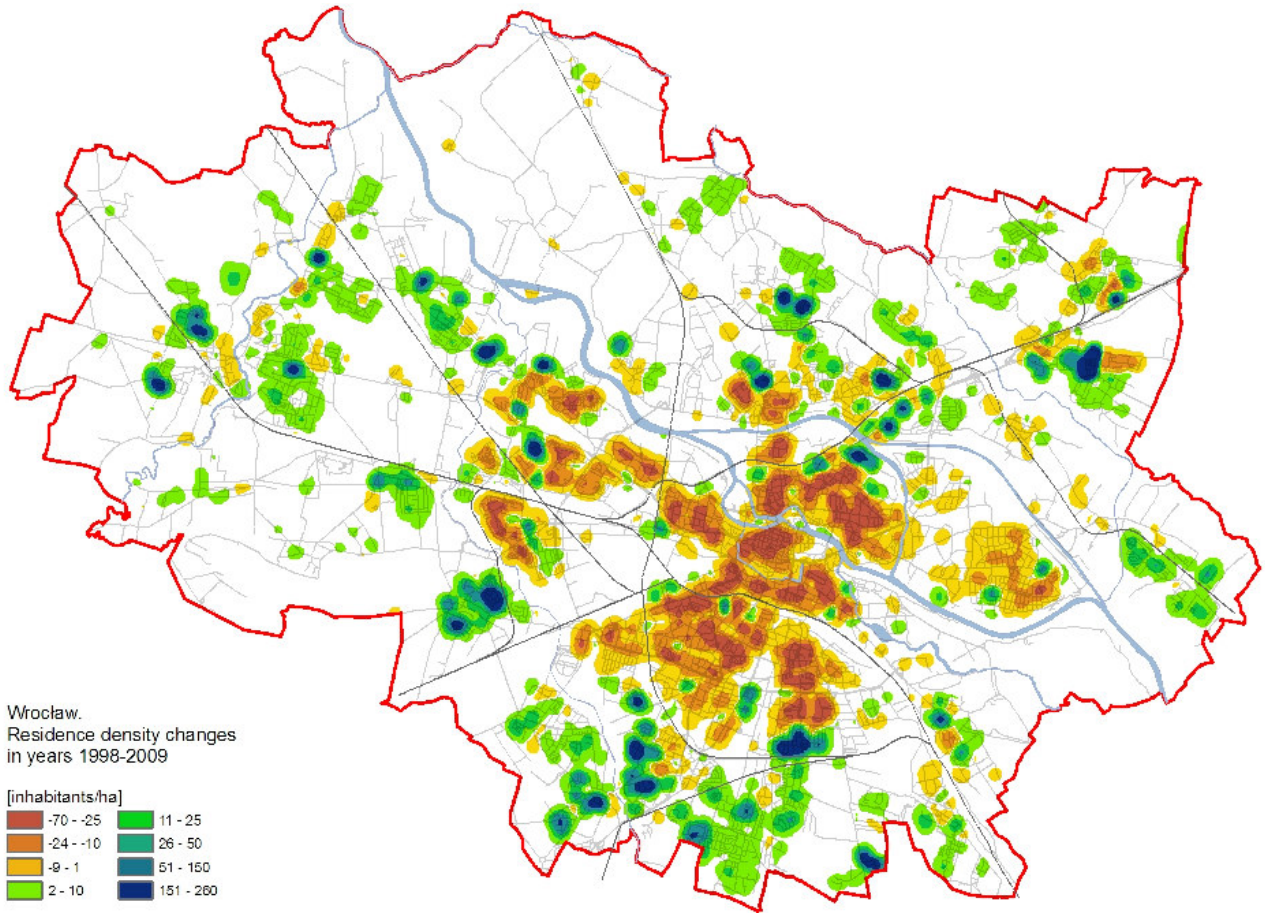

Fig. 1: Map of residence density changes in the area of Wrocław in the years 1998-2008, Elaborated on the basis of the permanent residence registers

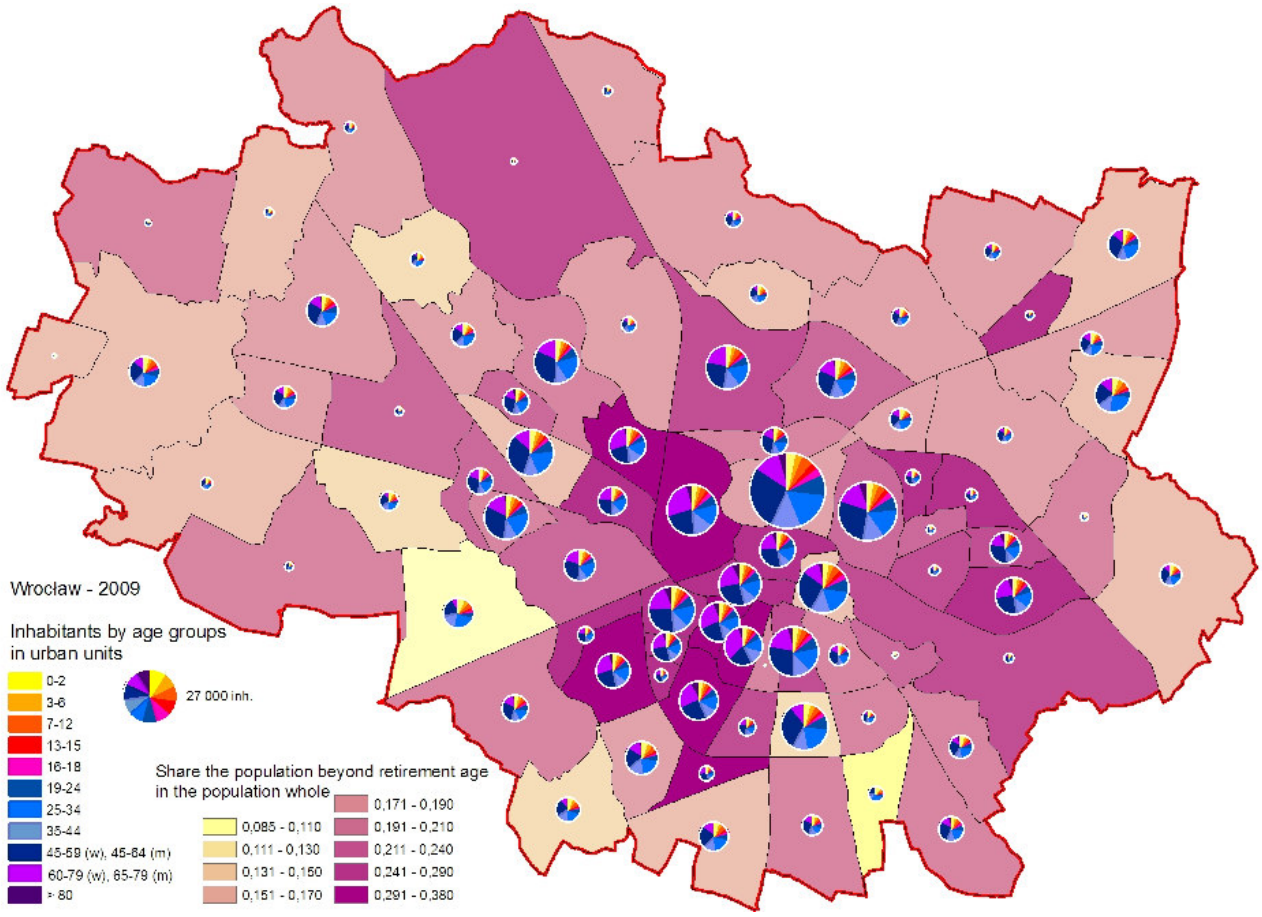

Fig. 2: Distribution of inhabitants of Wroclaw by age groups ratio in urban units. As at 31 December 2009. Elaborated on the basis of the permanent residence registers

A detailed framework for examining the deployment of children in relation to the location of different levels and categories of schools has been provided by the database of system of recruitments to schools, which embraced the places of residence of each school's students, referenced to the address point or, in case of the suburbs of Wrocław, to a village.

The good cooperation of the recruitment system with the Wrocław urban SIS data sets and tools is the result of several years of experience of users of the both systems, including their extensive application, and active cooperation in the modernization of the reference databases. Year by year the increase of the amount of the collected and processed information is noted, as well as the range of the analyses conducted. The above examples relate to the school year 2008/09.

Geocoding of objects was the starting point for conducting a series of visual and quantitative analyses including - among others – various images of the deployment of objects and their spatial relationships, the flow rate and the intensity of these phenomena, the study of diversification of the service indicators (spatial accessibility, distribution of commuting distances to the schools of different kinds and levels, the number of schools' attendants). Distributions of travel distances examined along with the deployment of citizens counted in relation to the school location, allow for the determination of the parameters for the simulation of home-education contacts. In this way, characteristics of both schools and zones of different type of residential area and inhabitants' socio-economic profile, were built.

Juxtaposition of data has allowed also for investigation of the compliance of school districts' ranges with areas of the allocation defined with assistance of GIS tools, and with the real spatial distribution of living places of each school's students.

The analysis provided the rationale for both planning a network of schools and the arguments for specific decisions concerning the maintenance or elimination of particular schools, or finding their substitute localization. The results' output allows also to identify the under-served areas.

Geocoding was used not only for planning and analyzing: in the recruitment process the evaluation of the place of residence of the child, and of its distance from the school of their choice, was considered.

The minuteness of the acquired information implies the search for new techniques of analysis and of the phenomena presentation. The examples of such attempts are to be found among the illustrations enclosed.

Figures 3 A and 3 C show, in various forms, where students of III LO (High School) school are recruited from. Figure 3 A and B present graphs of young people who commute to two high schools with different social profile. Fig 3 C and D, in the form of traditional cartograms, based on quantitative assessments, show areas with a population of greater degree of educational aspirations.

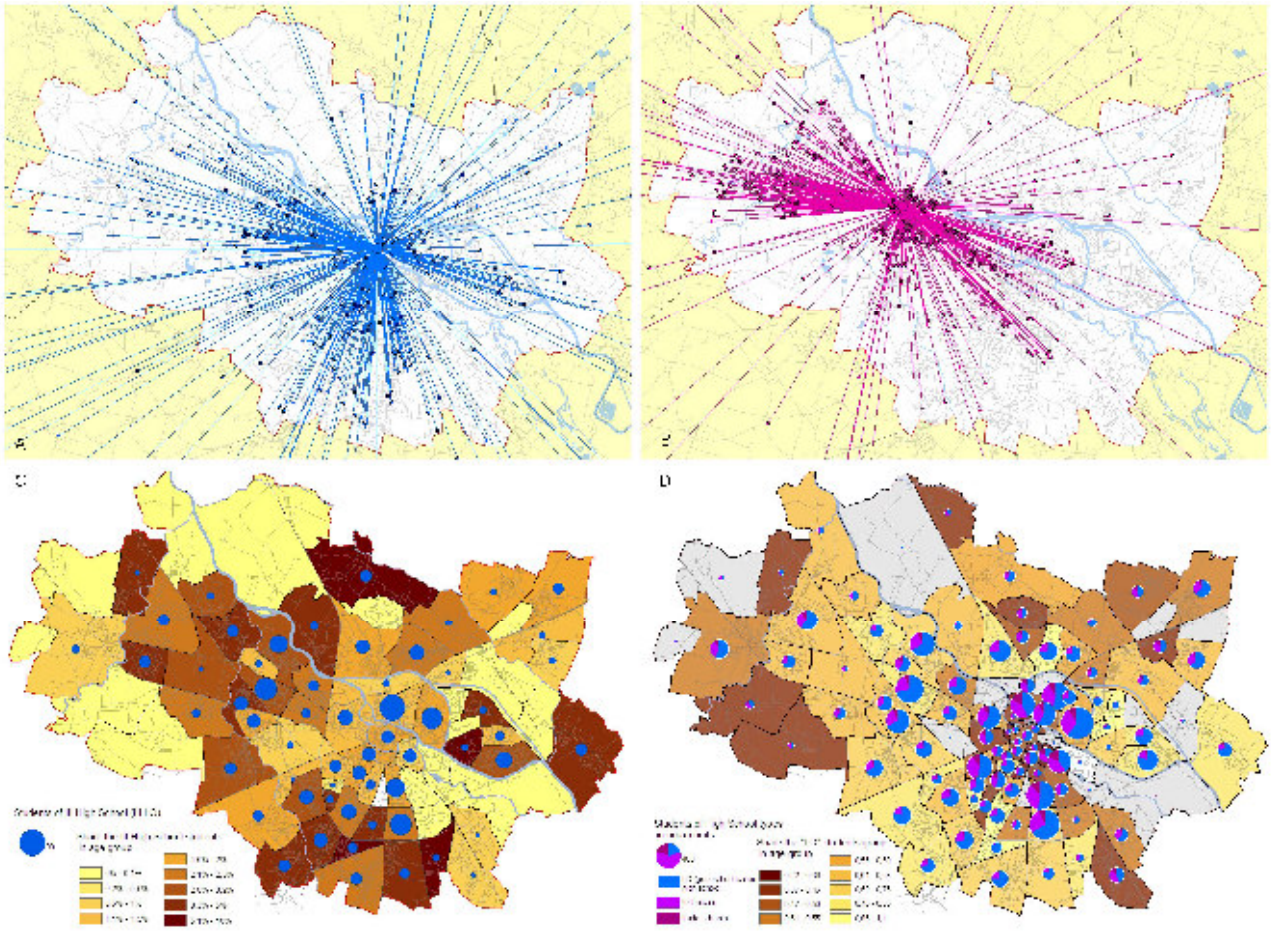

Fig. 3: Examples of analysis of the distribution of students: A) Graph of III High School students commuting to school B) Graph of VI High School students commuting to school C) Participation of III High School students in the age group (in the urban units) D) Participation of all high schools students in the age group

In the Figure 4 the spatial distribution of children commuting to different types of school is illustrated with use of a new version of trip-directional plans, matrix of displacements visualization method (Brzuchowska J., 2010)

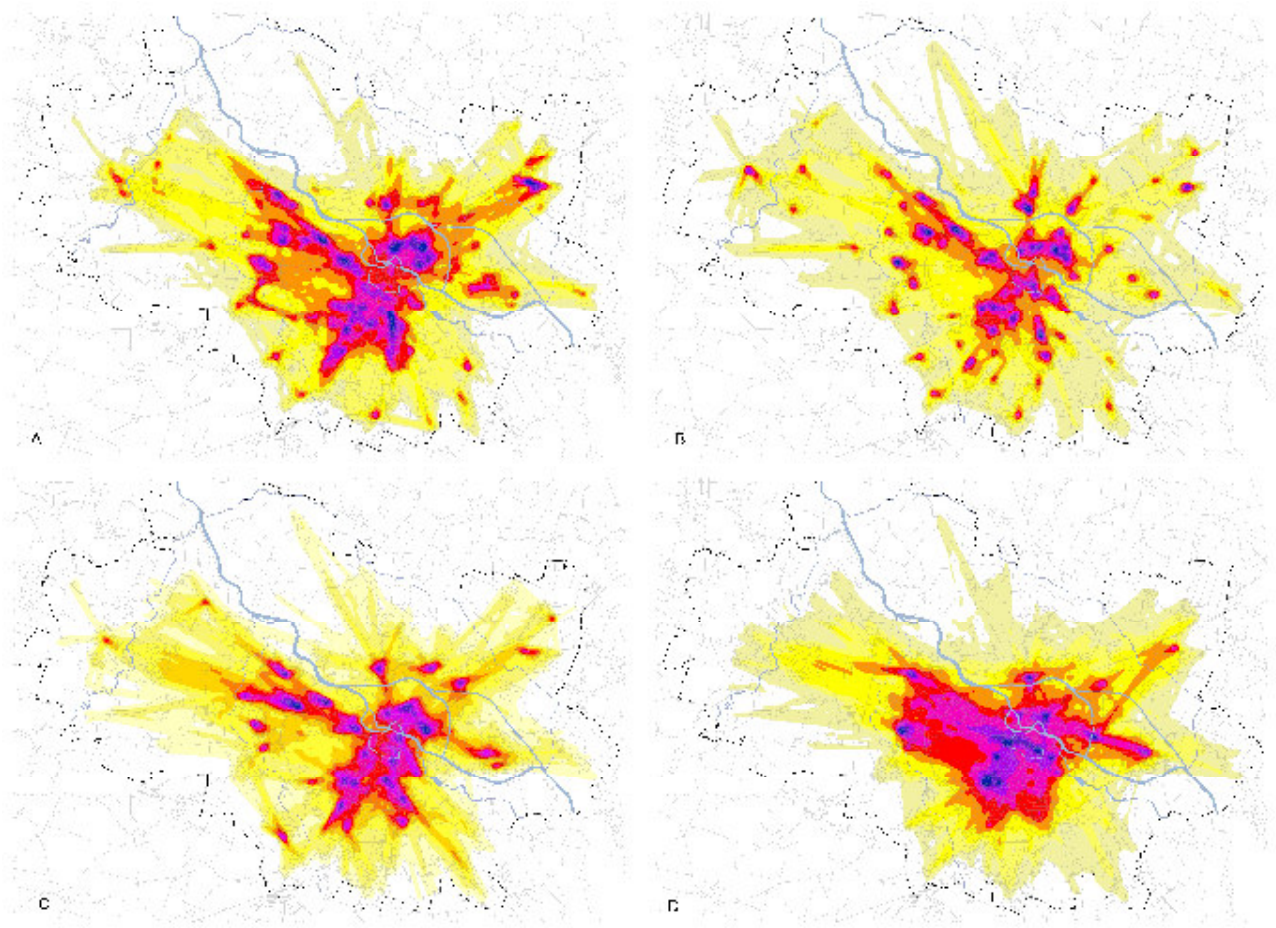

Fig. 4: Displacement density of children communiting to school of various level A) kindergarten B) primary school C) secondary school D) high school

4 CONCLUSION

Urban geoinformation systems are often used to record rather than for analysis of the information and for planning support. The new opportunities are a challenge for developers and users of geoinformation systems. They require imagination and expertise in the design and implementation of monitoring mechanisms and analytical tools. The efficiency of operation depends on the investment in quality of the reference databases, and on extortion of their compatibility with the other data. It requires a major effort, but it can give synergistic effects of unusually rich source of information supporting planning, spatial management, decision-making, and research.

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Nobel Economic Laureates and the "Performance" of Cities

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1 ABSTRACT

Cities are, according to complexity theorists, emergent patterns that result from how a variety of economic, environmental, political and social forces act out. The collected work of two Nobel Laureates in Economic Sciences – Paul Krugman (2008 winner) and Elinor Ostrom (2009 winner) in relation to the liveability, healthiness, and prosperity of contemporary and future cities is examined. Krugman's "trade theory" focuses attention on the self-organizing result of a polycentric economic structure within urban regions. Ostrom's "on the commons" provides a powerful alternative to public policy and government led participation processes by showing how more efficient, equitable, and responsive such alternative systems are. The paper reviews both the basic arguments of the Nobel Laureates and develops some pragmatic approaches to the use of their thinking regarding the workings of basic economic, environmental, political, and social forces.

2 A "COMPLEX" METAPHOR OF THE CITY

The hope for "cities for everyone" – cities that are liveable, healthy, and prosperous – requires at the initial stages some discussion of two notions: how cities function (their internal dynamics) and how these dynamics perform. Planners – especially those whose practice lies at the intersection of real estate, ICT, and the general planning function – should focus at a minimum on improving the functioning of these internal dynamics. Performance as a general concept is an improvement in a value of some attributes, parameter, or resultant of some temporally dynamic process. The unanswered question, of course, is what are these dynamics and how should they be described, categorized, and eventually modified.

Arguably, foremost amongst these dynamics and resulting performance is the economic dimension. A function that operates simultaneously on at least two scales: the individual and the aggregate. How to capture this dual characterization in a single framework has perplexed both academic and practitioners.

To overcome rather rigid and constrained economic models in common use by planners, complexity theorists (e.g., Prigogine 1967; Bak 1996; Portugali, 2000; Batty 2005) have begun to conceptualize city dynamics as complex systems. Complexity theory brings a new language to the table. The new language is both provocative (sounds good!) and overcomes a set of nagging methodological problems facing planners in their attempt to modify behaviors to achieve societal-desired outcomes. Complexity theory is based on a systems representation of economic, environmental, political, and social forces. What is observed in the aggregate is termed an emergent pattern; things such as average travel time to work, aggregate GDP, mean "sustainable GDP", average "granularity" of the road network, etc. The key to complexity theory is that it provides a mechanism – normally stated as "complex adaptive systems" expressed as either agent-based models or more simple multiscalar hierarchical processes – to link the behavior of individuals to these aggregate patterns. Thus, individual behavior identifiable, measurable, and changeable at the scale of the individual produce patterns at the scale of the aggregate.

While not complexity theorists per se, the two most recent winners of the Nobel Prize for economic sciences – Paul Krugman in 2008 and Elinor Ostrom in 2009 – have significant "complexity thinking" in their work. Krugman's "trade theory" focuses attention on the drivers and forces that result, when applied in the metropolitan context, in polycentric economic structures. Ostrom's "on the commons" focuses attention on the adaptive design and self-organization of institutional arrangements in the provision of services. While their approaches are almost at opposite ends of the "truth-finding" scale (Krugman is arguably portrayed as a popular-economist, Ostrom is arguably portrayed as an experimental-economist), both Laureates focus attention on individual motivations and behavioral processes that ultimately give rise to aggregate emergent patterns, which could be the basis of various indicators of the performance of cities. The intention of this paper is to examine the work of these two recent Nobel Laureates in the context of the contemporary urban/metropolitan condition. What does their work instruct us to think about, what are the practical realities, and what is the guidance imminent. Thus, this is a purely speculative theoretical paper, intended to expose these new ideas and generate alternative mindsets and perspectives.

The paper has a simple structure. In the next two sections, the major works of Krugman and Ostrom are identified, briefly reviewed and illustrated. The penultimate section extracts six talking points, three from each Laureate, about contemporary urban/metropolitan conditions and performance. The final section is both a mini-reflection of the exercise and an attempt to lay down the challenge for future research.

3 PAUL KRUGMAN (NOBEL ECONOMICS LAUREATE, 2008)

Paul Krugman was born February 28, 1953 (so he is now – as of this presentation in May, 2010 – 57 years of age). He grew up on Long Island in New York, received a BA in economics from Yale University in 1974 and a Ph.D. in economics from MIT in 1977. He is currently a professor of economics and international affairs at Princeton and a centenary professor at the London School of Economics. Krugman is also a member of the Council of Foreign Relations, a research associate at the National Bureau of Economic Research, and a member of the Group of Thirty. But perhaps most visibly, he is a regular columnist and blogger for the New York Times and calls his blog "The Conscience of a Liberal".

"The Nobel Prize Committee stated that Krugman's main contribution is his analysis of the impact of economies of scale, combined with the assumption that consumers appreciate diversity, on international trade and on the location of economic activity. The importance of spatial issues in economics has been enhanced by Krugman's ability to popularize the complicated theory with help of easy-to-read books and state-of-the art syntheses … [they state] 'Krugman was beyond doubt the key player in 'placing geographical analysis squarely in the economic mainstream' and in conferring it the central role it now assumes''. The provocative title of his Nobel address is "The Increasing Returns Revolution in Trade and Geography" (http://nobelprize.org/nobel_prizes/economics/laureates/2008/krugman-lecture.html, 44 minutes).

Five key elements of Krugman's oeuvre are examined. These include: (1) the 1991 Journal of Political Economy article that contains the original thinking about the increasing returns process; (2) the 1995 book Self-Organizing Economy that focuses on cities and regions; (3) elements of the "new economic geography"; (4) the original foray into becoming a macro-economic critic; and (5) the continued writings.

3.1 Journal of Political Economy (1991)

Krugman's most cited academic paper (857 citations by early 2009 according to Wikipedia) is an article title "Increasing Returns and Economy Geography" published in the Journal of Political Economy in 1991. The major thesis of this paper is the creation of a formal model that results in the observed pattern of regional divergence of specialized activity. That is, there are observed patterns of concentration of economic activities. The major advance of the formal model is explicit consideration of pecuniary externalities. Interestingly, even in 1991 in a formal academic press, Krugman's first major section is an "intuitive" model, perhaps pre-saging his current career as a columnist and journalist.

Economic modelers rely on a set of assumptions. Here, the location of economic activity is based on the interaction of "economies of scale" and "transportation costs". The eventual pattern of economic activity rests on a few key parameters. Both the intuitive and formal model rest on the simple assumption that economic actors will tend to locate in areas of larger potential consumption and that that part of the consumption is other producers. This is the "circular causation" or "positive feedback" effect of self-organizing systems. Krugman not only considers "backward linkages" common to understanding production systems but also "forward linkages" that argue that it "is more desirable to live and produce near a concentration because it will less expensive to buy the good this central places provides." Thus, demand becomes almost endogenous.

In this model, short and long-term equilibrium rests on only three factors: the share of expenditures of manufactured goods; the elasticity of substitution among products; and the fraction of good shipped that arrive. These factors create the ultimate explanatory variable, real wages (as opposed to nominal wages) defined in terms of both wages and differences in prices.

3.2 The Self-Organizing Economy (1995)

Krugman is even more explicit in The Self-Organizing Economy (1995) which focuses almost entirely on urban and/or metropolitan areas. The rather short (100 pages without the technical appendix) text is divided into two parts: "embryos, earthquakes, and economics" and "self-organization in time and space". In this book, the fundamental methodological perspective is the concept of self-organizing systems. Self-organizing

systems are those, in which seeming randomness and chaos at one scale of resolution evolve into unexpected order at another level of resolution or, put another way, produce "order from instability". The argument is quite simply and clear: the "economy" and "the spatial economy" of urban/metropolitan regions are self-organizing systems. The importance of the book is that this is the first time a [spatial] economist invoked with such force this notion. Simply put, Krugman develops a way to look at what he calls "urban morphogenesis" (p. 49). The notions of order from instability and order from random growth apply.

"Order from instability" relies on three properties of systems: complexity, emergence, and self-organization. Complexity is based partially on the insight that feedback mechanisms have surprising properties, including positive (reinforces the process) and/or negative (dampens the process) feedbacks. Emergence is about how large interacting ensembles – where the original units may be water molecules, neurons, magnetic dipoles, or consumers – exhibit collective behavior that is very different from anything you might have expected from simply scaling up the behavior of the individual units. Self-organizing systems are systems that, even when they start from an almost homogeneous or almost random state, spontaneously form large-scale patterns.

Finally, Krugman argues that complexity and self-organization are value and ideological-free concepts. Neither is necessarily or presumptively a good thing. So, books like Order out of Chaos (Prigogine, Stengers & Toffler, 1984) or Complexity: Life at the Edge of Chaos (Lewin, 1992) are really about method, not about normative prescriptions for a better society. Simply, systems exist, have properties, and contain drivers of change.

3.2.1 Embryos, Earthquakes, and Economics

Part one is focused on how the twin principles of "order from instability" and "order from random growth" can be applied to modern spatial economic theory. The chapters have provocative names: "self-organization in space", "complex landscapes", "an urban mystery", and "principles of self-organization".

Krugman starts the discussion with the traditional VonThunen/Alonso/Mills model and the notion of bid-rent curves and shows how these models do not reflect reality. Central place theory works better as a descriptive device, but lacks economic content. Finally, he shows the wisdom of the Shelling book Micromotives and Macrobehavior (1978) in which "mild preferences about ones neighbor" create "high degrees of segregation at the scale of the metropolis". Simply, local, short-range preferences and actions create large-scale structures. Using an agent-based model based on this notion and two criterion related to centripetal and centrifugal forces, Krugman is able to demonstrate a polycentric urban spatial structure. The second major concept of this first part is "order from random growth". Here, Krugman demonstrates the power of positive feedback and circular causation that result in explanations of known Power-function regularities.

3.2.2 Part Two

Part two is focused on self-organization in time and space. Once again, the chapters have provocative names: "dynamics of self-organizing systems", "temporal self-organization", and "models of spatial self-organization". The two major advances here are the explicit treatment of time, largely ignored in the "comparative statics" nature of much economics research. Krugman creates explicit temporal variations for a number of predominately spatial models.

The second major achievement is that Krugman develops complexity arguments that could improve understanding of the observed realities of such common planning and/or theoretical ideas such as Edge Cities, Central Place Theory, and Zipf/Simon Power Law. The key in terms of most of this is positive feedback and spillovers that create their own emergent property (of growth!).

3.3 New Economic Geography

The results of the Self-Organizing economy gave rise an energetic field of inquiry called the "new economic geography." The major reader in this field is The Spatial Economy (Fujita, Krugman and Venables 2001). In a review in the Oxford Review of Economic Policy, Krugman (1999) solidifies the work that focuses on the notion that one can clearly derive aggregate behavior from individual maximization.

The basic ideas of the new economy geography lie in a complexity theory formulation are other embedded aspects, including notions of how historical accident could shape contemporary geographies, how small and gradual changes in basic parameters that guide individual behavior can produce discontinuous changes in

spatial structure, and the principle idea of circular causation based on the relative strength of both centripetal and centrifugal forces.

3.4 Becoming a Macroeconomics Guru

Krugman is probably better known for his contributions to macroeconomics than for his contributions to the new economic geography, although it is the former that was cited in the awarding of the Nobel Prize. He has examined the trade theory that works at the scale of the firm (and maybe the city) and created a set of macro-economic perspectives. Two major books are discussed below.

What makes Krugman so popular (and perhaps so despised, if you are a fan of Taleb) is that many of the books about macroeconomics are written in a popular style (i.e., actual or perceived avoidance of any real economic content). Throughout the years, Krugman has distinguished between academic economists (who write for other academic economists) and other economists like "policy analysts" and "journalists" who write for a broader public and politicians. Krugman is, somehow, perceived in most quarters as an "intellectually honest" economist, praising both the right and the left.

3.4.1 Peddling Prosperity

In the book Peddling Prosperity (1994) Krugman aims at "nonsense" from both the conservative and liberal camps. But, the main target is supply-side economics and strategic trade relations (as opposed to market and free trade). His basis of argument is orthodox, neoclassical economic analysis; he calls himself a "New Keynesian. Though Krugman is a liberal, he is capable of praising both the right and left. The major point is that economic science still has limited knowledge and that the notion of tradeoffs in economic policy is too often ignored – on the right and on the left.

Krugman then goes on to suggest how policy entrepreneurs have succeeded in convincing politicians that big government with high taxation and excessive regulation hinders growth and that supply-side (tax cuts) would stimulate growth, raise investment, and enable deficit reduction. The empirical part of the book, covers the 70s and 80s refutes all claims and left the US economy with a wider income gap.

3.4.2 Age of Diminished Expectations

Age of Diminished Expectations (1999,3rd ed, 1994, 1990 by the Washington Post) is broader in scope. The major theme is that the US economy has performed poorly (in the 70s and 80s), that better performance is unlikely, and that the public seems oddly complacent. Set against the three major determinants of economic well-being – productivity and income growth, income distribution, and employment, Krugman argues that the US has done well in job creation only. The consequence is that Americans have accepted low growth and income disparity. Moreover, there is little public support for massive policy changes and he doubts the ability of government to produce such changes, even if the political will was there.

Krugman identifies three scenarios: Happy Landing (probability = .20) is a return to the growth of the 50s and 60s; Hard Landing (probability - .25) is a loss of faith by foreign investors in the US economy and a cut-off of capital exacerbating the debt crisis; and Drift (probability - .55) describes sluggish productivity, lower unemployment, and higher inflation combined with growing problems of the underclass leading to the US sinking to "third rank" as an economic power.

3.5 The Continued Writings of a Popular Writer

Krugman's The Accidental Theorist (1999) and Conscience of a Liberal (2007) are accessible compilations of the perspective. He continues to write; the latest books are The Return of the Depression Economics and the Crisis of 2008 (2008) and A Country is Not a Company (2009) as well as a series of story-driven college level textbooks (Krugman and Wells, 2008, 2008, 2009).

4 ELINOR OSTROM (NOBEL ECONOMICS LAUREATE, 2009)

Elinor Ostrom was born August 7, 1933 (so she is now – as of this presentation in May 2010 – 76 years of age). She grew up in southern California, received a BA (with honors) in political science, a MA in 1962, and a Ph.D. in 1965, all from UCLA. She is currently on the faculty of both Indiana University (Arthur F. Bentley Professor of Political Science and Co-Director of the Workshop in Political Theory and Policy Analysis) and Arizona State University (Research Professor and Founding Director of the Center for the

Study of Institutional Diversity). Ostrom is a member of the US National Academy of Sciences and past president of the American Political Science Association, the first women to receive the prestigious Johan Skytte Prize in Political Science in 1999 and the William H. Riker Prize in political science in 2008 in addition to the James Madison Award by the American Political Science Association in 2005and the Risch Civic Engagement Prize from the Jonathan M. Tisch College of Citizenship and Public Service at Tufts University in 2009 (http://en.wikipedia.org/wiki/Elinor_Ostrom).

The Nobel Prize Committee cited Ostrom "for her analysis of economic governance" saying that her work had demonstrated how common property could be successfully managed. Common resources include things such as forests, fisheries, oil fields or grazing lands. The central theme of Ostrom's work is that these resources can be successfully managed by the people who use them; in contrast to the more normal management strategies focused on either state or market. The provocative title of her Nobel address was "Beyond Markets and States: Polycentric Governance of Complex Economic Systems" (viewable at http://nobelprize.org/nobel_prizes/economics/laureates/2009/ostrom-lecture.html).

Ostrom's work is examined at four junctures. These are: (1) early work on identifying the "rational choice model" of inquiry for the study of public goods and common-pool resources; (2) maturation of the concept and measurement resulting in the classic book Governing the Commons (1990); (3) the concept of governance polycentricity and understanding institutional diversity; and (4) continued work, including the IASC organization, which continues the approach to public and common-pool resource evaluation.

4.1 The Study of the Public Goods and Common-Pool Resources

In a series of early papers, Ostrom and her colleagues systematically develop their "institutional analysis and development" (IAD) framework based on principles of rational choice theory. There are two basic questions: what is to be managed, and how to study systems that do the managing.

4.1.1 What is Managed

Ostrom, and others, argues that there are various types of goods and services. Public goods are those "that yield non-subtractable benefits that can be enjoyed jointly by many people who are hard to exclude from obtaining these benefits. Common pool resources are those who benefits are hard to exclude but each person's use of a resource system subtracts units of that resource from a fine amount available. When a fisher harvests a ton of fish, those fish are not available to any other fisherman.

4.1.2 Approaches to Studying Management

In her Nobel interview, Ostrom is very candid in stating that after spending years looking for "the answer" to efficient, equitable public management, there was none. In the absence of a single answer, Ostrom developed an approach – the institutional approach to studying the provision of public and common-pool resources. Ostrom's ultimate contribution is that there are multiple solutions to the provision of public goods and common pool resources and that the problem is getting the institutions right.

Since situations vary, the problem is one of finding the correct, successful, mixture of "public-like" and "private-like" solutions. By successful, Ostrom means institutions that enable individuals to achieve productive outcomes in situations where temptations to free-ride and shirk are ever present. There is a clear call for an assessment of the efficiency and equity of institutional arrangements. And, there is a clear proposition that, while messy, one can assess the relationship between institutional arrangements and performance. The key is in the details.

4.2 Governing the Commons (1990) and Understanding Institutional Diversity (2005)

Ostrom begins Governing the Commons with an explanation of the overarching methodology of her career. Ostrom, quite succinctly, discusses three "influential models" in the study of public policy questions: the tragedy of the commons (Hardin, 1968), the prisoner's dilemma (Dawes, 1973), and the logic of collective action (Olsen, 1965). These metaphors for public policy debate form the basis of most, if not all, organizational theory characterizations of the public arena. Then, she clearly identifies the two extreme policy positions: state and market. At the extreme point "state" the case is made for Leviathan type institutions; at the extreme point "market" the case is made for privatization. While ideologues gather at

extremes, arguing for either a solution based on large, coordinated and regulated government agencies or privatization, the major point is that in practical contemporary terms we have is a set of mixed models.

4.2.1 The Institutional Approach to Study Self-Organization and Self-Governance

Ostrom begins with the notion that individual behaviors are complex, and particularly so in uncertain situations. Next, she argues that there are certain adverse outcomes of independent action (as above). The "general problem" is "solved" by external agents in two well accepted theories: the theory of the firm and the theory of the state. Note the difference in terminology, particular in the first. She substitutes "theory of the firm" for "private market". This is a key point, more fully explained immediately below.

In both scenarios, the emphasis is on how institutions are supplied, how commitments are obtained, and how the actions of agents and subjects are monitored effectively, using in one case the firm, and in the other state, as an organizational device. How a group of principals – a community of citizens – can organize themselves to solve the problems of institutional supply, commitment and monitoring is still a theoretical puzzle."

4.2.2 The IAD Framework

The institutional approach is captured, both conceptually and for measurement purposes in the institutional analysis and development framework. Here, Ostrom and her colleagues developed a representation of the flows. The model "looks like" a normal production function from a classical microeconomics textbook, except that virtually nothing in under the singular control of a single producer. Two important items are outcomes and rules. Ostrom and Ostrom (2004) identify six outcomes: economic efficiency, equity through fiscal equivalence, redistributional equity, accountability, conformance to general morality, and adaptability. Evaluative criteria are simply numerical measurements for these underlying conceptual dimensions. What is important is that outcomes are identified and clearly part of an analytical system in which varying levels of inputs and flowthrough produce outcomes. A representation of this model is shown in Figure 1

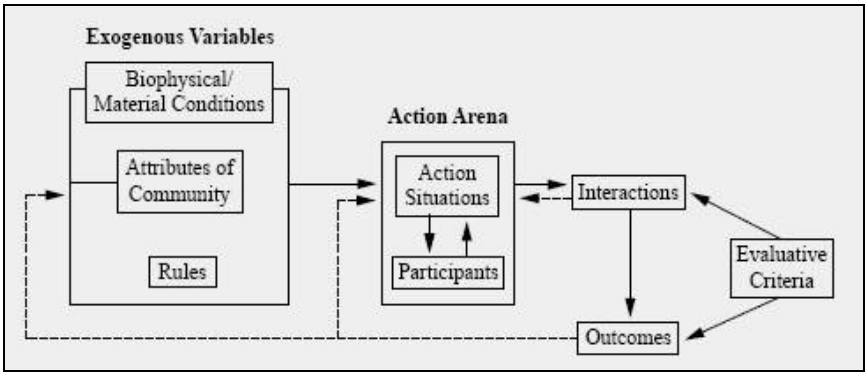

Figure 1: The IAD Framework (Source, Ostrom, 2005, p. 15)

4.2.3 Eight "Design Principles"

Ostrom defined eight "design principles" of stable local common pool resource management. Because they have been reproduced virtually everywhere, I include them here. They are:

- 1. Clearly defined boundaries (effective exclusion of external un-entitled parties);
- 2. Rules regarding the appropriation and provision of common resources are adapted to local conditions;
- 3. Collective-choice arrangements allow most resource appropriators to participate in the decision-making process;
- 4. Effective monitoring by monitors who are part of or accountable to the appropriators;
- 5. There is a scale of graduated sanctions for resource appropriators who violate community rules;
- 6. Mechanisms of conflict resolution are cheap and of easy access;
- 7. The self-determination of the community is recognized by higher-level authorities; and
- 8. In the case of larger common-pool resources: organization in the form of multiple layers of nested enterprises, with small local CPRs at the base level

The key point is that these are not "guidelines" or "blueprints" for developing a self-organizing governance system, but rather principles by which to assess them.

4.3 Polycentricity

The earlier arguments were developed by V. Ostrom (date), who relied on the original insight of Polanyi (1951) who had identified two different methods for the organization of social tasks: directed order (top down!) and spontaneous or polycentric order. V. Ostrom argues that "a spontaneous or polycentric order is one where many elements are capable of making mutual adjustments for ordering their relationships with one another with a general system of rules where each elements acts with independence of other elements" (date, p. 57). From here, it is possible to pose a series of empirically verifiable questions: (1) what is the relationship between the scale of provision and the scale of governance; (2) how do people choose among various governance opportunities within a metropolitan region; and (3) size matters systematically for problems of efficiency, effectiveness, equity and responsiveness.

These questions are formulated as a set of complex relationships and rules. The theory of governance polycentricity is a systems theory framework, more a hierarchical systems theory. Management of hierarchical systems occurs at multiple points; so for example, such systems do not necessarily need to be managed from a top down perspective.

Almost as a testament to her considerable curiosity, Ostrom began work with a series of systems modelers at Arizona State University. Moving from a more qualitative field work approach that characterized her work in natural resources in developing countries, now the task was to try to model – via complexity models – the behaviors of such governance systems. This work is captured, for example, in a series of articles in Ecological Economics and Ecology and Society (Wilson, Low, Costanza and Ostrom 1999; Gibson, Ostrom and Ahn 2000; Anderlies, Janssen and Ostrom 2004; Janssen and Ostrom 2006).

4.4 The International Association for the Study of the Commons (IASC)

The Ostrom "challenge" has been taken up by IASC (http://www.iascp.org), founded in 1989 that aims to understand and improve institutions for the management of resources that are or could be held collectively by communities. Historically focused on developing countries and natural resources, the current focus is on exchange of knowledge, mutual exchange, and the promotion of appropriate institutional design in a widening range of commons including things such as digital commons, intellectual property and copyrights, biodiversity, climate change, and other "urban commons" (van Laerhoven and Ostrom, 2007).

5 WHAT DOES IT MEAN? A DISCUSSION OF THE RELEVANCE OF ABOVE

So, what does all this "theory" mean to the creation of liveable, healthy, and prosperous cities. In this section, limited by space, I offer three major talking points for each of the Nobel Laureates. The first three emanate from the work of Krugman; the last three from Ostrom. Here, I provide a direct tie-back to the introductory remarks regarding cities as complex organisms as well as provide some references to contemporary work for each of the these talking points.

5.1 The Polycentric Internal Spatial Structure of the Metropolitan Region Matters

Most conceptions of the internal structure of metropolitan regions are, for lack of a better phrase, oversimplified. The usual suspects "core-periphery" "center city-other" and even "themed spaces" are poor metaphors for the reality of metropolitan spaces. In such a milieu, both academics and policy entrepreneurs tend to focus on one of these themed spaces as those were the only driving forces of urban development. Thus, we get a focus on "global business districts" that are "in the center" but have none of the characteristics of a "center" except in hyper spaced networks of such places and/or "airport cities" as some new form of urban development. Few of these studies even attempt a relationship between their signification and the three fundamental attributes of economic well-being: productivity, income distribution, and employment.

The real value of the Krugman argument is that metropolitan regions are composed of numerous subcenters, specialized within and functionally different among themselves. All are necessary. They create patterns of trade (the most obvious being between worker and residence). While these employment nodes may contain some housing and vice versa, it is naïve to think of a world of perfect little Howard "town-country" places.

The line of thinking is best reflected by Bogart (2006) and others who are clear in that these sub-centers are functionally specialized and different. Some of these sub-centers – like the central business district – are even further specialization and functionally different (Prosperi, Ozbakir & Erol, 2010).

5.2 Complex Adaptive Systems (Agent-Based, Multiscalar)

If there is a single word phrase that captures much of contemporary urban/metropolitan theorizing, it is "complex adaptive systems". This approach lies at the core of human-ecological conceptualizations (Alberti, 2008); urban/metropolitan economic spatial structures (Batty, 2005), and planning (Innes & Booher, 2010). The key methodological perspective is that there exists "agents" (people, institutions) that act as individuals in a definable way, including aspects of behavior in or control of space. Agent-based models focus on what happens when these agents are allowed to "act out" over time and space. The result is an aggregated pattern, which complexity theorists call a state of emergence.

Moreover, the properties of the emergent pattern may or may not be what would be expected by simple extrapolation of individual actions. Krugman retells the results of Schelling that demonstrate that only very mild preferences for social segregation at the individual level create widely segregated metropolitan spaces. The pattern observable at the higher or larger scale is both dependent (through other forces such as feedbacks) on the individual motivations but also independent (through thinks like non-linear and discontinuous processes). The overall process is multiscalar – behaviors at one level of resolution having observable behaviors at another level of resolution. This point cannot be made strong enough.

Regarding the urban/metropolitan debate, this approach suggests a meta-question: it the debate about individual lives or about the aggregate? This question is often overlooked. What it means for planning is that planning must focus its attention on the behavior of agents: individuals, groups, etc. in an attempt to change behaviors. The patterns that are observed – average GDP – are the result of individual agents acting out their behaviors. The fix must be at the scale of the agent, not at the scale of the aggregate.

5.3 Good Politics, Bad Economics … at the Metropolitan and Local Level

The tendency to base policy (and planning?) on the ideas of "policy entrepreneurs" is seen by Krugman to be almost dangerous. While he uses the phrase "good politics, bad economics" in discussion of national level economic policy, the question here is: does this phrase have meaning at the urban/metropolitan level.

Much of what passes for economic policy at the urban/metropolitan level is copycatting of popular, but unproven, manifestos, normally emanating from the popular press. Witness the craze, for example, about the "creative economy" (e.g., Florida, 2001) or the "pulsar effects" of large institutional or sporting events (ISOCARP, 2002). Simply put, the empirical evidence about the relationship between these "economic policies" and the economic criteria of productivity, income distribution, and employment is scanty, spotty, and may even be regressive (particularly in the case of large-scale publicly financed "games").

5.4 The Polycentric Structure of Metropolitan Governance

Metropolitan governance is a hot issue (e.g., OECD 2001, Feoick 2004, Salet Thornley and Kruekels 2003, Heinelt 2005) particularly outside the US. It represents Ostrom "messiness" and Ostrom "truth".

The new found reality is that the concern about how metropolitan areas are governed is still an open question. What is clear is that these large urbanized settlements are governed not by a government but rather by a nebulous set of institutional actors and relationships. The recent joining of the terms governance with social and/or territorial capital – both hard to pin down concepts – continues an unnerving tendency to "chatter". Under these circumstances, it is not surprising that Salet, Thornley and Kruekels (2003) major conclusion is that there is no best model or framework.

Normative-assertions and story-telling is not enough; empirical relationships need to be verified. Heinelt's story of the "Hannover Miracle" – a joining of public service provision by several levels of government – is a miracle only by proclamation. Collaboration for collaboration's sake (e.g., Innes and Booher, 2010) makes only very limited pragmatic success without observable improvements in the condition of something. Where are the relationships between the institutional structures and Ostrom and Ostroms's six evaluative criteria (economic efficiency, equity through fiscal equivalence, redistributional equity, accountability, conformance to general morality, and adaptability)? A new public economics is needed.

5.5 Performance through Institutional Design

There are two possible intuition pumps here. First, organizational behaviors and institutional arrangements matter. And, second, that this is really a matter of designing complex adaptive systems for individual cases and situations. In either case, the emphasis is on performance.

Europe, in particular, is witnessing the effects of changes in institutional arrangements and organizational behaviors. Due in part to a greater reliance on government interventions (a larger expectation that "government" will fix it), the structure and functions of the EU bureaucracy is the subject of much interest and research. But, the issue is more general than just whining about EU policies and frameworks. The problem is on the ground in metropolitan regions. What are the institutional arrangements in Vienna, or anywhere? Once we get away from economic competitiveness as an object of evaluation (sic), there are few studies that relate such arrangements to more normal primary (Krugman) or primary-plus (Ostrom) criteria.

Second, it is becoming clear that much existing policy frameworks, on the ground, have not yet adopted the complexity driven arguments of systems theory. Copycatting does not work.

The large point is that the institutional analysis approach is useful for the study of contemporary situations, as earlier work on policing has demonstrated. The new "Ostrom challenge" should be the application of her and her colleague's methodology to contemporary urban service delivery.

5.6 It is about the Questions, Not the Rules or There Are No Rules, Only Questions

In her Nobel interview, Ostrom recalls years of frustration in searching for a universal rule or a universal truth! Instead, in the end, she concluded that it is about the questions rather than a set of guidelines of rules. What stands out in the Ostrom oeuvre is a very simple set of elements, all of which must be present. These are: (1) the creation of a conceptual model; (2) a model based on complexity; (3) an empirical approach; (4) concern for outcomes. The IAD framework is a framework for asking questions, finding local truth, and finding interventions that matter in the sense of improving performance.

Consider water. Water is rarely considered as a system; instead we compartmentalize the "water issue" into neat little categories like "water supply for drinking", "pollution and runoff", and "flood control". Today, institutional structures are fragmented (i.e., the Water Directive and the Flood Directive). Would not an institutional approach, developed along the lines of the Ostrom models above, re-focus how we think about water. Such an approach would allow identification of "polycentric" points of governance or "multiple places of responsibility", relating to system functioning. Evaluative criteria follow directly.

6 CONCLUSION

Three arguments have been made and illustrated. First, I briefly argued that contemporary urban/metropolitan communities are better characterized by complexity notions that by simplistic models. Second, that there is something to be learned from an examination of the work of those who have achieved the notoriety of the Nobel Committee – in this case the work of the two most recent winners of the Economics Prize, Paul Krugman and Elinor Ostrom. The quandaries, theoretical premises, and methodologies of these two thinkers have been exposed and reviewed. Finally, I have identified six areas of research and/or planning that could be enhanced by understanding the simply dynamics of the theories of the Nobel Laureates, particularly in relation to the questions of this conference: liveable, healthy, and prosperous communities.

The Nobel Laureates are very different. Despite his earlier de-bunking of "policy entrepreneurs" from grounding in complexity theory, Krugman has become a "policy entrepreneur". He is a prolific writer of "easy to understand" macroeconomic texts. Others in this tradition include Thomas Sowell (http://www.tsowell.com/), the Freakonomic's (http://freakonomicsbook.com/), Fareed Zakaria (http://www.fareedzakaria.com/) and/or Thomas Friedman (http://www.thomaslfriedman.com/). This tradition is akin to the emerging tradition of popular urban writers such as David Brooks, James Kunstler, and historically even Jane Jacobs or popular writers of scientific puzzles such as Nassim Taleb (http://www.fooledbyrandomness.com/) or Leonard Mlodinow (http://www.its.caltech.edu/~len/). [Someone should do a course on these guys/gals. The same argument is made here for the general public.] Yet, Krugman has failed to take his complexity thinking to the macro scale, especially at the national level. His lack of theoretical treatment of these macro systems and his lack of detailed empirical analysis almost

defines him, and leads to criticism. Ostrom, on the other hand, is more of an academic and engaged in the local community. Her thinking over the years has become more complex and more abstract but within the context of improving local conditions. Ostrom's inner strength comes from a fundamental belief in the capacity of individuals and local organizations to find what is best for them. But, in either case, what has been provided here is really only a "chapter 1 understanding" of both; as should be clear, it is the oeuvre that counts, not the individual event. It is probably the same for communities, cities, and regions.

Six research themes were proposed. Simplifying even further and focusing on the scale of the metropolitan region, there are two word phrases that stand out. These are: polycentricity and complex adaptive systems. I, at least, find it interesting that two usages of the term polycentricity have emerged: the spatial and the a-spatial. The spatial is reflected in land use patterns and concentration of specialized and differentiated nodes. This is the view of Anas et al. (1998) and Bogart (2006). The a-spatial is reflected in the web of governance at this territorial level which contains overlapping competencies and interests. This is the world of Salet, Thornley & Kruekels (2003), Innes and Booher (2010), Heinelt (2005) and the OECD (2001). [Parenthetically, the EU uses the word in both meanings. It is clear that an adjective is needed]. The second key idea, complex adaptive systems, is a useful phrase to describe the fundamental process that individual motivations and processes (across the spectrum of economic, environmental, social, and government systems) work and how they are aggregated to produce patterns evident at higher levels of resolution. Change in a level of performance – of economic, environmental, or governmental system – is probably best accomplished by changes at the individual level. Characterization of functions as complex adaptive systems allows points of intervention – and hence governance – to be realized and analyzed.

So, here, we have the basis for action. Thus, it is not a set of universal guidelines for structure; rather, it is a set of universal sets of questions about process. It is about the questions and the ultimate tie to performance of our communities. The new challenge for academics, planners, and policy makers is to improve our thinking about public goods and services, including new ones like "knowledge" (Hess and Ostrom 2007) in a continuing effort to create liveable, healthy and prosperous communities, cities, and regions.

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🏆 *reviewed paper*

Old Brownfields, new Parks of Tomorrow. Chances to Improve the Environment of the Cities

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1 ABSTRACT

The contribution intends to present the importance of green spaces in the urban structure, their meaning for ecological and social quality in the city and their importance for the economic value of properties. It gives an overview on the originating of brownfields – urban waste land and the chance and opportunity to use them for improvement of urban districts. Two specific aspects were regarded more detailed, the importance of the integration of the inhabitants in the reuse process and the meaning of green spaces for the land value. By presenting examples of different German cities, the authors specify these aspects and point out the importance to include those in the urban planning process. The combination of social activities and economic factors occupies an important role in the sustainable urban planning process and how to consider them can be an advice for other cities.

2 BROWNFIELDS/ URBAN WASTELAND/ ABANDONED OR UNDERUTILIZED LAND, BACKGROUND

The growing number of urban wasteland is a worldwide phenomenon and has different reasons often they are the result of an economic change. In general, it is combined with a loss of population. Due to political and economic reasons parts of cities fell and still fall apart and thereby create a specific planning and development problem. We can find examples in Germany, in the Ruhr Area and the New Bundesländer; in Great Britain, we can find them in Manchester and Liverpool; in the USA, e.g. in Detroit and it is Osaka in Japan, we find them even in the Russian Federation, in Ivanovo (ATLAS OF SHRINKING CITIES 2006). An example of a shrinking due to geographical circumstances we can find with New Orleans (flooding) or the Chittagong Region (storm). But often we see a recovering of these cities.

In general we find the decreasing population in industrial countries, while the population in the developing countries is growing, combined with an enormous demand of open space. In these city regions, the problem is more one of the low quality of residential areas and therefore the question how to improve these quarters and how to do this ideally together with the inhabitants.

As a result of an experience phase of more than two decades we can learn from the so called old industrial countries how to deal with:

- The problem of industrial brownfields – which will be also created in developing countries - with a lot of serious pollution.
- The decreasing quality of residential areas due to social problems.
- The abandoned, empty residential areas, caused by a moving and declining population.

The question is how to stabilize these parts of the city, often well-equipped with infrastructure, but with a negative image and undergoing a severe demolition process.

To redevelop the inner city areas also helps to avoid the process of urban sprawl. One of the main goals in the Federal Republic of Germany is to reduce the land use from ca. 100 ha per day down to 30 ha per day (DEUTSCHER BUNDESTAG 2004). To reach this goal German cities have to follow the “inner-development instead of outer-development” principal. That means that they have to use areas located within the built-up area and not at the fringe of the city. Developing and stabilizing these urban areas and to make them usable and attractive for new people and companies can be regarded as a part of sustainable urban development. Since the Rio Conference in 1994 sustainability is a general political objective in the urban planning process.

The following figure shows the elements of sustainability.

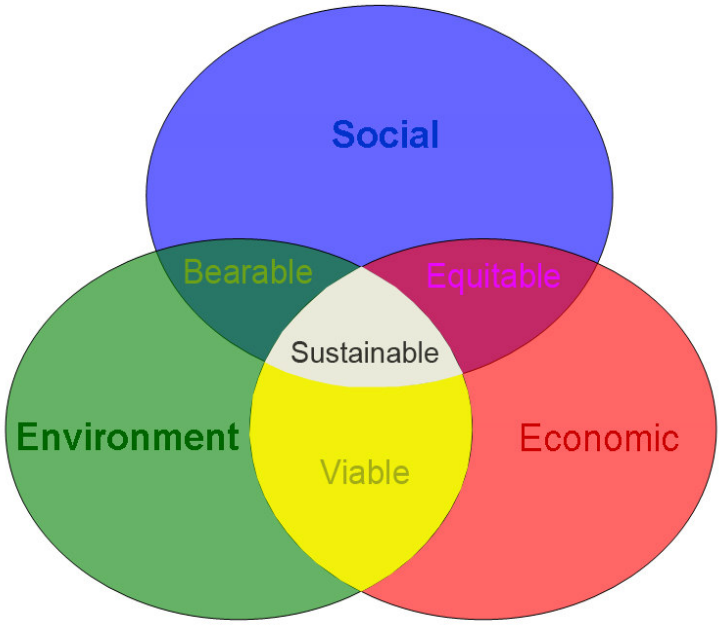

Fig. 1: Elements of Sustainability

Starting from the general definition of sustainability we can define: “Sustainable brownfield regeneration is the management, rehabilitation and return to beneficial use of the brownfield land resource base in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations in environmentally non degrading, economically viable, institutionally robust and socially acceptable ways.” (Rescue 2005: 11)

Using a brownfield or an abandoned site for a new development has many advantages. The good quality of the site in ways of centrality, public transport connections and often the urban environment and neighbourhood are good reasons. On the other hand the costs of technical infrastucture for a community are the higher the lower the settlement density is: 1.400 €/year/ inh. for single family houses; 500 €/y/inh. for multi family houses in inner city. In times of low public budgets this is a good argument for inner city development. (FEDERAL ENVIRONMENTAL AGENCY 2003; BESECKE 2005)

In Germany the Federal Environmental Agency published a guide book with the title “The Future lies on Brownfields”, which is an information for investors and real estate owners. This guide book stresses the meaning of cooperation and public private partnership on the one hand and the importance of creating an environment with a high quality, including adequate open spaces. This is the base for the concept of green parks and gardens on city wasteland, implemented with the inhabitants.(F.E.A., ICSS, 2005).

The experience of 20 years of sustainable brownfield regeneration, not only in Germany, but also in Europe, can be used as a reservoir for ideas which could be transferred to other countries. It is not only the aspect of developing of already used land but also the requirements of sustainable treatment of the natural resources. The focus however of this contribution lies on the development of brownfields to green areas, the participation of people and the enhancement of the property value through a green environment.

3 FUNCTIONS OF GREEN SPACES

In many European countries a contradictory debate of the value of and the benefits from urban open spaces is going on. On the one hand, they are highly regarded not only due to social, ecological and health related matters, but also increasingly to economic benefits resulting from them. Above all, they are seen as a mean to counter act migration out of cities and, thus, the deterioration of wide parts of the city centres. On the outskirts, their importance for the attractiveness of areas of complex housing has recently been recognised, at least in Germany. Finally, the provision and the quality of urban open spaces increasingly represent an important soft location factor for cities particularly with regard to attracting companies to settle down (FLL 1999; LUTHER 2000).

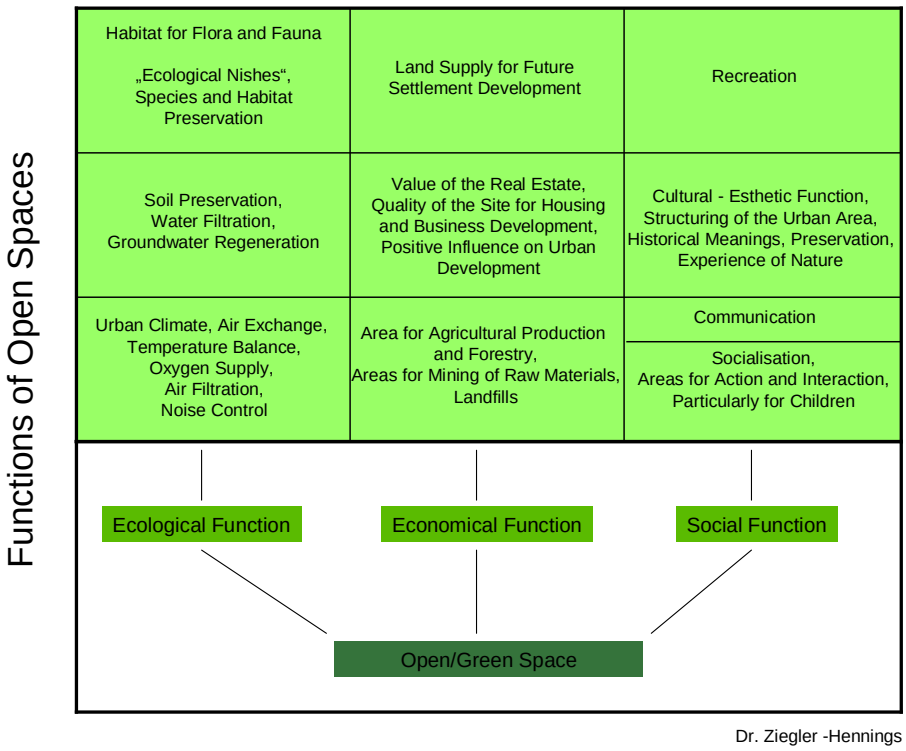

Fig. 2: Functions of open spaces

The social and economic function of open spaces often cause each other, even though they are sometimes in competition with the ecological functions.

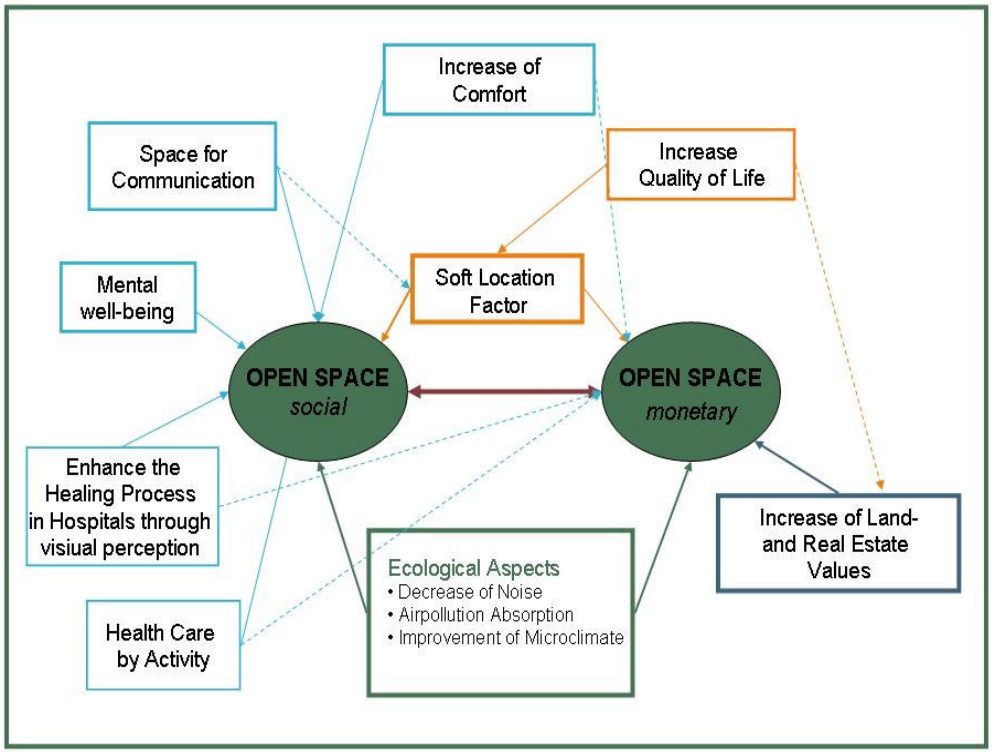

Fig. 3: Social and economic factors of open space

People are willing to pay a large amount of money to obtain property close to a park or any other kind of open space of a good quality. (SHERER 2006). The reason for this phenomenon is founded on the fact, that

living near to a green space can achieve many possibilities to do something for health and well-being and it allows the opportunity to socialize.

It is proved, that green space has a positive influence on human health and well-being. A study from the Netherlands has shown that looking out of a hospital room into the green significantly shortens the healing process of the patients.

Using green spaces is limited and determined by several factors, if they are not fulfilled green space has a very low social and economical impact.

These factors are:

- Accessibility within 10 minutes walk or biking,
- dimensions of green space, larger ones are more attractive than smaller ones,
- subjective feeling of safety and
- the attractiveness of the green space (playground, outdoor furniture, water…) (GÄLZER 2001)

The access to green space within a short walking distance influences the willingness of outdoor activities. If a person needs too much time to reach an open green space he will not use it.

Through the engagement in regular physical activity you can reduce the risk of premature death. If you enable the inhabitants of a city to gain access to a nearby open green space they are more likely to exercise and that supports the mental and physical well-being. (GIES 2006).

An urban green space is always a place of communication and a meeting point for different kinds of groups, for example, children, mothers with little kids or older people. Getting in touch with others is important for forming a community. Young families for example are very interested in getting in touch with other families to get their kids in contact. The importance of play because of the "playing is learning" idea is an important factor even for families with young children. They integrate this knowledge in their search for a home. (GIES 2006: 17). These are reasons for a location decision in the settling process.

Green is a soft location factor as mentioned before and shown in the figure 3 above. Mental well-being, communication and health are important parts of human life and so a lot of people are interested in supporting those functions. But as said before, the quality of the green area is important for those two functions of green. The park or green space, in other words, must be safe and of high quality. The definition of high quality is discussed in the case study, which is presented in chapter 5.

The entire above mentioned are reasons why green space has an economic function besides the social and ecological ones. People nowadays are willing to pay more money for more green. That causes an increase of land and real estate values. (GRUEHN 2006)

This increasing value of land and real estate prizes is not only valid for residential housing but also for commercial buildings. Ernst and Young showed this in a report they did for the "New Yorkers for Parks" Initiative. The Bryant Park, which was redesigned and reopened in 1992, for example, raised up real estate prices between 115 and 225 percent between 1990 and 2000. (ERNST AND YOUNG 2003)

4 GREEN DEVELOPMENT (WITH HOUSING) AND CIVIC COMMITMENT

There are different views and approaches regarding the combination of brownfields and open space planning. One view originates in the context of sustainable urban development and concentrates on the protection of greenfields and landscape at the border of cities through the development of brownfields. Another view stresses the development of biotopes with rare species on the brownfields site itself. In this context the brownfields should be defined as nature protection areas. A third view takes into regard the improvement of the environment in residential areas by creating new parks on abandoned sites.

As mentioned before, green spaces or parks have several functions for the inhabitants. Beside the improvement of the natural environment as water and local climate they play an important role for the recreation, for children's play and for social life. Therefore it is important to plan and to implement a net of residential open spaces, parks and green connections for pedestrians and cyclists. Green development of brownfields can contribute to these concepts. For economic reasons often a combination of housing and

green spaces is desirable. And there are many examples of successful neighbourhood of green and housing plots.

As a result of so many different social and economical circumstances the concepts demand a high flexibility. One main distinction exists between temporary and permanent use. The following figure shows the wide range of green uses. To maintain the green plots civic commitment and the cooperation with the inhabitants is important.

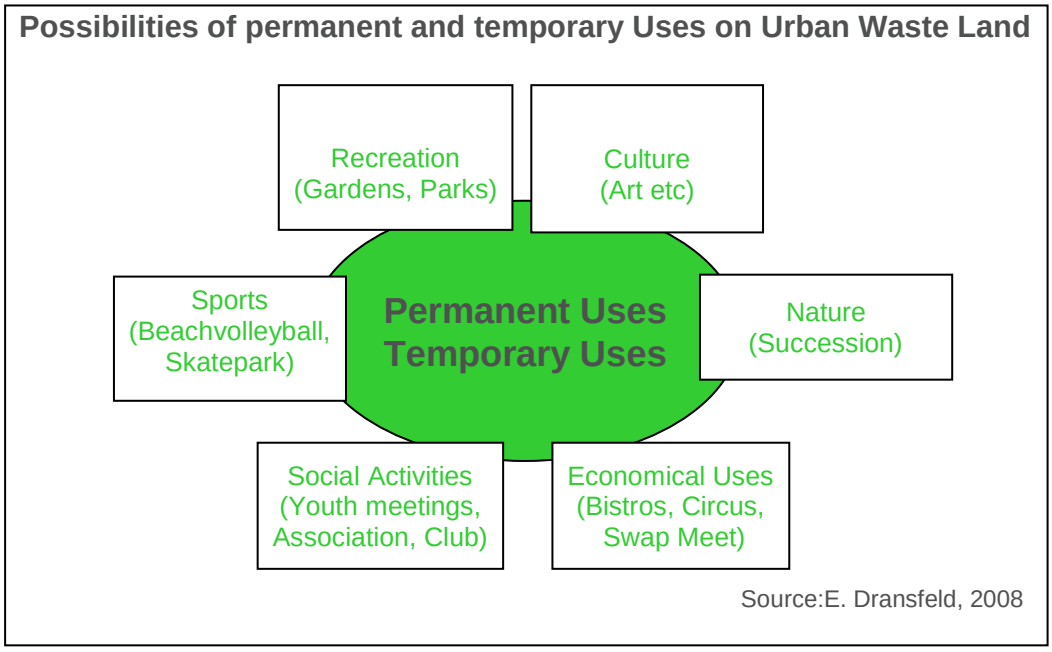

Fig. 4: Possibilities of permanent and temporary uses on urban waste land

In the following, three different approaches will be described concerning green space development (with residents) on brownfields - urban waste land:

- New green residential areas.
- Spaces for children's nature experience, wilderness for children.
- Temporary uses with citizens.

4.1 New green residential areas

As mentioned, the combination of housing areas and open spaces has many advantages. It causes a better quality of living and therefore people stay in the inner city. It increases the value of the property and guarantees a reasonable price. It even strengthens the identification of the inhabitants with their quarter and the willingness to care about green spaces.

In Germany we can find interesting examples in the Ruhr Area with a lot of industrial brownfields or in cities as Freiburg with big former military sites. In the Ruhr Area the International Building Exhibition from 1989 to 1999 was established. One of the central themes was housing, including the refurbishment of old worker settlements as garden city types and the construction of several thousand flats on brownfield sites. The following examples could be showed:

Bochum, Zeche Holland: Mulitfamily housing on a former mining site sourrounded by green and water.

Dortmund, Tremoniapark: Singlefamily housing around a park on a former industrial site.

Freiburg VaubanViertel: housing in different structures with a lot of green and good environmental concepts (e.g. energy)

4.2 Spaces for children's nature experience

This type of green brownfield combines two aspects. The genuine development of nature and the free, wild play of children. Children, often raised in an artificial environment, lose the contact with nature and do not experience the feeling of "wilderness". In these "Naturerfahrungsräume" they can learn the identification

with nature, the self determined play and some knowledge about ecology. Especially for schools such areas (1-2 ha=2,5-5 acres) are important places as outside classrooms. A research study is recently done to evaluate the positive influence of these spaces for children's health and attitudes.

Examples of playgrounds for children; paved unattractive environment and green spaces for free, creative planning.

Own source (Source: Tschäppeler, S. et al.: 2007)

4.3 Temporary uses with citizens

Especially the cities of Germany's East have to deal with a declining population, the moving away of people and remaining areas with little development chance. Therefore "temporary uses" for these building plots and sites have become an important phenomenon in city development. Temporary uses today are the product of structural changes in the economy. They are a strategy in a transformation process, they must be developed together with the citizens and they must be integrated in the urban planning remit.

Berlin and Leipzig present important examples of these transformation strategies. Berlin has about 1000 building plots with 170 ha in the inner city and is a pioneer in the creative development of these properties.

Leipzig as a member of the program " Urban Redevelopment Scheme in former East Germany" took part in the research study "Temporary Uses and new Open Spaces".

Leipzig lost 20% of its population and has a surplus of 60.000 flats. Both cities are very progressive in ideas and concepts for the empty space development and follow a strategy which has the participation of citizen as an objective.

The range of development projects is extremely wide, e.g.: New parks and urban forests in large residential areas; summer-gardens with the neighbours; coloured gardens, asylum plant flowers and vegetable; gardens for disabled people; school gardens; playgrounds for children; urban farms for urban children; BMX spontan, a sporting area for bikers; SANDSATION, sculpture park; nature conservation projects with livestock.

There are numerous projects. The common idea is the toleration of the owner of a temporary use, often the citizens' initiative and the support by the city. Often these projects are realized with a very low budget.(Ziegler-Hennings, Chr.: 2007)

5 INCREASING VALUE THROUGH GREEN SPACE (CASE STUDY FFM)

Increase of property and real estate value, is that possible?

At present, less attention has been paid to urban open spaces in every day political and administrative life. This has led to a severe neglect of these amenities. As a consequence, they do not only lose their positive effects on the environment in terms of ecosystem services to a great extent, but might also actually be partly responsible for an accelerating decay of certain parts of cities because unkempt, littered and run down parks are often associated with crime and under-privileged neighbourhoods by the public (Mahler 1998, Urban Park Forum 1999). The location of a site is the main factor for fixing property and real estate value, the factor open space is part of the location factor.

The economic effects of (urban) open space, as described in chapter 2, need to be pointed out, especially for developers of cities. Consequently, for a rational debate on the importance of (urban) open spaces and their

economic effects, it is important to find out more about which kinds of open spaces are appreciated by the public and which economic benefits actually result from them. This is the main goal of a research study on behalf of the GALK DST (German Federation of Park and Recreation Administration)) named "The Effect of Urban Open and Green Spaces on the Value of Properties and Real Estates". Against the background of the completed research study (at the University of Berlin and the Austrian Research Centers, Vienna) as well as the purpose of the project, to create a representative, German wide data basis for the evaluation of property and real estate values, is one aim of the project, to enlarge the data basis of about 15 cities about 10 more cities in collaboration with the already concerned cities of the former study. Afterwards the complete dataset has to be statistically evaluated and produced in a report. Additionally there will be a city specific analysis of some cities.

Statistical analyses of land value data from European Cities based on random samples reveal new information regarding economic benefits of open spaces (LUTHER 2000; LUTHER & GRUEHN 2001; LUTHER & GRUEHN 2002; LUTHER, GRUEHN & KENNEWEG 2002; GRUEHN 2004, GRUEHN 2006; HOFFMANN, GRUEHN 2010).

The aim of the research is:

- to discover the relationship between land value and the provision and quality of open spaces as well as
- to verify the value-increasing effects of urban open spaces by means of statistical methods.

The central hypothesis is:

Open spaces, or, respectively open space related criteria, have a positive influence on land value.

The research method is a statistical analysis of collected data, which describes on the one hand the open space itself and on the other hand the street sections, which are defined at the beginning as an average and stratified sample.

Data acquisition comprises two types of data, dependent variables (e.g. land values) and independent variables (open space related variables referring to street sections or open spaces in the vicinity of the examined plots). Additionally control variables (urban density, urban development restrictions or allowances) were included to eliminate interpretation errors (see figure below).

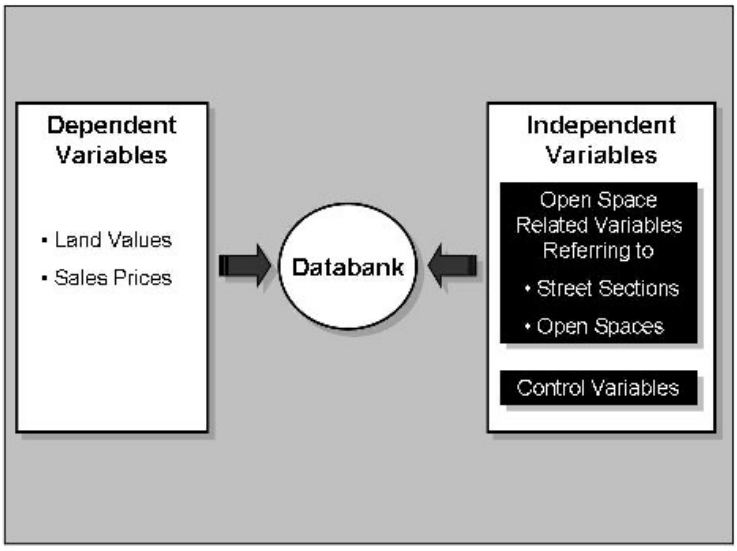

Fig. 5: Data Acquisition

The identified street sections are the locations of examination (US 1 and US 2 in the figure), 150 in each participating city. To identify green spaces relevant for the analysis we surround the locations with 500, 1000 and 1500 meter buffers. The following list gives some examples of open space related criteria which is collected and analysed in this study:

- Distance (of the sample elements) to neighbourhood open spaces,
- number of listed gardens within a radius of 500 m,

- lack of local city parks in specific urban environments,
- vicinity to open spaces and inshore waters,
- number and size of nature reserve areas or areas of great natural value in the vicinity of the sample,
- visual street quality,
- urban fabric.

Hypotheses were formulated which stated that each of the above mentioned criteria has a positive effect upon land value. Whether or not the hypotheses were correct was determined through the application of specific statistical tests on the data collected. A confidence level of at least 95 % (i. e. a p-value $\leq$ significance level α ($\alpha = 0.05$)) is necessary to accept a hypothesis. If accepted under this condition, there is a significant connection between the sample and the population from which the sample was drawn. In other words, there is a significant effect upon land value of the criteria examined.

The ANOVA (analysis of variance) was the main tool for the statistical analysis. It is a method which helps to detect the effect of certain variables on one or several other variables (BACKHAUS et al. 1996). Its purpose within the survey was to examine if there is a statistically significant effect of the independent variables (location criteria) on the dependent variable (land value). If so, additional statements regarding the level of the influence can be derived. Thus, it is possible to distinguish and to weigh the individual location criteria with respect to their importance as regards land value.

In addition to the ANOVA, other test statistics were applied, depending on the quality of data available and on the specific questions to be researched: the t-Test and nonparametric procedures, like e. g. the KRUSKAL-WALLIS-H-Test and the U-Test of MANN and WHITNEY.

The case study presented in this paper is placed in Frankfurt Main, Germany. Additional to the case study, which is under process, we will present results of the former study, carried out by Prof. Gruehn, from Berlin and Malomoe. Pre-analyses have shown that there is a missing of high and very high quality green areas within the boarder.

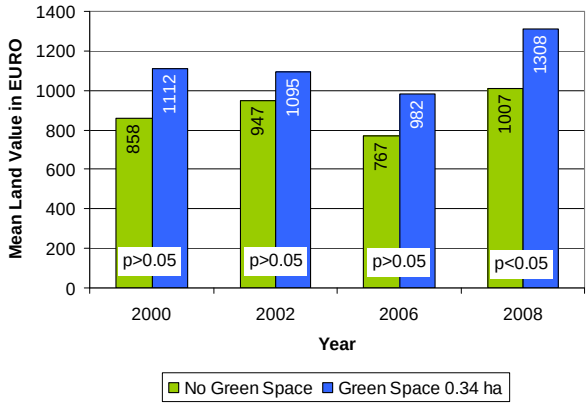

Fig. 6: Effect of the existence or not existence of green space on the mean land value

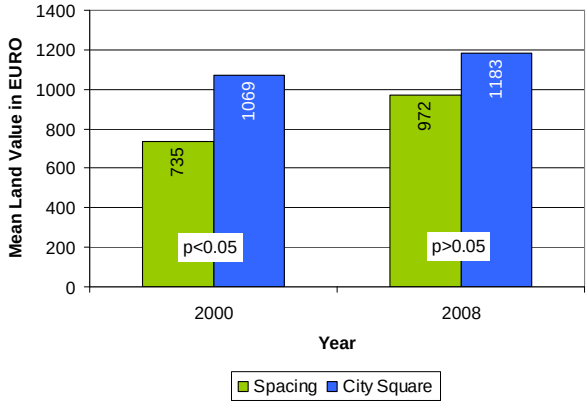

Fig. 7: Effect of spacing areas and city squares on the mean land value

As you can see in the figure above (6) effect of green space in cases of existence or not existence within a 100m radius around the locations of examination can be shown from 2000 to 2008 by of the mean value of the land value in the area around the future European Central Bank building. The result of the executed t-Test is that the values for 2008 are significant with $p<0.05$.

As you can see in figure 7, there is a difference in the mean land value between locations of examination with a spacing and those with a (green) city square of high quality related to the intensity of design. The mean difference is significant to a 95 % confidence level (t-Test) for the year 2000. Frankfurt has a very strong real estate market, so that the significance is getting lower in the years 2002, 2006 and 2008.

Also significant results can be shown from Berlin in Germany and Malmoe in Sweden. The data analysis for Berlin revealed that the extent of the sample land values is unambiguously dependent on the distance of the statistical blocks to their next neighbourhood open space. Comparing the means of the different categories, it can be shown that land prices decrease with a growing distance to this open space category (Figure 8). The mean value of the blocks with a distance less than 400 m is about 170 €/m² higher than the mean land value of blocks with a distance more than 400 m. The mean difference is significant to a 99.9 % confidence level (t-Test).

Fig. 8: Effect of the Distance to Neighbourhood Open Spaces on the Mean Land Value in Berlin (t-test)

Also the data analysis revealed that locations with a high density of listed gardens have significantly higher land prices than those with a lower density (Figure 9). If there are at least two listed gardens within the radius examined, then the plots are on average about 370 €/m² more expensive than those without such a feature. The variable ”Number of listed gardens within a radius of 500 m” has an effect of 18.9 %, i. e. the variation of land prices is nearly 20 % dependent of this factor.

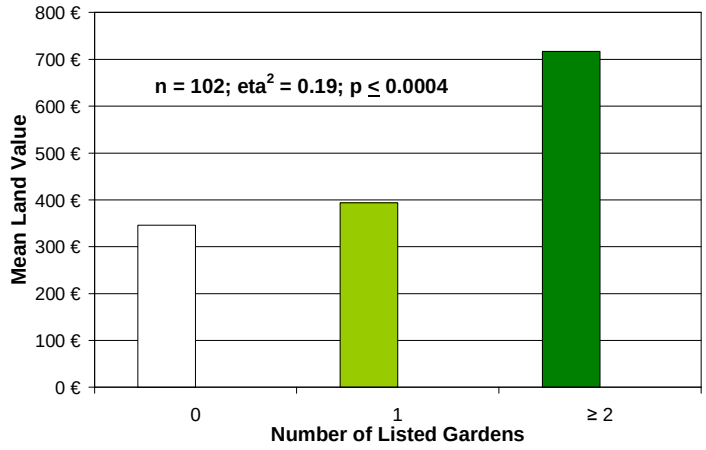

Fig. 9: Effect of Listed Gardens within a Radius of 500 m on the Mean Land Value in Berlin (ANOVA)

Figure 10 points out the effect of local city parks and missing of local city parks respectively, on the land value on residential quarters in Malmoe (Sweden). The data is valid for mixed development zones in the inner city, which are characterized by enclosed block development. Missing of local parks is linked with a significant negative impact on the mean land values in both cases, apartment houses and offices. The absence

of local parks explains 13 % or 22 % respectively, of the total variation of land values in mixed development zones in the inner city of Malmoe. The effect is significant to a 99.9 % confidence level.

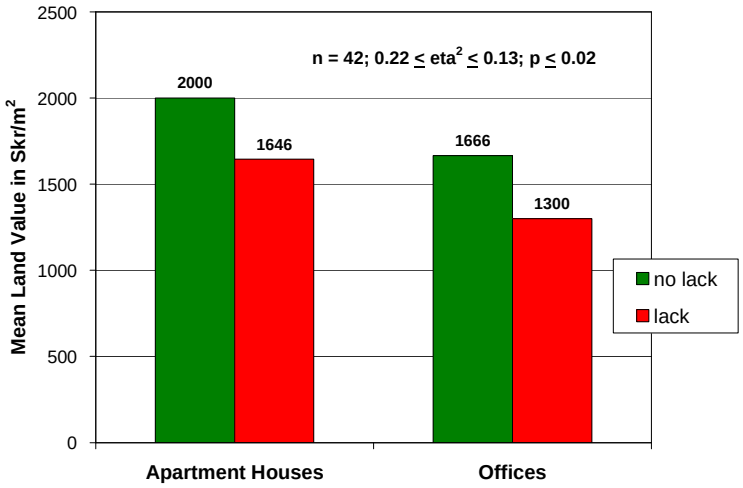

Fig. 10: Effect of Missing of Local City Parks on the Mean Land Value in Residential Quarters in Malmoe/Sweden (ANOVA)

6 CONCLUSION

The results of the described examples and the conducted studies present the importance of green spaces in the urban structure, their meaning for ecological and social quality in the city and their importance for the economic value of properties. The paper gives an overview on the originating of brownfields – urban waste land and the chances and opportunities to use them for improvement of urban environment.

Two specific aspects were regarded more detailed, the importance of the integration of the inhabitants in the reuse process and the meaning of green spaces for the land value. By presenting examples of different German cities, the authors specify these aspects and point out the importance to include them in the urban planning process. As shown through statistical analysis the land value and the prices on the real estate market are dependent on the existence and quality of urban green spaces. The inhabitants recognize very well the quality of their urban environment. The combination of social activities and economic factors occupies an important role in the sustainable urban planning process. The presented way to consider them can be an advice for other cities.

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🏆 *reviewed paper*

Perspectives for urban experts in future urban development and mobility practice in Serbia

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1 ABSTRACT

The focus of this paper is in reviewing the possibilities of new designed and tested teaching concepts, methods and skills at the Faculty of Architecture Belgrade University (FABU) based on the contemporary theoretical and practical European approaches in the field of sustainable urban transport and mobility and implications for future urban experts in the field of urban development and mobility practice in Serbia.

The importance of knowledge and information is rapidly rising in the knowledge economy especially in cities as nodes of production, processing, exchange and even trade of knowledge. Important role in that process which occurs in cities belongs to the Universities and research institutes, beside many other relevant actors like public authorities, NGO's & CBO's, private companies, civil society.

In the process of Serbia's accession to the EU the whole country is in the process of reform dealing with burdens from the past and aiming towards European values. Legislative as well as capacity building activities are present from the year of 2000 by democratically elected governments and by international NGO's and official governmental organizations (EU commission…).

FABU participates in the FP6 EU funded project 'Sustainable Surface Transport' as one of the partners in the project, disseminating knowledge on sustainable urban transport and mobility.

The project has enormous importance for improvement of all our institutions in the field of clean and sustainable urban transport systems and promotion and participation of Serbia in European Union projects. Benefits of using ELTIS web site is that experts from various fields can expand their knowledge on sustainable urban transport and mobility systems using findings and specific experience from other countries.

With the aim of disseminating knowledge on sustainable urban transport and mobility in Serbia the Faculty of Architecture realized several activities and results on urban transport and mobility issues:

- Promotion of ELTIS web site on seminars, round tables and trainings delivery in Serbia to public sector representatives (ministries, local authorities, urban planning traffic departments), NGO's (bicycle associations), private sector urban design offices.
- Translation of 56 English case studies into Serbian language and 13 Serbian case studies accessible on the ELTIS web site.
- In the education curriculum at the Bachelor level at the Faculty of Architecture new subject ''Mobility in cities'' was established two years ago where students work with realized EU and Serbian case studies on sustainable urban transport and mobility and its implications on urban structure, compare EU & Serbian context and give recommendations in mentioned field in soft aspects for policy issues, urban planning & management concepts, and urban design.

These new teaching concepts and methods designed & conducted by the authors of this paper were tested for 2 semesters and proved to add value to the knowledge and specific expert skills in two direct ways. One was that the increased demand from the students on sustainable design and urban mobility led to the additional subject ''Traffic in cites'' introduced last year. Another direct result was visible in the Urban Design Projects on Bachelor and Master level of studies where students applied new knowledge and skills on aspects of urban design and planning of the development of cities and reaching liveable and healthy cities for all users in accordance with principles of sustainable mobility concepts.

The paper explores and discuses new knowledge from the comparison of European and Serbian context and its applicability in the future urban development and mobility education and practice in Serbia.

2 INTRODUCTION

Aware of necessity of significant changes in Serbia, we are nowadays dealing with the problem of defining how to adjust our existing institutional and public authority capacities and their activities to the strategic development model demands. The major problems are appearing from incompatibility of existing

institutional and governmental capacities and their activities, established 50 years ago, in comparison to the organizational demands derived from new modern model of governance and management. Changes that are to be made mean fundamental reorganization of public sector.

In the process of Serbia's accession to the EU the whole country is in the process of reform dealing with burdens from the past and aiming towards European values. Legislative as well as capacity building activities are present from the year of 2000 by democratically elected governments and by international NGO's and official governmental organizations (EU commission…).

3 CHALLENGES FOR FACULTY OF ARCHITECTURE'S PARTICIPATION IN EU FUNDED PROJECTS

Under the coordination of prominent Austrian scientific research association Forschungsgesellschaft Mobilität gemeinnützige GmbH FGM AMOR Austrian Mobility Research (AMOR) Faculty of Architecture University of Belgrade (FABU) participates as a partner in the FP6 EU funded project 'Sustainable Surface Transport' from the year of 2005.

The Project aims to achieve international cooperation and review the possibilities of application of the results achieved so far within the EU FP6 projects in countries that have recently become EU members or countries that are its potential members. Participation of FABU in the Project is of the great importance, since it was the first time that one of the countries from the Western Balkans, potential EU members was included in the EU FP6 program.

European Union (EU) and European Commission have made great efforts for a long time in promoting sustainable urban transport. One of the ways that is the part of the Project is European Local Transport Information System (ELTIS) – an initiative of the European Commission's Directorate General for Energy and Transport. ELTIS is website that provides access to the best scientific and practical results and research materials for training and learning in the field of sustainable transport systems. The aim of ELTIS is to provide information and support a practical transfer of knowledge and exchange of experience in the field of urban and regional transport in Europe.

The Project's primary objectives are:

- to make easier to use and allow users easy access to all relevant information (news, files, materials)
- to increase the number of available examples, materials, and translations and to include new content and topics;
- to increase the number of users through the construction of ''brand'' ELTIS Web site and allow a professional Marketing (goal is that ELTIS website become ''Google''search engine in the field of transport);
- to focus attention to the new EU countries and countries in the EU accession process through a system of expert training and workshops, translation of the most important examples of the languages of these countries and to offer active user support;
- to offer non-traditional ways of knowledge dissemination.

Through the ELTIS website it is possible at this moment to directly establish more than 150,000 contacts through various user's network that ensures the project's broad and far-reaching impact even after completion (expected in april 2010). It has been expected in 2005 and has been realized so far that inclusion of non-European partner network (Eastern European, Asian and Latin American) will enable new initiatives for the successful exchange of knowledge, and Europe on the other side will be able to promote its own approach to issues of sustainable urban transport systems on a global level and contribute to global dialogue.

The expected result of the implementation of the Project is increased level of knowledge and practical use of research results developed in the enlarged EU. It should be achieved through expanded ELTIS service, specific activities in the field of education and training of professionals and focused on development initiatives.

In that respect, FABU prepared and realized several activities within the Project with direct showing benefits to relevant stakeholders such as policy and decision makers, politicians, heads of urban management departments, public transport operators, practitioners in the field, university staff, researchers, students:

- Access to the Information network users through ELTIS web service;
- local representation of realized and potential projects (both research and practical) in the field of sustainable transport systems at European and world level;
- involvement in a series of workshops on topics of ecological and sustainable urban transport system that FABU will organize and implement;
- access to brochures and other relevant research and practical materials specifically oriented to the problems of the partner countries (in English and Serbian language);
- the possibility of inclusion in training courses for the training of experts.

The project has enormous importance for the capacity building activities of our institutions and organizations in the field of clean and sustainable urban transport systems and promotion and participation of Serbia in European Union projects.

Benefits of using ELTIS web site is that experts from various fields can expand their knowledge on sustainable urban transport and mobility systems using findings and specific experience from other countries.

With the aim of disseminating knowledge on sustainable urban transport and mobility in Serbia the Faculty of Architecture realized several activities and results on urban transport and mobility issues:

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4 REFORM OF HIGHER EDUCATION AT THE FACULTY OF ARCHITECTURE BELGRADE UNIVERSITY (FABU) AND RELATION TO EU PROJECT

University of Belgrade exists from 1846. Throughout the history it has changed several times its organizational form, but on the other hand many of the principles are rooted deep and it is almost a rule that change is something that happens very slowly in academic world.

Until the year of 2005 organizational form and structure of FABU dated from after the World War Two with cathedras as basic organizational units with different subjects within them. There were several attempts of radical change of educational plan and program and therefore organizational structure of FABU, but more or less they remained incremental or temporary.

Most of the proposed changes in the past failed due to several reasons, but most important was the resistance of people to change due to established norms and values within character of organizational structure mentioned above. Another reason was that there were not real pressure from outside environment that would call for fundamental change, especially in "well designed and planned system as Socialist centrally driven system was".

Things have changed with the political and overall changes in Serbian society at the end of '90s. Shifts from centrally planned to transitional economy in Serbia and attempts to follow European integration processes have had major impact on the FABU. Most important inputs are: 1) Bologna declaration, 2) Legislative change in Higher education in Serbia (new Law on Education from 2005) and 3) obvious need for improvement of Educational Processes and Programs at the Faculty.

Finally, Bologna declaration brought the change in 2005 both in organizational system of the Faculty in terms of:

- 1. three years of basic, Bachelors studies and two years of Master studies;

- 2. cathedra based organizational arrangement to independent subjects and their relations due to need of Educational programs;

Those changes created the platform in which new elective subjects could be established and included in the Faculty curriculum with the cooperation with other institutes or within national or international projects.

5 NEW CONTEMPORARY MOBILITY ISSUES AND CONCEPTS FOR FUTURE URBAN DESIGNERS AND ARCHITECTS

Education on the subject ''Mobility in cities'' is directed to explore contemporary aspects of multimodal transport in urban areas in order to achieve sustainable development of urban areas. Education aims to reach the outcome (product, result, effect) and the process (action plan, working method, route, activities). The goal is that students gain a basic understanding of modern management concepts in transportation systems and mobility in relation to land use in urban areas. It is also important that they understand the role of architects and urban designers and planners in these processes along with other experts and stakeholders such as public authorities representatives, local communities and their needs, private sector interests, etc.

Students acquire knowledge on methods, techniques and skills on organization of sustainable urban transport systems in relation to land use in order to apply their knowledge and learn what kind of implications will decisions based on principles of sustainable transport will have on the spatial organization.

The main goal in the teaching process is dissemination of aspects of design and planning of urban structure development in order to achieve higher levels of quality of life in urban areas in accordance with the principles of sustainable urban transportation systems.

Subject outcomes are closely related to the problems of urban design and planning and students applied new knowledge on the subject Urban Design Project on the same semester and in the Bachelor Design Project.

The basic knowledge and learning outcomes that students gain on the subject are:

- Understand key contemporary disciplinary issues related to enabling multimodality problems of transport and mobility of people in urban areas through the review of the basic assumptions in the field of sustainable transport: mobility management, parking management, relation of land use planning with the sustainable transport, aspects of safety and environmental protection.
- methods of mobility management, parking management and relation of land use planning with the sustainable transport
- Practical knowledge of the principles of urban design in accordance with the requirements of high mobility and sustainable transport in the city.

This theoretical and practical knowledge increased the competence of students in solving problems of urban design and planning in accordance with the principles of sustainable transport systems in the city and skills to collaborate with experts in the field of integrated transport in solving urban problems in a competent way.

Method of teaching that were used during the course were divided into two main blocks:

- Block of interactive lectures divided into four groups of basic trainings in the field of relation of land use planning with the sustainable transport, mobility management and transport, parking management, and safety and environmental protection;
- Block of exercises divided into two parts where students work on:
    - 1. The study of literature and analysis and comparison of implemented cases from the European Union and Serbia from one of these areas of their choice;
    - 2. Thematic exercise: analysis of selected specific real urban situation and forming conceptual proposal and solutions from one of these areas of their choice;
- Two presentations of added knowledge on key issues based on the results of implemented: 1) research, analysis and comparison of cases, and 2) the proposed solutions;

Final research report include findings from the research analysis and comparison of EU and Serbian cases, as well as guidelines for soft policy measures in the field of urban design and planning in accordance with the principles of sustainable transport in our community.

Students deal with important questions such as: What is missing in Serbia so that similar principles / decisions / actions like in EU can be applied in this context (for example: lack of integrated policies, transport awareness campaigns, institutional resources and know-how, the will to change or learn, the participation of relevant stakeholders, guidelines, laws, monitoring results, etc.)? What are the benefits in Serbia or what is better done than in the European Union, or what the pitfalls are? Further recommendations are given as the series of future and next steps in capacity building, travel awareness, stakeholders participation, campaigns targeted towards end – users.

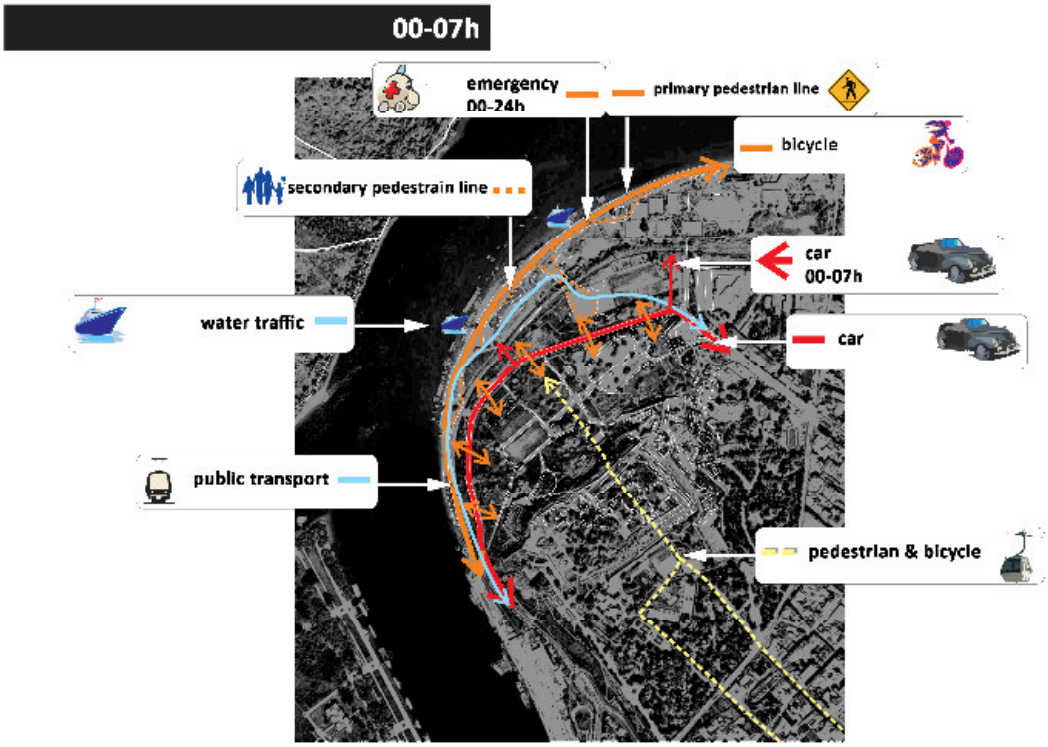

Fig. 1: Application of knowledge from ‘’Mobility in cities’’ on student’s Master Urban Design Project (students Jovana Pavić and Stefan Drašković)

6 CONCLUSIONS AND EXPECTED IMPLICATIONS

Following criteria that the teachers and the authors of this paper included in the evaluation of results and findings are important both for the improvement of the subject ‘’Mobility in cities’’ in the education process and for the specific knowledge and skills in the field of sustainable transport for future urban designers and architects.

- ‘’emotional perspective’’ in order to support ideas and concepts for clean and sustainable urban transport like e-mail gimmicks, cartoons and illustrations;
- acceptance of professional English language terms with the outcome of reading and understanding English literature in the field of sustainable transport and sharing knowledge and experience with the global community;
- flexible process - students attitudes / stakeholders in real arena towards new topics (student’s identification of specific Serbian cases that are further presented, discussed and approved both by teachers and other students);
- identification due to flexible process that creates sense of belonging within the group and forming of identity trough the Case (for example – students often tend to call students upon specific cases they have elaborated – ‘’Drunken drivers’’ for special service for drunk car drivers that want to safely be driven home by motor bikers);
- non-traditional ways of information and dissemination trough visual products from ELTIS such as brochures, website, presentations;

- attendance on local conferences and seminars in Serbia and enlargement of knowledge with relevant stakeholders from the region and neighbouring Balkan Peninsula countries;
- interactive workshops with guest lecturers from public enterprises in the field of sustainable transport, representatives of NGO's and CBO's;
- 24/7 on line support and e-mail communication with students / or end-users in ''real urban arena'' up to the creation of mobility centre for information; and,
- student's point of view on new gained knowledge and skills and general satisfaction related to expectations from the beginning of the subject period (beside general evaluation at the Faculty level).

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reviewed paper

Planning for Health Amelioration: Analyzing Mumbai's Urbanization Patterns

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1 ABSTRACT

Indian urbanization is characterized by multiple extenuating circumstances which forestall the emergence of ideal communities within cities. Issues such as overpopulation, social fragmentation and environmental degradation which are symptomatic of developing countries impact cities negatively, compromising quality of life. The urgent necessity to address basic needs for a growing population is consistently prioritized over the planning of cohesive, organized and healthful communities. Such unregulated urbanization poses challenges to the creation of viable, sustainable communities, in addition to generating circumstances of significantly compromised public health. This paper offers an empirical evaluation of contemporary developmental patterns in Mumbai (predicted to become the world's second-largest city by 2050 with 26 million residents) as a case study with critical implications for urbanization in other Indian cities. It analyzes demonstrated developmental trends, identifying inherent drawbacks as well as positive parameters evident in recent growth. The study posits that the urban environment can be ameliorated by comprehensive planning to moderate the impact of social, cultural and economic disadvantages, arguing that planning is essential for future communities representing the desired ideals of aesthetic form, social cohesion, equitable social engagement and improved health.

2 URBANIZATION IN INDIA

Global urbanization manifests itself at an accelerated rate in the developing world. This phenomenon is especially pronounced in India[1], where high rates of population growth and the urban/rural developmental imbalance (partly a legacy of colonialism) have precipitated a sustained, large-scale migration to larger cities by populations seeking economic opportunity. This unprecedented and unregulated over-urbanization (Datta 2006, 1) exceeds the absorption capacity of cities and compromises their identity, character and functionality. It degrades the quality of life and deprives the population of advantages which the city should ideally provide. Although the quality of life in India's cities is perceived as superior to that in towns and villages, this superiority is essentially materialistic – better employment opportunities, greater income potential and improved amenities exist, but social cohesion, aesthetic environments, meaningful community participation and nature-derived benefits are relatively lacking. Characteristic problems of Indian cities include overpopulation, poverty, substandard education, deteriorating environmental quality and impacted urban health[2] (WHO 2007).

Fig. 1: Streetscape in historic Mumbai

Fig. 2: Public plaza edged with distinctive architecture

[1] World population is estimated to be 70% urban by 2050, with growth mostly concentrated in Asia, Africa and Latin America. India and China together will account for 35% of this increase. (UNPD 2007)

[2] Major environmental health risks (caused partly by development without environmental safeguards) account for nearly 20% of India's total disease burden.

This situation is exemplified in Mumbai, India's fastest growing city and the fourth-most populous in the world[3]. Conceived as the British colonial city of Bombay, its sophisticated historic core with elegant architecture, street hierarchy, public spaces, monuments and vibrant landscape creates an urban map that is the most expressive and experientially-rich part of the city (Figs. 1, 2). Recent growth beyond this core, however, has not attained a commensurate level of coherence. The urgent need to provide shelter, transportation and employment to a steady influx of migrants compels development to be largely housing and road construction rather than the building of coordinated, environmentally-responsible communities inclusive of other requisite components – public spaces, gardens, marketplaces and civic monuments. Consequently, most new neighborhoods are essentially housing districts devoid of social identity or unity. This reactive approach has other consequences as well – it precludes the conservation of environmental, social, cultural and historical resources in the process of constructing infrastructure, and marginalizes nature, creating ecologically-unsustainable environments which compromise resident health.

3 URBANIZATION AND CONSEQUENCES FOR PUBLIC HEALTH

While cities offer access to better medical facilities, public health can be negatively impacted by certain urban conditions such as overcrowding, improper sanitation, inadequate drinking water, pollution, etc. which increase incidence of disease (Aicher 1998, 43). Urbanization also compels a reinterpretation of traditional patterns of living, deemphasizing or eliminating conventional healthy practices, with the import of these modifications often unrecognized by the general population. The situation is exacerbated by a widespread lack of awareness and prevalent misinformation about health (for instance, Indian culture has traditionally assigned value to obesity as a sign of prosperity). Three major derivatives of contemporary urbanization which adversely impact health and which pertain to physical planning are enhanced city size, individual-level adaptation, and societal trends, as described below:

- Magnified Constructed Scale

  The physical scale of Mumbai involves distances which are too large to negotiate on foot for accomplishing daily tasks, a fact that encourages private automobile ownership and eliminates opportunities for physical exercise. Personal transportation is also preferred, both as a status symbol and as a consequence of the overburdened public transit system.

- Redefined Recreation

  An altered perception of 'recreation' has led to a preference for passive, sedentary activities (watching television) over outdoor activities (walking in the park or to the market). The increasing prevalence of individual-centric lifestyles, limited time for leisure, curtailed social networking and higher levels of isolation and stress as a consequence of "urban disruption" (Fullilove 2006, 187) further reinforce this inclination.

- Cultural Value Shift

  Western modes of behavior (conflated with progress) are being adopted due to the prestige assigned to westernization in the public perception. The growing preference of the urban middle-class for malls, fast food, processed or pre-packaged meals and synthetic beverages[4] (Cunningham 2006) is rationalized by convenience and efficiency and affects health negatively[5]. At the same time, consumption of healthy foods – fruits, vegetables and pulses – is well below accepted standards nationwide[6] (Mudur 2003).

In recent years, social scientists and medical professionals have mapped a steady increase in health issues afflicting urban residents. As linkages between urbanization and health concerns are increasingly documented and verified (Agrawal 2002; Datta 2006; IIPS & Macro International 2007) the effectiveness of city planning as an instrument to improve health is actively promoted (Jackson 2003; Sengupta undated; Rice and Rasmussen 1992), creating opportunities for city planners and urban designers to resolve this problem through comprehensive planning.

[3] Predicted to become the second-most populous by 2050 with 26 million people. (UNPD 2007)
[4] Cunningham correctly identifies obesity in India as largely a disease of the urban middle-class.
[5] According to The National Family Health Survey, obesity is most common "in urban areas, among the well-educated and those in the highest wealth quintile."
[6] Average daily consumption of fruits and vegetables is 150 g/person, instead of the recommended 400g.

4 PLANNING AS PRESCRIPTION

Can physical planning offer an appropriate paradigm for future development in Mumbai and similar communities? While the value of planning for the creation and sustenance of communities has been long recognized in the western world and in developed countries, practical and logistical conditions have precluded a comparable view of planning in India. It can be argued, however, that the detrimental circumstances in which Indian cities must exist and thrive necessitates a stronger emphasis on the inclusion of planning in the development process. Indeed, there have been historical attempts at planned communities with mixed results, including in Mumbai (Heitzman 2008). The ultimate objective – the creation of human-scaled communities which are aesthetically, functionally and socially rich, environmentally-responsible and rooted in their milieu – is universally relevant and as applicable to the Indian condition as to any other place. These considerations are reflected in historical Indian settlement patterns which incorporated walkable streets, contextualized architecture, and valued social spaces. These characteristics, although generally rejected by current development in India, must be acknowledged (and retained) as vital components of the city. By reinforcing their intrinsic value, planning can create real places that eschew the placeless, soulless and generic appearance which characterizes so many cities in the developing world.

The following narrative locates the core values of planning in the context of Mumbai's existing built environment and physical construction, classified as Positive Attributive Factors (substantive assets which actively contribute to the vitality of the city) or Inadequate Desirable Factors (vital, non-negotiable components of the city which are currently absent).

4.1 Positive Attributive Factors

- Pedestrian Focus

  Emphasis on environments which are primarily navigated on foot finds resonance in Mumbai, which is built on a scale amenable to pedestrian movement. This derives both from traditional spatial arrangement of private, public and civic functions as well as the limited integration of the automobile, as a large majority is unable to afford private transportation. This vital component of viability, although omnipresent in India, unfortunately lacks comfortable, safe and pleasant streetscapes to accommodate it. (Fig. 3) Further, the traffic model of a hierarchical network segregating diverse users has not been implemented. Instead, street width is determined by space availability and not by function, design or planting character. All users – from pedestrians to trucks – are compelled to negotiate the streets simultaneously, leading to constant conflict. (Fig. 4)

Fig. 3: Compromised pedestrian convenience, Fig. 4: Pedestrian safety jeopardized by traffic

- Built Diversity

  Complexity and variety exist on multiple levels in Mumbai. A compact, high-density building pattern (Fig. 5) results from escalating real estate prices, large population and rapid growth. The perpetuation of traditional social organization has created neighborhoods peopled by intermingling ethnic, linguistic, religious and economic groups. This diversity extends also to gender, age and education, etc. Although populations in larger cities often tend to coalesce based on levels of affluence, this trend still remains a strong determinant of heterogeneity. Housing similarly manifests

a spectrum of residential options within each neighborhood, ranging from small, affordable units to larger, expensive accommodations, reflecting diverse economic levels, family sizes and preferences.

Fig. 5: Typical high-density, high-rise housing

4.2 Inadequate Desirable Factors

- Contextual Architecture and Landscape Architecture

  Much of Mumbai's architecture reads as an incoherent, repetitive agglomeration of negligible aesthetic value. (Fig. 6, 7) This is true for individual buildings as well as their collective composition. Creative visual expression is largely proscribed by cost, as is continued maintenance, thus accentuating the widespread architectural non-distinction and disrepair. The generic, monotonous uniformity and absence of referential natural features or iconic landmarks fail to create an "identifiable neighborhood" (Alexander et al. 1977, 80).

Fig. 6: Unremarkable, visually unappealing architecture

Fig. 7: Poorly maintained buildings

  The landscape, when not absent altogether, is an ineffective design component, included more as a concession to building codes than for any real contribution to the environment or to the lives of the residents. (Figs. 8, 9) This superficial 'landscape' produces nothing other than a minor enhancement of the aesthetics of the built environment.

- Civic Institutions and Public Spaces

  Mumbai's neighborhoods exhibit no cohesive organizational pattern, epicenter or focus for their spatial arrangement. Historical centers of organization – palaces, temples or public squares – have not been replaced by corresponding democratic emblems for structuring neighborhood form and identity. Civic architecture, shared communal spaces and monuments are not employed in the formation of the community. That role has been tragically assumed by malls which, by virtue of their locations, sizes and distinctive architecture, have become the new locational markers. (Fig. 10)

Fig. 8 & 9: Installed landscapes are perfunctory and irrelevant

- Sustainability and Ecological Responsibility

  The collective environmental impact of Mumbai's population is severe, and recent climate change necessitates the integration of ecological stewardship as an essential component of future planning. As natural conservation is presently not a component of urban planning, natural systems and resources are afforded little protection in the course of development. The implications of construction which ignores topography and natural processes can be catastrophic, as witnessed in the devastating floods of 2005 which paralyzed the city and caused almost 900 deaths[7]. (Government of Maharashtra undated).

Fig. 10: The mall is the new civic landmark

[7] The flooding was partly blamed on the interruption of natural drainage channels, and on garbage (including plastic bags) which is thought to have clogged drainage systems.

Fig. 11: Unprotected, abused creek used as drain

Fig. 12: Garbage covered island in the creek

5 CONCLUSION

While the value of planning, urban design and the influence of a positive built environment on communal behavior are well documented in the western world (Lynch 1960; Alexander et. al. 1977; Whyte 1980), India's developmental history does not reflect a similarly extensive theoretical or implementational foundation for its cities. Although historical instances of planned communities exist, contemporary development is forced to marginalize the time, resources and effort necessary for planning in order to deal with other exigent issues of human necessity, such as housing and employment. Consequently, the form, function and ideological identity of its cities fail to provide citizens with the idealized environments they deserve. The consequences of such environments reflect broader aesthetic, social and functional inadequacies, as well as secondary concerns such as impaired public health.

Many health issues and their deleterious effects which characterize Indian urbanization today can be remedied in communities that integrate aspects of physical wellness in their design. Aesthetically pleasing, socially enriched and environmentally responsible neighborhoods can foster greater participation of the individual with the larger society in ways that nurture physical and psychological health. The current approach which produces mere housing clusters must be replaced with a holistic philosophy that prioritizes both tangible opportunities for recreation (gardens, streets, plazas) and intangible attributes (beauty, comfort, convenience). The provision of destinations for communal interaction and social reinforcement can elevate the standard of fitness within the community with minimal effort on the part of the residents.

As the above narrative demonstrates, the relevance of universal objectives of planning is strengthened by its dual emphasis on pedestrian-oriented design and the neighborhood as the operational unit of urbanization. Walkability is a fundamental characteristic of the Indian city, and its formalization as the essential determinant of city form will incorporate a healthy dimension in the routine experience of daily living. Furthermore, well-designed neighborhoods will allow inhabitants to construct intimate relationships with their surrounding environment, social spaces and neighbors. Individuals are more likely to interact with the exterior, public realm (thus engaging in healthful behavior) if they believe themselves to be stakeholders in their surrounding environment. Indeed, planning at this local scale may be the only pragmatic approach for megacities such as Mumbai, which physically and psychologically transcend conventional conceptions of cities.

The achievement of the goals of planning in India will be facilitated by the human component vital for sustaining a city and manifested in density, diversity, mixed-uses and social complexity. Built for, and peopled by, large pedestrian populations, cities in India are replete with the primary component that makes urbanism successful. It is this fact that has eventually transformed Le Corbusier's Modernist plan for Chandigarh into a thriving city, in spite of its complete disregard for cultural, geographical and environmental context (Verma 1994). The emergence of optimal communities has been prevented by the absence of a comprehensive organizational structure for this human resource, but the implementation of an appropriate framework and planning philosophy can result in cities which accomplish the goals of being functional, socially and aesthetically pleasing, contextually relevant and environmentally sustainable.

Ultimately, planning's most significant contribution (and one which also directly influences health) would be to heighten awareness of the ecological crisis, worsening continuously, which recent history has precipitated. The necessity to protect, conserve and treasure natural resources must inform any planning philosophy that seeks to create durable cities, and be incorporated in administrative policy. This awareness is critical in view of the global future – as natural resources diminish and populations grow, sustainability and ecological responsibility become the only options available. At this stage, we do not have the luxury of pretending we are not in trouble.

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Planning healthy cities - the role of markets in urban life

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1 ABSTRACT

Liveability of urban areas depends on the quality of common urban places, on the places where people unintentionally meet with their neighbours. Thus it is the quality of life in the neighbourhoods and within it the routines of our everyday life, which defines the quality of our urban lives. Food shopping is a necessary activity of our urban lives and we spend more and more time on the urban places for shopping. The places of shopping, the food malls and markets are taking an important position in our everyday life in the city. The importance of markets is visible from the many markets which have been redeveloped and being under reconstruction in the past years in Budapest. But how can we foster good quality urban places from markets? What are the architectural considerations for creating a welcoming community public space and what other urban development arguments lead the work of our urban planners, these are the questions, my paper tries to unfold. Therefore the question of my research is not about the architectural quality of the buildings but rather the quality of life created in these market places. The research is based on the qualitative interviews with urban planners and architects active in Budapest in the last 5-6 years in reconstructing urban public spaces in and around market halls.

2 INTRODUCTION

„Our final conclusion is that going to market gives you pleasure, even for people like us, busy intellectuals, if not other time than on a Saturday morning." (Piackalauz romantikusoknak, 2004)

"More than just public spaces for buying and selling food, public markets are civic spaces – the common ground where citizens and government struggle to define the shared values of the community. The public market is society's conscience – the place where we can see, hear, taste and smell whether or not government is doing its job." (Tangires, 2005)

Markets as urban institutions are praised from all aspect. They are taken for pleasure while at the same time they are praised to be the backbone, the conscience of society arguing that markets are truly democratic places. But what it is in markets which make them so unique and important in the quality of urban life? What is the secret of markets? How can the urban space transform the duty of shopping into a pleasure-seeking experience? In this paper I aim to unfold the physical and architectural characteristics of markets which enable them with that commonly hold idea of democratic quality.

Reflections on market places are even more important for two reasons; people get more conscious about the food they eat and local authorities get more conscious about the markets they run, and evidently there must be some causality between them. Firstly food shopping is becoming an important activity within our public life. We spend more time buying our food, and care more about the quality of our alimentation. "While stores have gotten larger, more pervasive, and less personal, we have sought refute in the old forms of farmers' markets. … All over America, shoppers are showing greater awareness about where and how their food is produced, and demanding closer relations with their suppliers."(Zukin, 2004) Food-consciousness gets into people to search for high quality food, to choose ecologically friendly food, or food from bio agriculture and if possible preferring first hand contacts with farmers. Shopping places are one of the most important public spaces of our time. A good deal of our time we spend in private spheres, in our homes and in our workplaces, offices. Most of the time left in-between the private tasks we spend more time for shopping. Therefore it is important how well they are designed and how much they enable contacts between people or rather they are isolating people.

The second reason why we give more importance to understanding the mechanisms of markets is because there is a strong public interest in market renewal in Budapest in the last few years. There have been several market halls and market areas renewed in Budapest in the last 6-8 years. Bigger market renewals include some of the XIX centure market halls, such as the Central Market hall, Battyhany and Rákóczi market halls, and also renewals with more intense alterations such as Fehérvári úti market hall which encapsulates the market place from the 70s, the market cum housing estate of Garay square, the market attached to Mamut shopping mall, the Fény street market, the Lehel market which today has an average daily 25 000 visitors.

Besides these renovations and renewals there is an even greater upsurge of renewal on the way. Mostly it is in the outer districts of Budapest, where local authorities are restoring the markets. Such is the case in Sashalom, Újpest, Rákosmente, XII district, Zugló and Budafok. We should use the experience of past urban developments and market renewals for the benefit of the new ones. We have to use what is there to be learnt from past experiences in creating good quality urban places through market renewal.

The importance of shopping places in our society and the importance attributed to market renewal by local authorities in Budapest are underlined by the third factor for market renewal. If markets are well designed they are able to transform the necessary activities of shopping into the social activities of meeting, seeing and hearing other people, and thus markets can be an infinite source for social interactions. This observation is underlined by the research performed by PPS: "In a society so often marked by divisions rather than commonalities, an incredible thing happens at markets: people talk to one another. Perhaps it's the informal environment, the shared interest in uncommon and beautiful varieties of fruits and vegetables, or the joyful mood created in bustling markets" (Spitzer et al., 1995)

Activities to be performed in public spaces require different attention for their urban design quality according to Jan Gehl. Gehl has developed a very simple three-fold typology for outdoor activities, by dividing our daily movements in cities into necessary, optional and social activities. He argues that people perform necessary tasks such as shopping regardless of the quality of urban environment. According to him optional activities will take place only if time and space allow it, and social activities are the results of other people in public spaces. "Social activities are all activities that depend on the presence of others in public spaces. They develop in connection with the other activities because people are in the same place, meet, pass by one another, or are merely within view." (Gehl, 1971) If shopping is only treated as a necessary activity, than there is no need to be concerned about its quality and physical characteristics. However if it is to become a thriving urban place: its urban quality is at stake. Social activities are dependent on physical conditions of the urban public space.

"Although the physical framework does not have a direct influence on the quality, content, and intensity of social contacts, architects and planners can affect the possibilities for meeting, seeing, and hearing people – possibilities that both take on a quality of their own and become important as background and starting point for other forms of contacts."(Gehl, 1971)

In this paper I aim to unfold the architectural and design characteristics which make markets so bursting urban places. It has a high importance for future urban development and market revitalisation projects: not only to create places for shopping activities but at the same time to help encourage civic life and social activities around the urban space of markets. The research is based on seven qualitative interviews with architects responsible for the renewal of urban markets in and around Budapest. The interviews were conducted in the summer of 2009 and they lasted about 50-120 minutes. My aim has been to distil the essence of market halls so that future urban renewals will be more aware of the functioning of urban markets as places for social activities, social interactions and thus they will be more readily available in creating quality of life around them.

3 HOW IS A MARKET DIFFERENT FROM A SHOPPING MALL?

3.1 Layout

"The market hall at Battyány square was transformed into a kind of department store, losing its spontaneous, free atmosphere typical of the market; instead of a market, it became a commercial institution. … The overly regulated nature of the building at Fehérvári Road destroyed the entire atmosphere. And now that it has been transformed into a market hall, its character has become even more hybrid. The whole form is fettered hand and foot: it is a market and not a market, a market hall and not a market hall. There is no particular expression in it architecturally, beyond its own practical solutions.(Siegel & Uhl, 2005)

What changed the building so radically at Battyány square market that it forbade us to call it a market? What changes puzzled Szalai at Fehérvári market? Is there a real difference in the organisation of space between open markets and market halls, except that one is covered? In this chapter I will try to find the basic characteristics of markets which distinguish them from other shopping places. From the most spontaneous weekly open markets organised on removable stalls to the traditional architectural design of market halls of Budapest from the turn of the century markets have some common threads, common characteristics, which

enables us to differentiate them from shopping malls or hypermarkets. And if we are able to find the major characteristics of a market, then we might also be able to find out why its atmosphere is so much praised, from where comes that openness which makes them such attractive public spaces.

Markets are invading us through all our senses. “So what is it that makes the market hall and its architecture so special? The market hall affects all our senses, accomplishing something that commercial architecture nowadays rarely does.” (Gran, 2005) They have something to offer to all of our ears, eyes, tastes and fingers: smells, forms, tastes and colours all ready to affect our senses. “It is good to enter into a market because of the smells; one feels the smell of fruits, of vegetables. This compound effect of smells and colours of markets, the condensed presence of fresh goods into my senses which makes it feel good. The market is where 100 different vendors sell the same good, and you get simply crazy not knowing which one to choose, since they all look gorgeous. (Kertész)

A market is a rustic shopping space. The market attracts all our senses. And thus they create a very naturalistic atmosphere. There is something familiar and closeness in markets. The smells, colours, sounds lead us into the world of the market, which is therefore more rustic than other types of shopping places. The smell of tomato together with rotten fruits and the odours of the sour cabbage give a mixture of smell with a touch of human respiration in it too. But interestingly it does not end up being revolting, when there is such penetrating stink in it. This is all very naturalistic. In a shopping mall I cannot feel the smells, since everything is refrigerated, neither the colours since the lighting deceives our eyes.” (Kertész) However it is just as much the design of markets which allows and enhances this sensuality, the fusion of the different smells and sounds and also this makes them distinct. The space within markets treats shops and shoppers differently from the big department stores or hypermarkets.

Market is a shopping space where the shops face outwards into the common open public area. “It is not like I go into the shop, but I just stop in front of it at the counter and shop like that. The shop belongs only to the vendor, at the rear there is the sink and service area, and receives the goods, and have vegetables and empty boxes. I am separated by the counter.” (Rajk) And in this respect there is no different between stalls and shops, between open markets and market halls: the goods divide the zones for vendors and for shoppers in both types. On the contrary in a shopping mall the shops are all inwards-looking, in order to get into contact with the vendors I have to step inside the shop, and thus I disappear from the public area of the mall and from the public eye as well. And thus a shopping mall which would seal off the different vendors into separated shops would allow neither the free flow of smells nor the extent of social activities and the fusion of experiences. Thus there is a very strong and distinguishable element which clearly divides market-type urban spaces from non-market type spaces.

Rows of individual shops where one have to enter would not help comparison shopping and thus would reduce the time of strolling. Once you enter into a shop you made up your mind to buy there something. If you come out empty handed, that means you rejected the shop and would not venture back into it again. Whereas market stalls encourage comparison shopping. And it also has psychological consequences too in relation to my behaviour towards fellow shoppers. While in the private areas of a shop I step into a more delicate and more personal area. In a market the life is going on out in the common space of the market, on the aisles which do not belong to any particular shop owner or vendor.

The aisles within the shops or stalls are neutral grounds, they are not the private spaces of private shops, but they belong to the common area of the market, which allows us to behave more freely “Throughout history, markets have been neutral ground, encouraging people to gather, make connections, discover their similarities, and appreciate their differences” (Spitzer et al., 1995) People will not disappear into the secrecy of small shops only to return with something hidden in their shopping cart, but are out and open about their choices, also about their budgets, about their tastes for other people to look at. The life in the aisles gives a higher level of opportunity for watching people and for this reason markets become places for social activities. In a market I would not offend other people by watching them doing their shopping. Markets are the greatest places for people-watching, and thus for social activities. And the shops merely provide a veil for the life going on among them. It is therefore the general layout of markets which generate this common ground for social activities.

“Best of all, even if you’re by yourself at the farmers’ market, you’re never shopping alone. Unlike in stores, strangers often talk to each other.”(Zukin, 2004) This is what transforms the shopping activity into social

activity: markets through their use of space allow much more encounter between fellow shoppers and does it with a high level of openness: we can see other people to choose, to talk to the vendor which will in turn inspire us to talk to other people too.

Returning to the original question, now it seems easy to respond. It became easy to decide whether a shopping area is a market hall or a shopping mall by studying the stalls: do they face outwards? Thus the market hall at Batthyány square has become a shopping mall, by turning the shops inward, by closing off activities into different small entities. However Fehérvári road market hall maintains its market like atmosphere by the imminent contact of shoppers and goods, by the open layout of shops and stalls, and thus by the social activities it is able to create.

3.2 Density

Besides the layout of the shops there is another factor which attracts even more people on the aisles of markets: the density of shops. “With great distances in the urban plan, there is nothing much to experience outdoors.” (Gehl, 1971) The density of shops is although not as clear cut as the orientation of the stalls but also very important feature of markets. Gehl’s statement is not only true for outdoor streets but also for markets and inner shopping areas. Within markets there is twice as much shop on the same surface area than within shopping malls. The size of shops within a market do not exceed 25 sq meters, while in shopping centres there are around 50-100-200 sq meters. It seems than in Budapest not all local authorities are aware of the choice they have to make between the benefit of intense social activities created by small size shops and the economic considerations of larger floor area shops. “I doubt that they had some kind of background study, since the call is very vague. For every shop size they give 20-50 sq meters, which means, I can make double or half size buildings. It will become the responsibility of the architect how large shops and market building to design.” (Kertész) In order to have intense life on the markets market stalls should be as small as still achievable to do business in them. “To accommodate the greatest number and variety of vendors and to keep the cost of rent affordable, the size of each stall should be minimized.” (Spitzer et al., 1995) There might be need for one big supermarket, and even the central market in Budapest has a supermarket on the -1 floor, however it should only be a supplementary function.

It is the many little shops which give life to the market. One can never get bored since it is so quick to get to the next stall and have a look on another pile of goods. The numerous many little stalls help circulations since it forces people to compare prices and go back and forth between stalls to make up their minds. With two steps one arrives into a different world of vegetables or cheese. And as we learned from Jane Jacobs (Jacobs, 1961) “the sight of people attracts still other people, is something that city planners and city architectural designers seem to find incomprehensible.” Allowing single vendors to occupy many stalls to create an oversized single-stall on the long run could ruin the mix, the intensity and the liveliness of the markets, and therefore should be avoided.

Thus markets differ from shopping malls and other shopping centres in the arrangement of space which helps enriching encounters and social activities. The ratio of aisle floor area over shop floor area is higher in markets. Markets foster the highest possible number of stalls to be arranged within them by having small available rental places and in turn this policy would also keep customers off the limits of the shops and forces the people to go around the stalls. Since most of the people are visible on the paths within the shops or stalls there are more people to look at, there are more chances for social activities. Both of these architectural features are contributing to the good quality of urban public spaces since they foster encounters and help the density of social activities. Therefore it is this physical attribute what helps creating the lively, open atmosphere within the market.

“The activity generated by people on errands, or people aiming for food or drink, is itself an attraction to still other people”(Jacobs, 1961) Looking, gazing, watching are according to cognitive theory important stimulus seeking behaviours. In a market as in many other public spaces we want to see each other; it is the view of other people, the swarming of people which makes the quality of our urban life. In markets there are plenty of opportunity for flaneurism, for watching other people to browse, to select, to shop and to chat with vendors and fellow shoppers. Thus we can argue that markets are certainly unique shopping spaces since due to their architectural layout they foster social activities, they promote social interactions. For this reason the quality of the public spaces of markets is worth further analysis. In the next chapter we will look at the most

important architectural attributes of markets which are perceived as important factors for high quality public spaces.

4 ARCHITECTURAL AND MANAGERIAL CONCERNS FOR MARKET PLANNING

In Budapest the most common form of a market is the covered market hall. There are only a few exceptional temporary markets, such as the so-called MDF car-booth markets and the weekly market on the Havanna housing estate, which are both open markets and work only on Saturdays. Most markets however are more stable and are open daily from 6 am until 6 pm, except Sundays. The layout within the market halls is traditionally just a few rows of tables within the main hall area, while small shops are lined up by the walls of the market. At some markets even in the main hall individual stalls have been installed, such is the case at the Central Market. The most complex buildings, such as the Lehel market and the Fehérvári úti market can have more levels and also can accommodate other functions such as the post office or pharmacies, so complex that many people would not even call them markets any more. These markets all manage to flourish social activities within them although to various degrees.

Looking at the many different types of market layouts one starts to wonder why one is working better than the other. What makes good quality urban design when it comes to markets? In this chapter I will analyse three different aspects for good quality market design: the arrangement of the site, some amenities at markets and the role of nostalgia towards the “lost rural paradise” in the form of family farmers. Whatever is the type of building of the market these factors are important for the quality of the space and for the quality of life the space can generate.

4.1 Arrangement of the site

The arrangement of the site is the backbone for any market and something which have to be thought about in advance, since these are characteristics which cannot be altered later on. Considerations include obtaining the right size for the market, the system for uploading goods, and allowing good circulation within the market. I will give detailed explanation of these aspects in this chapter.

The market works well if it occupies all the space available for it. If there are empty stalls and empty areas it results in a feeling of decay. The market is best if it has a somewhat crowded atmosphere. The market is good when it is full. You have no desire to enter an empty market. It is extremely difficult to estimate the right size, which gives this pleasant well proportioned feeling, but endures the peaks of Christmas and Easter too. (Kertész) However municipalities at many market renewal projects aim to increase the size of the market building, mostly for financing the cost of reconstruction. The size of the new market building is decided according to economical return considerations, and the size is blown up for higher rental revenues. From both social and economical point of view this argument is mistaken, since it will cause a somewhat loose space. Unless new market buildings accommodate new functions such as new community play areas or libraries, etc. or otherwise there are fundamental societal changes in the area – new transport lines to attract more visitors, new housing development, or changed travel patterns and its supporting parking facilities – there is not much reason for building a substantially larger market than what an old, well-functioning and not-overcrowded market occupies.

“The market was not an architectural challenge but a societal. There are so many personal interests at play at a public development. We were given an enormous programme, which, I am glad, did not succeed. Only two third of the original plan has been created because the municipality run out of money in the last moment. I personally believe that the first part, the open hall would have been enough for a bit more compact, but still well functioning market, and would have given more open public space.” (Berzsák)

The size of the new market is decided in the municipality. It should be the role of the local authority to commission studies about the use of the market, to create a sound programming for the development project. (Kertész) A usual solution sought by local authorities to increase the floor area of the market on the same site by introducing second, third layers. This would create a more relaxed space distribution on one level and at the same time doubling the rentable floor area. However second layers rarely work.

What we learned from the 100 years of experience of building market halls, that it has been confirmed that the galleries don’t work. In the central market hall it is a tourist attraction place, but it does not work in any other place. The market hall in Hold street is echoing from emptiness. It is a cursed idea. We managed to get

around it by putting the parking lot on the top of the building, so for those who arrive with a car that will be the main floor. Muddled up the senses of people with this idea and aired some life into the upper floor. (Rajk)

There are definitely problems with the gallery at Csepel market, where no business could be charmed up to the gallery. It could be added that second layers are prone to be dead if the main floor area is in itself too spacious or the gallery is not comparable in size with the main floor area: it is just an add-on. In Csepel both of these assumptions are true. Such non-essential, non-functional second floors are the hardest to rent and the hardest to give life to them.

The manager of the Lehel market has taken the two levels of the market as a challenge. He was the first manager to invite different public functions into any market hall in Hungary, even before shopping malls have started. He invited the post office to be settled on the gallery level of the market, and later on the land registry office and a pharmacy. In this way it is only the main floor of Lehel market which is still a market and the second floor is not a market any more: it is more a shopping centre or a mall, since the new functions do not have the same outward looking atmosphere, but rather they are individual shops. Another clever deception has been done at the Fehérvári uti market for the benefit of giving life into two layers: the street entrance is halfway between the main and the first floor, while the size of the two levels are nearly the same, so it is really hard to decide which is the main floor.

In the market it is the hall I am most proud of. It is a very harmonious space. And we managed to create a good circulation system, with the escalators, the stairs, and the bridges. It is easy to look through all three levels and easy to circulate among them. When you enter you feel the swarm, the noise but at the same time the building, the built environment gives to it a kind of strength, a frame, maybe because of the materials, the walls and balustrade are made of cement, it is massive but at the same time pleasant. (Kertész) At Fehérvári uti market even the third level – which is the level for the restaurants and buffets – is widely used. And it is due mainly to the ease of the circulation with the inviting escalators and the many options to move between the levels, which just shows that it is not really the number of levels but the ease of circulation which matters. The gallery level works ok, but would be much better if there would be more connections between the main shopping area and the gallery. (Vörös)

“To facilitate circulation and comparison shopping, nearly all public market halls operate on only one level. Basement or second-story spaces generally are difficult to lease, and the businesses located there often do not perform well.” (Spitzer et al., 1995) It is therefore not necessary to stay only on one layer within a market, but rather it depends on the ease of circulation whether a double or triple layered market would work or not.

Wide enough aisles would accommodate shoppers to stop and chat without disturbing the flow of people, otherwise number of small talks and spontaneous conversations would lessen. However if the aisles are too wide people would be too worried to start talking to other people. It is the closeness, the crowdedness of the place that people are forced to bump into each other which helps them to start conversations.

The ease of circulation at markets not only means the flow of people but just as much attention should be given to the circulation of goods. On contrary to the social encounters generated by bumping into each other at markets, it is rather distracting when big bulky carts knock down people, or force them to move and spoil the ongoing conversations. The most obvious aim in terms of the free flow of people: “that goods and people should not meet before they meet at the stalls”. In other terms they should not cross each other’s ways during uploading. The traditional way to solve it comes with time-regulations, but with changing patterns of wholesale markets it is becoming less and less capable of managing uploading. The rhythm of inflow has changed and instead of only arriving at the early hours of the day, now it is throughout the day that fresh goods arrive to the market. Than another option is to use – if exists – the cellars for the transport of goods and having internal corridors within the building for the stalls. Basement levels are also useful for storage capacity allowing minimal space-use of the main floor area by single farmers.

Another popular option is to have outdoor upload for the market. This would mean that the stalls around the walls of the market are all facing inwards, and that individual vendors are able to park their trucks next to their shops back-doors. However this option should be avoided if possible. Since the space given shop owners would prefer park their truck at their shop entrance allowing only the minimal amount of goods to be taken into the shop. This custom however blocks passageways and gives an un-orderly look to the whole market.

To put it shortly the market works well if it occupies densely its space, if it has a good circulation which eliminates the disturbing encounters between goods and consumers. Compact, full but not overcrowded, is the essence of a good functioning market. For this reason the layout should be easy to understand and also should be easy to get around. Stalls and shops should be kept to a minimum size, while aisles should give a comfortable space to pass by people but not as wide as to prevent from zigzagging. And if the local authority is aiming for multi-layered market than the layers should have equal importance and multiple and easy to use options are essential to circulate between the two levels. If possible underground uploading and storage facilities would help good circulation within the market, or otherwise strict time restrictions for loading should be enforced. At the next chapter we will look at the factor of additional amenities for well functioning markets.

4.2 Amenities

With the dawn of supermarkets shopping has changed its fashion and its rhythm. New shopping markets also changed our shopping habits. If markets are to survive the upsurge of shopping malls and hypermarkets they have to accommodate new requirements for comfortable shopping. “These days we do not have time to go to the market. Maybe the elderly have to whom it is a great place to hang around. But we are more worried to find a parking lot, or not to overrun the time meter.” (kertész) It is true we need more time at the market. Comparing qualities and prices, lingering around it takes more time than just go to the supermarket. If physical conditions improved users would lengthen the average time spent at public spaces. This is true when a street gets pedestrianised (gehl), but also it is true for markets. We spend twice as much time at markets as it is necessary to do our shopping. According to a survey at Lehel market hall 60 % of people spend more than 3 hours at the market at once. It is the clear cut result of social activities at the market. “This is why we have decided together with the deputy mayor, to allow cars to park for free for two hours. One can easily do their shopping in 1 hour, but than they would have no time for social life.” (Balogh) Having this in mind the management of Újpest market when opened a car park they let it have free for the first two hours.

Another idea was developed by the Lehel market which also relies to a higher degree on shoppers with cars. They found out in a survey that the average load people carry is about 6-7 kilo, while the average time spent on the market is about 50 minutes. To boost shopping capacity of customers and to encourage them to spend more time at the market they introduced shopping carts familiar to us from big supermarkets. “First in Europe it was at Lehel market that we introduced shopping carts at a market. Shopping habits have changed, but when I first introduced even my colleagues were dubious. Now people are complaining at the municipality that there is not enough of them. We have to follow the changing shopping habits.” (Vörös)

It is thus the change of shopping habits to which Lehel market responded positively. “We had another dilemma with the market: to have a shopping cart at the market or not. The biggest difference between a market and a supermarket is that in the market the goods I have in my cart I have already paid for. And thus we approached the company producing the shopping carts to develop a type which could be closed from top, with a kind of lid. We should not vision customers only in the old fashioned way: that people come with two big baskets which they would drag home. People will shop less without a shopping cart and thus it would hold back the good functioning of the market.” (Rajk)

Thus changing shopping habits and needs should be accommodated at markets. It will not be a fairy-tale market from our childhood any more, but people will continue using them. And as long as the essential features of the market will not be destroyed by compromises they are worth taking. Changing shopping habits are visible not only in the use of transport to get to the markets but also on the activities performed at markets. Markets are becoming not just mere shopping areas but social hang-around places and thus the importance of leisure activities, cafés and bars and social happenings are rising.

In recent years open air Garay market has been redeveloped into a shopping mall-housing estate complex while the market was transferred to the basement. Shops are empty in the mall and thus also the market struggles for life, half of its stalls are always empty, there are few customers who can find their way around and still like the place. However it has one lively area: an open area in the form of a horse-carriage where people are free to sit down to eat or just wait, relax. The same style of sitting possibility has been installed at Vác market where vendors started to alter the form of the market to their own taste. “The owner had put out a kind of grape harvest cart something, which is ok at a harvest but here at the market? People are not

supposed to sit down at market. However if there had been a request, it should have been down precisely, and at another area, but not just like that." (Sáros)

For a market to foster social activities it is important to have places designated for relaxation, for eating or drinking. Pubs, cafés and eateries are essential parts of any lively markets. Amenities for eating would foster users to linger around in markets, spend more time and boost even more action. "In public markets, commerce coincides with intense social interaction, so adequate space where people can linger is desirable. Benches or tables and chairs should be provided if food is sold for eating on the premises." (Spitzer et al., 1995)

However these areas are very difficult to create at markets, since the functioning of markets would eliminate any rentable space for more commercial activities, thus reducing even the in-designed spaces for lingering. "The problem is that life would wipe out such places for lingering. If it will not be in the way than there something else will be put in its place. We can't really create comfortable sitting areas since the management will eradicate them and the space will be rented for money. Maybe outside the market, that would be good and at Fehérvári although there are some possibilities to sit down, however that is not very welcoming." (Kertész)

This need for sitting and chatting is a new impulse at markets and articulated with the hollowing out of other shopping spaces. Since commerce in the narrow sense has more or less abandoned markets as institutions, with other institutions having much higher revenue, they are searching for their own niches. Thus being able to sit down at markets is becoming an important factor for taking pleasure in shopping. This is the case at Vienna Nashmarkt but also at Fehérvári uti market which has a striving eat-in area. The secret of this market area is that the benches, chairs and tables do not belong to any individual shop-owner, they are free public spaces overlooked by the community of the restaurants. So people could freely sit down, even to eat their own food, sandwiches and bakery products. The more neutral a sitting area becomes the more attractive it will become for market users to linger around.

4.3 Family farmers

Thus communal spaces where people gather, maybe eat a sandwich or have a cup of coffee are getting more and more important at markets, just as much as the marketing power of family farmers. Family farmers, called őstermelő in Hungarian are the icons of Hungarian markets. According to the general opinion they are not trade businessmen but farmers who sell their home-grown food and they are the essence of the market experience.

According to my experience the market is different from a mall because here we have family farmers. We are lucky to have in a year around 120-150 family farmers at our market, who would bring in the freshest of the goods, picking the goods on the day before. They are real family farmers you can see it on their dresses, on their products. For example they would not come in the winter months, since although they have some vegetables, potatoes, onions or apple but not that much. (Balogh)

However in most of the cases this idea seems to be outdated. "What have changed in the life of markets is that these days there are no more family farmers. It is just a mere legend. The classic old lady who would get up at 2 or 3 am to take out fresh radish and carrot from the soil to pack it up and take it to the market… this is just wishful thinking, a kind of nostalgia. Instead experience shows that these people are lacking capital to rent a proper shop. So they also go out to the wholesale market in the morning and resell whatever they buy at the market." (Rajk)

Family farmer is a vanishing occupation and most of the sellers at these stalls are just tradesmen without enough resources to rent a shop. There are other urban legends told by the architects themselves that professional vendors would hire old ladies to dress up in old traditional folk costumes to sell at the stalls opposite their shops.

Whether it is true or not it shows the importance of family farmers in the marketing of markets. I am not sure, that the market would remain market without the "family farmers" (Rajk) It shows the level of attachment of people to family farmers and the kind of trust and authenticity they create. It is not the farmers themselves but the space and the atmosphere they create which is important. They are part of the market show. Family farmers are part of the marketing features of the markets.

It is not only the people themselves but the physical space created by the presence of family farmers within the market hall is important for the atmosphere. Therefore including a space for family farmers is essential for the "feeling" of the market. There is a strong pressure on market managers from the society in search for authenticity. The part of the market where the open stalls are is the liveliest in Lehel market hall. At other places for example at the Central market it is a different case. Here family farmers are less numerous and less visible as well, being at the back entrance of the market. "The most thriving and most profitable part of the market is in the middle. There where we have installed the stalls for family farmers. With the way to put the stalls into the middle of the market we could re-create the old fashioned market atmosphere of the old Lehel market." (Vörös) This is the place within the market with the most talking and watching, this is the loudest corner.

The professionalisation of the farmers brings challenges for the physical space. „Changes in the occupational structure are also more visible. Even at the family farmers' stalls – from which there are 100 at Lehel market – they would rent 4-5 and they would bring in the goods by small tracks." (Rajk) This process is capable to eliminate the atmosphere of the space, therefore it should be guarded carefully. If we aim to achieve a market which is not only a shopping experience but also a social experience the spatial arrangement of family farmers are important in the arrangement of space of the markets. It is not the authenticity of the food but the authenticity of the space which matters. For the latter it is more important to maintain the small-stall structure, not to allow the compilation of stalls into a mega-stall. It is even more favourable to create a space for other even charity merchandise for NGO's, school etc.

Amenities at a market have to be responsive to the changing needs and shopping habits. They have to cater for the changing habits of transportation, of changed farming patterns. Changing supply and demand structures are in odds with the atmosphere of the markets. However it will not prove to be favourable to rigidly cling to old traditions but we should be able to find the space of the market within this new structure. If it is the "marketplace" atmosphere which counts than we should be able to provide more space to linger around more amenities for sitting and chatting. And finally the reduction of family farming around Budapest should not lead to the weakening of the function the spaces of family farmers played in the life of markets but other authentic and small scale vendors could replace their places and take up their role in the social space.

5 TO CONTROL THE UNCONTROLLABLE: MANAGING MARKETS

I was accused for closing off the market at Fehérvári street. I was asked: What kind of a market is where you have to enter through a door and it is not even visible from the outside? However it was the expressed requirement of the owner: to close off the market. It was purposeful because they were in constant confrontation with the district authority, with the city authority, with the police that they penetrate the surroundings. (Kertész)

So far we have treated markets as ultimate urban places for social activities. Therefore it might sound strange that architects are ready to talk about markets as a cancer on the body of cities. It is another paradox of the markets: we like them, because they burst with life but at the same time it urges us to control this life. The most common expression and the tasks architects seemed themselves to be faced with concerning markets was that markets have to be controlled. Markets –since they are such an intense urban activity – invite all sorts of spontaneous activities: small street vendors, many of whom could be selling unofficially goods from obscure origin, and also beggars, homeless people who hang around giving help in moving heavy stuff in return of some vegetable and also petty crime. On Teleki square market there has been even a washing machine on sale in the middle of one aisle, and once I could buy real cheap – probably stolen – bicycle from the bartender. Markets cannot stay within their boundaries, they overflow their limits. Whatever hard an architect tries to control the market through vigorous design and activity planning life would overgrow it like a rainforest. Stalls would install small umbrellas against the sunshine, or put up nylons against the frost and cold, would make their own signs and advertisements or would attack aisles with their merchandise.

In Hungary the problem with markets is that it is all penetrated with the repulsive atmosphere of the market, which would infiltrate the space and quality of the surroundings of the market. And it is all because it is impossible to stop at the limits. A market would sprawl, It lives a life of its own and in no time would it become entirely uncontrollable. Stalls would shoot up from nowhere, would grow in number and illegal vendors would appear and dirt all around it. It is like a tumour which would grow uncontrollably. This is

terrible. We cannot manage a market as a closed system, which would guarantee that it will works in a cultured way. (Kertész)

The bursting life of markets is not seen as desirable by city leaders. Markets are synonymous with dirt, rubbish, with unwanted elements, with smuggling, with stinking. Therefore markets have to be controlled. However as soon as a market is deprived from all its dirt, noise, smells and frenzy it would become a supermarket. it is a strange paradox and a real urban development challenge to keep the atmosphere of the market, however within its boundaries. The question to be answered is how is it possible to control a market without loosing its atmosphere, without loosing its social activities. If a market will be part of a city-renewal programme this aspect also has to be taken into account. If the urban shopping experience of markets are to survive for many more decades it is important to learn how to control market activities.

There are two basic different methods to control markets, both having their own consequences for social activities. The two methods are to control markets either in space or in time. Both of them have its architectural and urban design consequences. Controlling markets in time would mean that markets are not available as public spaces for 24 hours a day. They would become temporal, visible only on special days. The control of markets in time is seen as an ideal in Hungary. “On a Friday morning [In Gent] trucks encircle the market place – there is junk there too – for an open air market. But conversely to the market in Vác at 2 pm as for a miracle everything disappear and at 3 pm one can eat from the pavement because it is all cleared up. There are no tables, no boxes, no wrappings, no stalls, nothing visible left from the market.” (Sáros)

Market activities which are controlled by time would leave market squares for the evenings or on non-market days as open public spaces. This form of market is idealised within Hungary but at the same time conceived as unmanageable for mainly two reasons, from the vendors’ stance and the other is from the managers’ stance.

“In Hungary it is absolutely impossible to have a temporary market, mainly from the vendors’ point of view. If he has to remove his goods and even his stall is removed and the space is cleaned after him, well he would not fell secure enough to be able to come next week. It is a security issue for the vendors; the continuity of the rental is only felt evident if the stalls are rented continuously.” (Sáros))

“The model of open air temporary markets proved to work for thousands of years, however at the moment it is not an option in Hungary. Everything is ridiculously over-regulated, to the point where it becomes unconceivable. Every authority puts in its own regulation. (Cságoly)

Since the control of market through time is perceived as inconceivable in Hungary; managers, owners and architects turn to control the markets in space. What it means is that outside of market hours the market is not visible, to make its boundaries clear and visible. It is done usually with walls closing it off from the surroundings. In this way it is easier to control the activities of the market and to decide on responsibilities.

“From the point of view of management it is absolutely necessary to be able to close a market.” (Sáros) The reasons for closing off the markets had many very understandable reasons: health and hygienic considerations, urban beautifications, financials – since it is easier to collect the rent – and as we have seen in terms of illegal activities, responsibility issues.

These two kinds of control mechanisms of markets have different consequences for social activities. While an open air market could boost activities in a neighbourhood, it is also a shallow urban space. Out of market times the urban square would be usually empty and deprived of activities, unless the market is so small that its place can be taken up by a café. Larger markets would leave emptiness for the urban spaces. The same emptiness is different for the markets halls, since the building itself encapsulates the void of activity. It is also true although that the market hall is also more rigid and thus it would not allow alternative functions such as concerts and other gatherings. The empty space left after markets should also be carefully examined when deciding on the type of the market.

The open air market is a flexible use of urban space since it can be easily removed. It is beneficial for the vendors, especially in the cold winter months that these markets operate only a few hours a week. In the many open air markets in Paris stalls are erected only twice a week for about 6 hours. On the other hand this flexibility has consequences for the number and intensity of social activities on the market. They treat the urban space very generously, but at the same time they do not offer that much possibility for lingering as the market halls would provide.

Infrequent, open air markets, although very proficient in managing space, concentrate much more on the narrow commercial activities and allow less opportunity for social activities, for social gatherings. Installation of amenities such as common sitting areas is mostly missing from open air markets. They do not facilitate the smooth operation of cafés and eateries, and thus they are weaker in building up social communities.

On the other hand the market which is regulated in space is much more flexible in time. A covered building fosters all kind of activities. The opportunity offered in market halls for sitting and chatting is a strong force for the development of regulars. Sitting areas are not typical for open air markets but for market halls." (Rajk) The market is open 12 hours a day, 6 days a week and is bearable in nearly every type of outside weather. Thus it is a more predictable space.

Deciding on the type of control over markets local authorities would choose also the type of social activities and social life which could develop at markets. Whether it will be just some nodding and shaking hands or also sitting and chatting – will depend mostly on the construction of the time and space of the market.

The most recent tendency in Budapest is stemming from this constant bad conscience for creating closed market halls. Architects try to re-create public spaces within the markets. To close off public spaces within market areas, to create semi-public spaces which could be regulated, and life on them could be monitored. However the question is still open that they will also be only an illusion of public space (Banerjee, 2001) or will they be part of the transformation of public space and restructuring of community life and places of social inclusion.

„We wanted, since we had no chance outside of the market, since the roads are busy, to create a public space within the market. This is why we created this small park, which is quite, but also it is possible to close down with the market." (Berzsák)

This tendency could have different effects: to recreate the agora - the open public space – within closed boundaries is to loose its main feature, to create semi-public spaces. We privatise the public spaces. This is the question for the next decades to decide whether these semi-public open spaces will really work as community spaces and how they will affect the in-between spaces around markets, the squares whose functions had been transferred into the belly of the markets.

6 CONCLUSION

From its rustic outfit and openness, markets invoke nostalgic sentiments in people. There is a natural urge in people to go to markets, to experience markets. Also people spend more time in markets than they would need to finish the strict necessary activity of shopping. The quality of our urban life depends greatly on the social contacts we might have with our neighbours, also on our relationship with complete strangers. Markets offer a societal space which is denser and more impulsive: there are more social interactions and encounters. But we have just too often seen redeveloped markets which lag behind the original atmosphere of the run-down previous market. Markets can be communal spaces, but the functioning of the life on markets should be understood both by local authorities and architects so that they regeneration would reinforce this social quality.

"It is equally possible through planning decisions to influence patterns of activities, to create better or worse conditions for outdoor events, and to create lively of lifeless cities." (Gehl, 1971) Understanding the mechanisms of the markets as public spaces allows us to further influence social activities, which is especially important when planning new market areas.

Many of the social qualities of markets can be found in the physical arrangement of the space they occupy. A market is different from a shopping mall thanks to its inner structure: numerous small outward looking stalls would show openly the activities going on at markets and would allow people just to look and gaze other people. The activities going on in the public area would further enhance the density of encounters and social activities. The physical layout of the markets enhances social activities and foster social encounters. The necessary activity of shopping is transformed into a pleasure seeking social activity.

However it is also true that shopping habits and needs have changed dramatically with the dawn of shopping malls and big supermarkets, which have consequences for other, more traditional forms of shopping, such as markets. Markets will not survive if these new needs are not catered for. While markets are important social

places, we should not forget: this is a competition. If I only take a market as living from its traditions and running as a public facility left from socialist times I will loose in the market forces. (Vörös) Thus markets have to accommodate new needs such as free parking and shopping carts, but at the same time it should distinguish itself from markets through the many places and activities available for social interactions. It is a kind of revised traditionalism which would keep markets not only as lively urban places but also places with strength to keep neighbourhoods together and to support social ties.

My experience is that the least specific framework I create for the life within a school or within a market, the best it is going to work. From this follows that we should start from zero and should let it develop. We shouldn't start straight away with erecting a building; we should leave it to breathe freely, to form and to develop. (Cságoly)

The biggest challenge for the redevelopment of markets is that they are both welcomed and detested urban spaces. They are full of life but at the same time they sprawl into the surroundings causing disorder and civic discontent. In the eyes of architects and local authorities markets have to be controlled or in time or in space. Since controlling mechanisms have consequences on the social activities of markets, thus controlling leaves local authorities with the difficult task of balancing social activities of the markets.

We have learned from the examples of Budapest market renewals how to influence patterns of social activities in markets, how to create better conditions for a lively market atmosphere and thus how to help creating lively cities. However there are no exact measures, a golden rule to give for market regeneration. The market is a very mobile function. Of course we should give space for social encounters, but it is in constant change. What works at 8 am will definitely not work at 4 pm. Not only spatial, but also temporal factors are at play. You cannot solve a market in a rational, analytical way. The more I concentrate on the small, analytical problems the less my building will work. All its details will work, but the building as a whole will not. I take pleasure in things and do not want to solve them how they work. Intuition will show a few options which will help. (Cságoly) The social construction of the site is so strong that life would always slip out of our analytical hands. Every market site is a world in its own and the quality of the urban space also depends on the social, physical and environmental conditions of the neighbourhood.

Interviews were conducted during summer 2009

- Balogh Angéla (manager), Újpest market
- Berzsák Zoltán (architect), Csepel market
- Cságoly Ferenc (architect), Fény utca market, Gödöllő market
- Kertész András (architect), Fehérvári úti market
- Rajk László (architect), Lehel market
- Sáros László (architect), Vác market
- Varga István Péter (architect), Újpest market
- Vörös Péter (manager), Lehel market

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Polyrational strategies for sustainable energetic development of space – the example of Leipzig

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1 ABSTRACT

The project "The sun is rising in the east – energy efficient city of Leipzig" is a joint project funded by the German federal Ministry of Education and Research (BMBF). Main objective of the project is to develop an innovative concept for the future procedure of developing Leipzig as an energy efficient city. Therefore the concept contains "energetic-spatial" topics (in the sense of a combination of both strategies) against the background of demographic change.

As a first step this concept will be developed in the urban district "Leipzig east". This is a quarter of the so called Wilhelminian style. It suffers from a shrinking population and changes in the population structure. In spite of perennial reconstruction measures the area is suffering from a backlog in reconstruction. Therefore it is necessary to go on with the urban regeneration. Generally, potentials to integrate energetic needs can be found, but on the other hand it is difficult to realize them because of the socioeconomic structure. Therefore reducing energy is not the only objective. To find sustainable solutions it is essential to include socioeconomic demands and restrictions: Not the best technical solution can be realized but a solution which also considers social and cultural aspects and which can be financed at least.

Within the project, "energy" will represent a benchmark for the evaluation of the technical dimension of the "city system", as well as an object for the planning process in the political dimension of that system. For the first time, strategies to handle with the spatial consequences of demographic change and strategies of mitigation will be combined in this project. The results of the concept will be integrated into the strategic district plan for Leipzig east. Leipzig thereby shall become a role model of urban reconstruction in Germany and in Europe.

2 MAIN OBJECTIVE OF THIS ARTICLE

The dynamic changes currently taking place in society and space call for a rapid response. Therefore, research needs to highlight alternative approaches to achieve sustainable solutions. Concerning sustainability of spatial development which includes energy efficiency it is necessary to create new strategic and action plans which basically have to be developed by local actors.

Main objective of this article is to emphasize that a modern urban energy concept should integrate several dimensions, especially it is necessary to combine the two policy fields of energy and of space. For that it is obligatory to develop an integrative and cooperative governing process. Following this objective, "energy" should be seen as a new object of spatial governing process. It is essential to find a sustainable answer which integrates also the demand side into the strategy and action plan to develop urban energy concepts. On the whole, the article refers to the question of urban policy.

3 EXAMPLE OF LEIPZIG

At first it is necessary to give a short impression of the city of Leipzig to understand the challenges and the background for preparing a sustainable energy concept. Leipzig is a big city in East Germany. In 1989, not only a political transformation has begun but also social, economic, cultural and ecological transformation processes. Looking back to more than 20 years of these different forms of transformation it has to be emphasized that the city – its physical and its societal structure – has changed in an enormous way and that this transformation processes are still going on (Doehler-Behzadi, Lütke Daldrup 2004). A lot of problems could been solved – but not all. The unemployment rate is very high. The population has decreased from 1989 until the late 1990s because of migration to the suburban areas of Leipzig or to West Germany. Although the current height seems to be stable or even to increase again the density is much lower than in the early 1990ies. Concerning the spatial structure, the city has to cope with waste land and with apartment vacancies. This has got impacts for society, space and for the effectiveness of the technical and other infrastructure.

Leipzig has got a specific local situation with energy related challenges. That is why on the one hand there are also specific challenges for sustainable forms of energy policy. But on the other hand the transformation process in Leipzig has got a lot of similarities to other cities in Central and Eastern Europe. That is why it is useful to share experiences with each other and also to use methods and results of existing projects. But it is always necessary to find out if they are exactly transferable or if a modification is required.

To cope with these spatially related problems in East Germany it was not possible just to adapt the traditional understanding of a policy of space which had been developed in West Germany but to develop new forms, with new content and new instruments (cf. Oswalt 2005). On the whole, sustainable urban development has to follow two approaches to cope with these dynamic changes: At first it has to implement different sectors in an integrative way which influence the spatial structure (cf. Leipzig Charter 2007). Then, because of this integrated approach it also has to be organized in a cooperative way (cf. Healey 1995) – as the power to analyze, to plan and to change spatial structures does not only belong to the public sector. Different actors can be identified:

- Government of State
- Local authorities
- Public utilities
- Owner of building
- Inhabitant
- Users
- Consumers

These different actors have got different rationalitites, different perspectives and also different opportunitites to implement their objectives. Especially if the existing city (the "built city") should be transformed – and this is the main task in the future – it is obligatory to have a development together with private actors. An urban energy concept should be a part of a superior strategy of urban development. Therefore it should be discussed if and how an energy concept also could follow these two approaches.

Concerning energy related projects there are several initiatives in Leipzig. Not only public authorities have begun to develop strategies and actions plans like preparing an application for the European Energy Award or finding strategies for adaptation processes in Leipzig Region against the background of climate change. Also some private groups discuss and realize interesting solutions in this subject. For example there are two districts which have not been refurbished on the whole until this moment, the owners and the inhabitants of the buildings have now initiated bottom up plans to develop their district. The possibilities of energetic improvement are discussed together with a lot of other demands and objectives.

But although energy is already a topic in the perception of several actors an integrated and cooperative solution is still missed. That is why a project consortium has applied for a research project in Leipzig which should develop an integrative urban energy concept. In the following chapter this project is described.

4 RESEARCH PROJECT "ENERGY EFFICIENT CITY OF LEIPZIG"

The project "The sun is rising in the east – energy efficient city of Leipzig" is a joint project funded by the German federal Ministry of Education and Research (BMBF) (www.energiemetropole-leipzig.de). Main objective of the project is to develop an innovative concept for the future procedure of developing Leipzig as an energy efficient city. Therefore the concept contains "energetic-spatial" topics (in the sense of a combination of both strategies) against the background of demographic change.

As a first step this concept will be developed in the urban district "Leipzig east". This is a quarter of the so called Wilhelminian style. It suffers from a shrinking population and changes in the population structure. In spite of perennial reconstruction measures the area is suffering from a backlog in reconstruction. Therefore it is necessary to go on with the urban regeneration. Generally, potentials to integrate energetic needs can be found, but on the other hand it is difficult to realize them because of the socioeconomic structure.

The joint project is split up into different working packages "energy space", "actors", "software" and "service engineering". In every working package other objectives are more important so that it is possible to

analyze the city from different perspectives as system of energy, a spatial system or a system of users. As results of the project, an energy-spatial concept will be developed, an energy-spatial consensus will be concluded, a computer-assisted communication platform will be prepared and a service engineering will be introduced.

All results should serve the main objective of the project to identify strategies of highly reducing the energy demand in the east of Leipzig and should show potentials for energetic optimization, increase public awareness and lead to new forward-looking businesses. Based on an evaluation of the current energetic structure, the concept will show strategies and actions to save energy consumption. But reducing energy is not the only objective. To find sustainable solutions it is essential to include socioeconomic demands and restrictions: Not the best technical solution can be realized but a solution which also considers social and cultural aspects and which can be financed at least.

To find out what the perceptions of the different groups and actors in the inner-city are, existing superior (political and societal) and individual strategies are analyzed and optimized. Thereby, a decentralization of technical infrastructures is discussed although the dominance of the existing district heating network in the east of Leipzig has to be accepted.

Within the project, "energy" represents a benchmark for the evaluation of the technical dimension of the "city system", as well as an object for the planning process in the political dimension of that system. For the first time, strategies to handle with the spatial consequences of demographic change and strategies of mitigation are combined in this project. The results of the concept will be integrated into the strategic district plan for Leipzig east. Leipzig thereby shall become a role model of urban reconstruction in Germany and in Europe.

The first part of the project has got a time period only of twelve months; it has started in June of 2009 and will go on until June of 2010. Within this period it is only possible to develop a concept for the future. The second part of the project for which we have to apply again will focus on the implementation of the concept. Only three to five of the current 15 projects will be funded in the next period which will take five years at a maximum. But even if we will not be funded the project will have been successful because already now it is possible to discuss the challenges and solutions of a spatial-energetic urban development in Leipzig and to sensibly people and organizations for this topic.

Four project partners are mainly involved in the project:

- Fraunhofer Center for Central and Eastern Europe (MOEZ) (coordination)
- City of Leipzig (department for business development)
- University of Leipzig, Institute for applied Informatics (InfAI) e. V.
- University of Leipzig, Department for urban development and construction management (ISB)

The research project has got some advantages for the municipality of Leipzig. The concept contributes to a sustainable urban development. It also connects strategies and actions of spatial with an energy policy and it is strengthening the profile of energetic and spatial policy. Furthermore, solutions to overcome two crises – "climate crisis" and "socioeconomic crisis" – will be shown. Finally an integrative and cooperative concept for the district of "Leipziger Osten" (east of Leipzig) concerning spatial and energetic dimensions will be developed which combines objectives of urban regeneration and needs of technical infrastructure.

At the municipal authorities the project is assigned to the department for business development. But this is only for formal purposes. In fact, a lot of departments (e. g. planning, environment) are involved. Additionally, there is an exchange with several public and private actors, so called "dialogue partners", for example housing companies and public utilities. In this dialogue a new "energetic truth" as a part of sustainability will be discussed.

5 "CLIMATE JUSTICE" AND "ENERGETIC TRUTH" IN THE CASCADE OF SUSTAINABILITY

In the Leipzig project it is necessary to define what the impacts of climate change for spatial policy are. Therefore it is also essential to operationalize the normative concept of sustainability. For that two new terms have been defined: "climate justice" and "energetic truth".

Future strategies and measures of spatial development will increasingly focus on adaptation. Given the macro trends of spatio-structural influences, spatial structures will have to be reorganized: apart from socio-cultural changes in the demand for buildings and areas to live in, the positioning of agglomerations within competition as a result of technological and economic structural transformation, and the way in which fragments and the declining intensity of use in connection with demographic change are dealt with, sustainable spatial development will entail adapting cities and urban regions to the requirements of energy-optimized urban structures and the consequences of climate change (cf. Mörsdorf, Ringel, Strauß 2009).

Materially speaking, this new integrated viewpoint will necessitate reviewing previous models, strategies, aims and measures of spatial development. And in institutional terms, too, the traditional forms of control will have to be examined regarding their suitability in the face of climate change. This includes analyzing the actors and patterns of action as well as the instruments available. A suitable set of instruments for climate change needs to be made available which actors can use to ensure and restore urban development and regulation.

Ultimately, these two areas require a new type of analysis of the forms of transformation which, compared to other spatial-structural challenges, are beset by a considerable lack of clarity. Whereas for example in response to demographic change supply is adapted to changing demand , both demand and supply have to react to the changing conditions brought about by climate change. In addition, forecasts are very unclear and complex. The uncertainty arising from this fuzziness regarding future change is a source of risks – but also of opportunities as innovative solutions become possible (cf. Strauß 2009).

Adopting a holistic interpretation of climate justice of space, measures of mitigation and measures of adaptation need to be combined. In addition, climate justice also ought to take socio-political elements into account. Therefore the term contains:

- The requirement to be suitable for the climate (as environmental justice)
- The socially fair arrangement of these strategies in terms of standards of living and survival capability (as social justice)

In these spaces, innovations are possible with climate justice in a double sense. On the one hand, the haziness of climate projections ultimately leads to an inability to plan space and therefore enables individual innovation, while on the other changing sets of criteria form a breeding-ground for innovations of social justice in regional systems of innovation (cf. Fritsch 2005: 479–480). A climatically suitable spatial innovation system therefore consists of the two mutually dependent foundations ‘knowledge’ and ‘ethics’ (cf. for biotechnology: Koch 2006: 2). The system of innovation contributes to economic improvement and to social and cultural regional development. It hence helps a region as a whole to distinguish itself and to reduce disparities (cf. Schwinges et al. 2001).

A strategic target in future discussions and project dealing with energy consumption, renewable energies as well as climate justice is to publish and to discuss an “energetic truth”. This term can be defined in the following way:

“Accepting and disclosing of current energetic situation and its impact on the future of availability, consumption and costs of energy. The bounded rationality of politics, economy and private persons has to be accepted and alternative polyrational solutions for present ways of acting with all their advantages or disadvantages (costs and limits) have to be shown.” (own definition)

This term implies to enlighten the society about the status quo of energy consumption and the finiteness of fossil fuels as well as telling the truth about perspectives of renewable sources and future energy concepts. The implementation of the energetic truth goes along with the utilization of renewable energy sources, an increase in the efficiency and the adaptation of the current energy infrastructure in combination with the improvement of the physical structure of city as well as the question of decentralization of the main power supply and an energy efficient mobility.

The approach of implementing an “energetic truth” follows the concept of bounded rationality but also emphasizes the need of developing a new polyrationality (Davy 2005, based on Douglas 1992). Therefore it implies two major strategies with the focus on developing new methods of cooperation. The superior strategy sets the focus on the public authority which is in charge of the overall spatial planning process and therefore responsible to secure the welfare of the general public. An innovative connection between general and

sectoral planning is discussed during the process. The superior strategy also includes a dialogue with the public in form of public relations and workshops with the owners and the inhabitants of the district. The individual strategies contain initiatives of private actors which influence spatial development as well as an analysis of institutions and their patterns of acting. These individual strategies are attended by new service concepts like the computer aided service engineering.

Both strategies – the superior and the individual ones – should follow the principles for a sustainable energy supply (cf. Bundesministerium für Umwelt 2009):

- Guarantee security of energy supplies
- Strengthen economy
- Increase renewable energy
- Realize nuclear power phase-out
- Use coal in an efficient way
- Make power grid efficient
- Consume power more efficiently
- Reduce fossil-fired heating system
- Reduce emissions in traffic system
- Act international

In reality, a lot of objectives and actions follow these principles, but there are also a lot with conflicts to them. And it is important to say that the principles refer to different actors. In the sense of a planning process which includes the elements of integration and cooperation it is necessary to find solutions to reduce the conflicts between these objects. Within this discussion there is also another debate which becomes stronger: the debate about zero emission cities. The debate includes the discussion about the following theses (cf. IWU 2002):

- "Zero" is only a vision
- Zero is not absolutely 0
- The city is surrounded
- Integrated analysis is obligatory
- Reycling management is necessary
- Physical space: impact or result?
- How sustainable is the compact city?
- Polycentric agglomerations have got less traffic
- The only question is about "zero"
- People are catalyzers

In opposite to new towns like Masdar City or Dangton it is not possible to realize zero emission structures in the already built city like Leipzig. But it is necessary to analyse the current energetic structrures, to develop scenarios about the future development and to create realistic concepts. Therefore, the project has begun to find and to commuicate the energetic truth.

6 METHODS AND DATA COLLECTION OF THE ENERGY CONCEPT

Parallel to the two strategies there are also two possible methods to evaluate a city as an energetic system: top down and bottom up methods. Both methods have got advantages and also disadvantages. After all the project partners have decided to follow a bottom up method (in opposite for example to the methods of the European Energy Award). Again, this bottom up method contains alternative possibilities to analyze the energetic structure – they mainly differ between the basic units: buildings (units of the built city) or consumers (units of the societal city). Concerning, this question the project has decided to mix these two

units because it is necessary to have benchmarks regarding the built but also the societal city. Therefore the following indicators have been chosen:

- Construction year of the building,
- Quality of refurbishment,
- Form and quality of heating system,
- Size,
- Use,
- Owner (esp. private/public),
- Population structure,
- Protection of historic building
- Electricity consumption,
- Modal split and other indicators concerning mobility.

As the project has begun in June 2009 the data collection has not been finished. And it will also not have been finished for every indicator (especially concerning mobility) at the end of the first part of the project (June 2010) because the collection is very difficult. But until the end of the first part of the project we will have created an action plan which includes a set of indictors, first data collection and also the responsible actors and sources of the data.

A lot of problems exist with data collection because in Leipzig there is no central public authority which would be responsible for collecting and publishing or selling relevant data. This is not only a problem of Leipzig but of almost every municipality in Germany. In future it is not probable that this will be changed. That is why different ways to collect data have to be found. As an example we have tried but failed (at least until this moment) to get data from the guild of chimney sweeps. At least it is useful to establish a task force where all relevant public actors take part and share their data.

Another challenge has been to define the border of the site. There are different borders – administrative, statistic, funding, content – which also reflect different data, strategies, authorities. We have taken the borders of the ERDF district ("European Regional Development Fund") which already exists so that it is possible to combine socio-spatial strategies of EFRE with energy related strategies.

In the research project not the whole city of Leipzig will be analyzed but a part of it. This "pars pro toto" is in some kind more difficult to be analyzed than if whole of the city of Leipzig would have been taken because the results of the site have to be typified to be transferable to other districts of Leipzig and to get overall results for the city.

7 CONCLUSION

The Leipzig project of urban energy concept does not achieve a "high end solution" in the sense of a best energy system. But it achieves a sustainable solution which permits a pareto optimum including socioeconomic demands. This optimum reflects the restrictions of an integrated perspective: A sustainable urban energy concept aims not a technical energy system but a combination of spatial and energetic optima. Its content includes the dimensions of space, actors and – at least – energy. This does not mean worse but better objectives and actions.

The research project of Leipzig is specific on the one hand and has got transferable elements on the other hand. While empirical results have to be explained with the local situation it is possible to use the theoretical concepts of "climate justice" and "energetic truth" as well as the methodology of differing strategies and differing data collection for other cites. Especially it is valuable to discuss about a transfer of connecting spatial and energy policy to create really sustainable urban development.

In the future sustainable urban energy concepts should not be prepared separately but it is necessary to combine spatial solutions against the background of different forms of change like climate or demographic change. It is also necessary to combine spatial and energetic policy to permit integrated perspectives of urban

development. Furthermore it is necessary to realize cooperative forms of governing to achieve a cooperative governing process. These polyrational strategies are a key to sustainable urban development.

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Position and Possibility of Large HungarianTowns in the Hierarchy of the European Towns

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1 ABSTRACT

There is a dual research objective: the position of the large Hungarian towns in the hierarchy of the EU on the other hand their possibilities and development directions. The population of the town dwellers has been gradually increasing during the last decades. It has resulted in the concentration of the new job openings, knowledge and possibilities. But unfortunately this particular trend has implied negative consequences as well. The issues such as sustainable development of towns, converting them places where well-being is guaranteed are both topical questions. The engines of the settlement networks s are such places where resources and activities are concentrated. Towns of the European Union can be arranged in groups based on several criteria. According to the research towns are terminated as European or trans-national towns (called mega) moreover national, regional and local centres (Rechnitzer 2007). Centres in Hungary – comparing to the capital- are significantly smaller settlements representing less population and more modest significance. The population of Budapest is about 2 million. The so called 8 big town's population is about 100- 200 thousand.

The significance of the national borders has been eased in the tremendous competition for the profit for the continuous development. The significance of several other potentials has been developed such as inexpensive labour force, knowledge, the number of the active population, the culture of the population, professional preparedness of the population. The potentials of the local values are upgraded and valued. Geopolitical potentials are also incorporated. A higher educational institution can be a special regional attraction being a professional headquarter of labour force reinforcement. Numerous young moves to towns and elderly also can be attracted due to sophisticated service supply. The significance local values, local traditions, cultural values and natural values are being kept at a high esteem evaluating the role of country living. Infrastructural changes modify the way of country living making transport and employment a mobile business. Competitiveness depends on the productivity with which a location uses its human, capital, and natural resources. Productivity sets the sustainable standard of living (wages, returns on capital, and returns on natural resources). It is not what industries a nation competes in those matters for prosperity, but how it competes in those industries. What Determines Competitiveness? Nations and regions compete to offer the most productive environment for business. The public and private sectors play different but interrelated roles in creating a productive economy (Porter 2008).

On the basis of all this it is acceptable that competition started between towns at first since this particular competition is all about for companies, tourists and the increasing number of the population. There is a very close connection between the towns and the companies since these two factors individually increase the attractiveness of each other. Qualified professional labour force, having intellectual language acquisitions is a significant factor to attract companies to launch a new business and vice versa a company providing good living standards attracts young, mobile labour force. (Filep 2009). As different countries, companies can be compared so can towns. But an only identical type seems to be worth being compared. Our research has been designed to position Hungarian towns into the hierarchy of European towns.

2 COMPETITIVENESS OF CITIES: MEASURES OPPINIONS IN FOCUS HUNGARY[1]

Recently – besides analyzing the regions – regional research focused on the successfulness of cities as well. It is not by chance, because more and more people live in towns. „Today there are more than 300 cities with a population over a million in the world (city region), and there are almost 20 among them having more than 10 million inhabitants." (Enyedi 2003). The population of the town dwellers has been gradually increasing during the last decades. It has resulted in the concentration of the new job openings, knowledge and possibilities. But unfortunately this particular trend has implied negative consequences as well. The issues such as sustainable development of towns, converting them places where well-being is guaranteed are both topical questions. The engines of the settlement networks s are such places where resources and activities are

[1] This part is writing of Bálint Filep by „Competitiveness and Area Organizing Fuctions of Major Cities" PhD Thesis, 2009.

concentrated. Towns of the European Union can be arranged in groups based on several criteria. According to the research towns are terminated as European or trans-national towns (called mega) moreover national, regional and local centres (Rechnitzer 2007). Centres in Hungary – comparing to the capital- are significantly smaller settlements representing less population and more modest significance. The population of Budapest is about 2 million. The so called 8 big town's population is about 100- 200 thousand. The Hungarian "big" cities are not compare with the European big cities!

Which are the factors which may serve the way forward in this competition and amend the positions of cities. Studies have been made earlier to compare and evaluate competitiveness on national and on international levels as well. We can read deeper analyses in scientific literature, which cover the way of development of a city and seek its reasons and motivating factors and contribute to the elaboration of the development strategy. The economic sphere and human resources and the connection between them play an important role in the different theoretical and practical measuring tests. In my opinion examining the competitiveness of cities and their surroundings is a really exiting topic. It would be worth observing the individual cities from their formation, because the choice of the site and the historical events formed the cities, their role, their society, their traditions and economy. Competitiveness depends on the productivity with which a location uses its human, capital, and natural resources. Productivity sets the sustainable standard of living (wages, returns on capital, and returns on natural resources). It is not what industries a nation competes in those matters for prosperity, but how it competes in those industries. What Determines Competitiveness? Nations and regions compete to offer the most productive environment for business. The public and private sectors play different but interrelated roles in creating a productive economy (Porter 2008). International examples show that nowadays competitiveness appears beside on the level of companies, higher education and several other dimensions, also on the level of nations, regions, towns. There is a competition for floating production factors like capital, skilled manpower. Several other factors can contribute to competitiveness; some of them can be expressed with exact indicators, but some immeasurable factors may also occur, which are debated in rational and emotional economics as well. The historical development also contributes to the conditions of today.

It is important to determine our aims and the devices to analyse while typing the regions. It is not easy to type regions; there are several possibilities. To limit the attraction field of towns is not simple either. In many cases this limitation is very evident, because almost every country has well known borders, the limits of the regions in the European Union show up on maps well, the Hungarian counties and small areas are also known. The borders of towns are a bit harder to define; the limitation of their attraction field depends significantly on the examined factors. In some cases the limitation is strongly influenced by the geopolitical situation. It is particularly true in the case of towns and regions on the nation's borders (Dusek 2004.) Competitiveness and welfare will be defined by several theoretical indicators. The most common are GDP, GDP/person, HDI (Human Development Index). In opinion of Berey and Nemes (1998–2001) the reason for the regional differences characterized by the indicator of GDP/P was mainly the regional discrepancy of the gross value added (GVA) per person[2]. In the opinion of Nemes, Nagy József (Nemes 2007) as a result of information explosion, it is possible to get information from many places of the world. It is questionable whether they can be compared. The mathematical statistical approach, typical of the 1970s-1980s, narrowed to more simple indicators. All these can be traced back to the fact that these comparisons were not made for scientific purposes, but to serve the supporting politics.

We can find comparing reviews with different indicators, related to a point in time or time range: innovation clusters for a development index by Grosz−Rechnitzer (Grosz−Rechnitzer 2005), components of Nárai (Nárai 2005) created by factor analysis. Horváth (Horváth 1999) analysed different international major cities based on individual indicators. Similar reviews have been made in other countries as well. Győrfy and Benyovszky analysed the productivity of work in Romania and the evolution of the regional competitiveness in the counties (Győrfy−Benyovszky 2005). Many of the methods mentioned above cannot be used during the analysis of the Hungarian towns, because a lot of data − e.g. GDP − is not available on the town level.

[2] Berey and Nemes published a method in 2002 saying that the ratio/figure of GDP/P often used to chracterize regional competitiveness and living standard (where P is for the populationi) can be divided as follows: GDP/P=GVA/P+(T+D-S/P), where GVA/P shows the gross added value per person, T+D-S/P shows customs- and productfees per person (T+D) and state subventions (S). GVA can be inscribed by the multiplication of the ratio of gross added value per person and the employed labour per person: GVA/P=GVA/E*E/P, where E means the employed labour (Berey–Nemes 2002).

Zoltán Nagy measures the level of social-economic development with a manifold indicator system (2007), the so called Bennett method, which turns heterogeneous indicators into synthesized indicators. The essence of the method is „in the case of all indicators, the data of that region will be considered as the basis, where the value of the indicator is the highest. Bennet treated the sum of the relative values of each region units as the result of the calculation. So we can see which regional units have the highest values, and what kind of a relative development they have." (Nagy 2007). Using this method Nagy positioned the following towns: Békéscsaba, Debrecen, Eger, Győr, Kecskemét, Miskolc, Nyíregyháza, Pécs, Salgótarján, Szeged, Szolnok. He made the calculations for the years 1900, 1920, 1949, 1980, 1995, 2000 and 2004. In the total ranking of these 11 towns, Győr has always had the first or second place up to 1980. The position of the town has declined in the last years and it went back to the 4th - 5th place. Nyíregyháza shows a more various picture. It has had the 7th or 8 th place continuously until 1980, when it sank back to the last place, but in the last three years it reached the 6 th place[3].

The significance of the national borders has been eased in the tremendous competition for the profit for the continuous development. The significance of several other potentials has been developed such as inexpensive labour force, knowledge, the number of the active population, the culture of the population, professional preparedness of the population. The potentials of the local values are upgraded and valued. Geopolitical potentials are also incorporated. A higher educational institution can be a special regional attraction being a professional headquarter of labour force reinforcement. Numerous young moves to towns and elderly also can be attracted due to sophisticated service supply. The significance local values, local traditions, cultural values and natural values are being kept at a high esteem evaluating the role of country living. Infrastructural changes modify the way of country living making transport and employment a mobile business.

On the basis of all this it is acceptable that competition started between towns at first since this particular competition is all about for companies, tourists and the increasing number of the population. There is a very close connection between the towns and the companies since these two factors individually increase the attractiveness of each other. Qualified professional labour force, having intellectual language acquisitions is a significant factor to attract companies to launch a new business and vice versa a company providing good living standards attracts young, mobile labour force. (Filep 2009). As different countries, companies can be compared so can towns. But an only identical type seems to be worth being compared. Our research has been designed to position Hungarian towns into the hierarchy of European towns.

3 CITIES GOVERNANCE IN EUROPE

„European integration has led to a manifold and far-reaching involvement of cities in policies devised at the European level. In many respects metropolitan regions and cities have become the concrete, practical testing grounds for EU rules, strategies and programmes. For cities, the EU has emerged as a new political arena, offering both opportunities to gain from policies geared towards local level development, but also new constraints emanating from European regulative frameworks. European policies like this are simultaneously played out at all levels of public administration and policy: first, at the EU level, where formal governing in the absence of a real government materialises; second, at the level of member states governments, where programmes and strategies are formulated in cooperation with the subnational entities (taking different forms in member states with more centralist and more federalist traditions); and third, at the sub-national tier of government that has responsibilities for programme codrafting, programme management and operational implementation." (European Metropolitan Governance: Antalovsky;Dangschat;Parkinson (eds.) 2005.)

[3] Zoltán Nagy examines in his PhD thesis in 2007 the situation of Miskolc with the Bennett−method, comparing it with other cities. He refers to the work of Abonyiné P.J. from 1999.

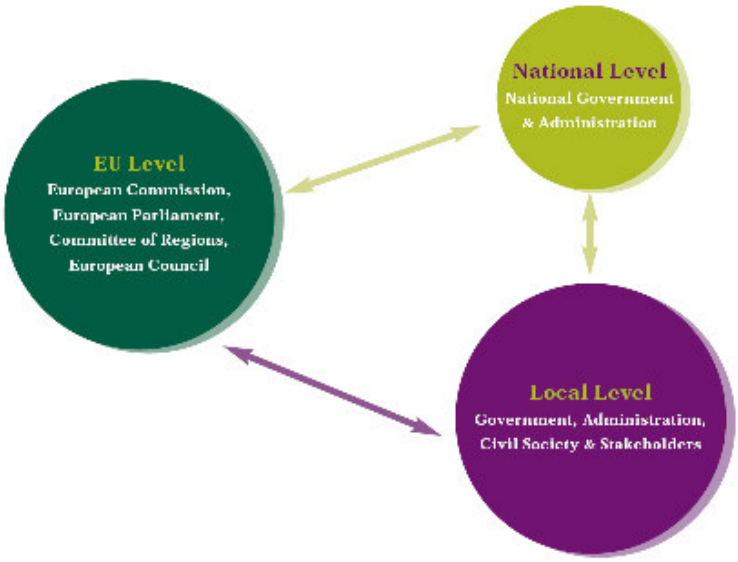

Fig. 1: Governance hierarchy for Cities (European Metropolitan Governance: Antalovsky; Dangschat; Parkinson (eds.) 2005.)

The conclusions regarding this case of deliberative governance are all-important for cities as actors on the European stage with only a very limited formal role in the EU decision-making processes: solely through their presence in the 'discursive space' that surrounds the European institutions, 'good arguments' that are brought forward convincingly and efficiently, the provision of policy expertise to the Commission and the Parliament and, in the final analysis, a 'legitimacy input' for the European Union and the integration process, cities have a fair chance of influencing important EU policy agendas (European Metropolitan Governance: Antalovsky;Dangschat;Parkinson (eds.) 2005.).

Numerous external factors can influence the development of countries, regions, and towns. Veress finds in one of his studies about globalization that in terms of new achievements of the information society and international financial economy we can see: the category of “country” becomes more marginal and irrelevant. „The relation of the state and the business sector can be treated in a way as both parties move in their own ways; sometimes they meet. (Geometrical proportion and speed determine the extent of the autonomy of each party). The lower a country is in the list of the potential sequence of nations; the stronger it depends on the levels of integration, on different international financial levels, and big investors. It has a strong influence on the relationship of the two spheres; a strong need appears for a mutual approach between governments and entrepreneurs. The parameters of each country are determined by their histories, the level of development, economic traditions and the position in the potential sequence altogether.” (Veress 1999). Very important concepts also play a role in interpreting their role in the region.

There are always a lot of external and internal factors, which are very important for the cities future. But the governance and cooperation ability of cities could have a key rule.

4 CONCLUSION

„The city regions of developed countries become the motor of economic growth; there is a significant concentration at these places. The availability of top level business services, research and development, financial institutions, development of cultural economy – in spite of information technology development – is important in determining competitiveness. Networks promoting education, creativity, and innovation come into existence in major cities, because clusters concentrated in regions allow the flexible reaction to the more specific demands. Global markets, increase of specialized demand, and flexible networks of big cities make it possible to attract ever more specialized producers into cities, so regions of major cities became the regional motors of the world economy.” (Hungarian settlement network.2007, 10−11.).

By the one of ESPON forecast we can read: „The development of polycentricity has taken place through the expansion of the pentagon rather than through the development of alternative global economic integration areas. Remote peripheral regions, and even those with large cities, have generally not been successful in generating or maintaining sustained development processes, so that no global economic development area emerged outside the wider pentagon. As a result, large cities in the peripheries remained rather isolated in

their development processes and have not significantly benefited from network and synergy effects. From a global perspective when compared to the early 2000s, European "global" cities have odernized their economic and technological base though their collective competitive position vis-ŕ-vis the global cities of North America and Asia has not changed.

At an intermediate scale, the level of polycentricity in the national urban systems of the countries of Central and Eastern Europe and of the southern peripheries has been reduced, compared with that of the early 2000s. This is a result of territorial differentiation in the long-range economic trajectories of regions. In the countries of Central and Eastern Europe, rural-urban migrations have been significant up to 2030, precisely because of the process of territorial differentiation. Nevertheless, a substantial part of the rural population has been urbanised in situ, i.e. without long-distance migration. Migration flows have also developed from small to larger urban centres" (ESPON 3.2, 2007).

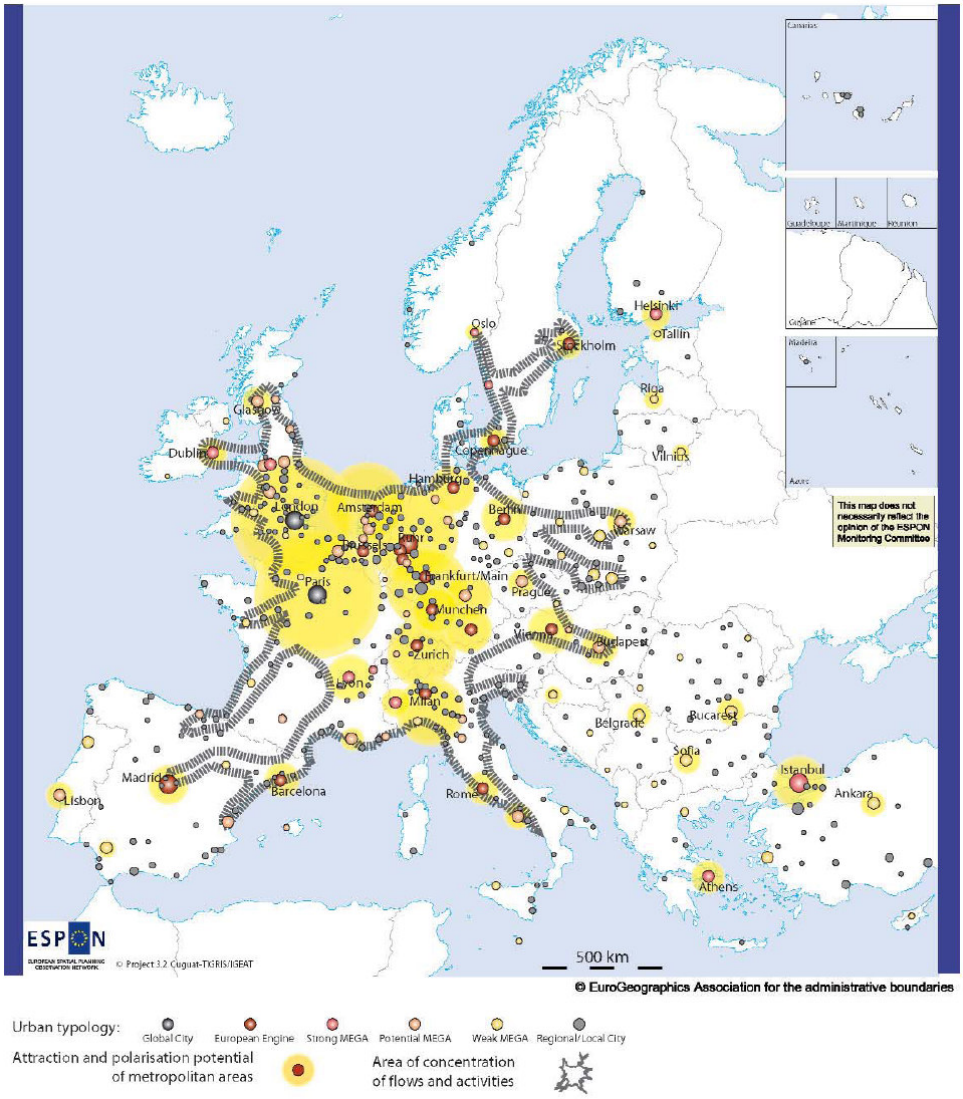

Fig. 2: Spatial structure and urban hierarchy in 2030 according tot he Trend Scenario

The carriers of knowledge are the institutions of higher education. Encouraging innovation and innovation have priority, because they contribute to development. Dőry's formulation for reducing the differences between regions – "the cohesive gap" – is only to achieve with intensifying the R+D and the innovation activities (Dőry 2005, 27). „It is an elementary interest for Hungary to belong to the European Region for Higher Education. It was the same in the age of Latin culture. Europe has to compete today as well, as university rectors and government ministers realized it in London in 2007.

The global challenge created a contention, where the European higher education can only keep its leading position if it reacts appropriately to at least four worldwide challenges. These challenges are mobility, permeability, employment and quality." (Szekeres. 2008.) Europe, Hungary and the regions, cities and towns

compete. The aim is to match the new challenges on national and city, university level and to achieve a better position.

Centres in Hungary – comparing to the capital- are significantly smaller settlements representing less population and more modest significance. The population of Budapest is about 2 million. The so called 8 big town's population is about 100- 200 thousand. The Hungarian "big" cities are not compare with the European big cities. At the 14th conference in Sitges in 2009 on city planning and regional development the definitions of integrated town, "live - ability," knowledge and sustainability came to the front. The conference for city planners held for 13 years in Vienna was deliberately moved to a small Spanish town this year –to give the possibility for smaller towns to find their way to development and to get ready to adjust to challenges. (Cities 3.0 www.corp.at 2009). This shows, that not only the big cities are liveable.

The knowledge required by the Lisbon Strategy contributes to the development of human resources and the economy; it is worth examining it deeper, on town and region level as well. Knowledge of society is closely connected to this. Robert K. Merton wrote about it in 1957 and in 1968:"The European version of the sociology of knowledge tries to find the social roots of knowledge. It searches how the surrounding social infrastructure influences knowledge and thinking" (Merton 2002). It is very important to measure knowledge, how the number of innovations, licences depends on environmental settings and structure.

We wish to develop an even more complex indicator to measure the competitiveness of the cities in the future, which could also be used to more easily compare Hungarian cities internationally.

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🏆 *reviewed paper*

Public transport accessibility in Poznań

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1 ABSTRACT

Public transport played significant role in the modal split in Polish cities before the economic transition. Nevertheless, the development of public transport infrastructure could not keep up with the changes in urban structures. Since the beginning of the economic transition, cities have been trying to fulfil old gaps, but also to confront new problems (like increasing the motorization level, rising suburbanization, the lack of well thought urban development policy). Poznań is a special case study: on the one hand it has one of the best and innovative public transport systems, on the other hand car usage is on the highest level among the biggest Polish cities. According to the last general traffic surveys performed in 2,000, trips by car equalled 56%. It seems that the main reason of this situation is inappropriate development of the public transport network, which is not following by the urban development. Analyses were performed in 2009 by using advanced GIS and GPS tools. The paper presents the public transport accessibility level in Poznań in many aspects such as coverage of public transport stops and time needed to reach main destinations in the city. There were also examined extensions of routes between homes and stops according to the types of urban structures.

2 GENERAL VIEW

Poznań is one of the oldest cities in Poland. It is also Poland's fifth largest city (557,264 inhabitants in 2008) and fourth biggest industrial and academic centre (with more than 130,000 students). Poznań is the capital of the Wielkopolska (Greater Poland) Voivodeship. Since the 19th century the city has been one of the richest communes in Poland.

The spatial structure of Poznań was formed by: the Warta River, which is north-south axis of the city, two rings (one surrounding the downtown and one located approximately 6-7 km from the city centre) of former Prussian fortification and four triangles of the greenery (extending from the city centre to the city limits). The city structure is determined also by the network of main railroads (focusing in the main station – Dworzec Główny, which is located in the city centre). The city is comparatively flat. Until the end of communism the city was being concentrated relatively in small area, and the main idea of urban planning was the statement: “city of short ways”. Very visible were also triangles (wedges) of the greenery.

Since 1990 Poznań have been witnessing significant changes in urban development, living preferences and transport behaviours. The city has lost about 33,000 of inhabitants. In this time in the surrounding communes (Poznań County), the number of inhabitants has risen by more than 86,000 inhabitants. In effect, in 2008 Poznań County had 311,390 inhabitants. The migrations into surrounding communes (beside chaotic residential areas developed within the city limits) are creating many transport problems in the whole metropolitan area. In result the travel distances are lengthening and make inhabitants dependent on cars.

3 HISTORY OF PUBLIC TRANSPORT IN POZNAŃ

The development of public transport network does not following the spatial changes in the city. Inhabitants of new urban areas, customers of new shopping malls or workers of new industrial centres have to wait several months to get first bus connections to other areas of Poznań (in addition usually with low frequency). The development of tram network is much slower and new tram lines are not filling the network gaps which were appearing in the late 1970s and 1980s during construction of new residential areas.

Local authorities (in 80s) have been planning fast tram route in the north of the city to supplement the public transport network. The route (6.1 km) was opened after many years in 1997 and was a significant revolution for public transport in Poznań. It has allowed a rapid connection with the downtown for inhabitants of high-populated northern districts. The average speed of Poznań Fast Tram amounts to 35 km/h. However it has become a victim of its own success: the demand is higher than its capacity.

For the next tram-track inhabitants had to wait 10 years. In 2007 it was opened new track, which has a goal to optimize the network in city centre i.e. to shorten travel times and to give priorities in historical city centre

for trams. This investment can be also a symbol of changes in traffic policy concerning tramways: optimization of the network and priorities for trams in city centre instead of new tram-tracks to new housing estates. Outside the city centre, in narrow mining, the most important role is reserved for private cars.

4 PUBLIC TRANSPORT DEVELOPMENT PLANS

According to the general strategy for the city development from 1994, trams should be the fundamental mode of transport in the city. Since then, during renovations of the streets and traffic lights, it has been introduced some improvements in tram network, e.g. high priority at some intersections.

Currently in Poznań there are several plans to extend the tram network. Most of them are only conceptions. Only two of them have the chance to be constructed until 2013 (last year of financing investments from EU Structural Funds for 2007-2013):

- extension of route form Lecha terminus to the shopping centre M1 Franowo, with a depot at the end,
- extension of the Poznań Fast Tram route to train station Poznań Główny and connection with the rest of the tram network.

Only the first extension is sure because the old depot was sold in 2008 and city-owned Urban Transport Company has limited time to leave old one. The second conception is eagerly awaited by inhabitants expecting higher capacity of the Poznań Fast Tram, but this investment could be delayed till next years. In investments financed from EU Structural Funds for 2007-2013 there was also the extension of route through Zawady and Główna (northern-eastern part of city) to train station Poznań Wschód. However due to the economic crisis the city office decided to resign from it.

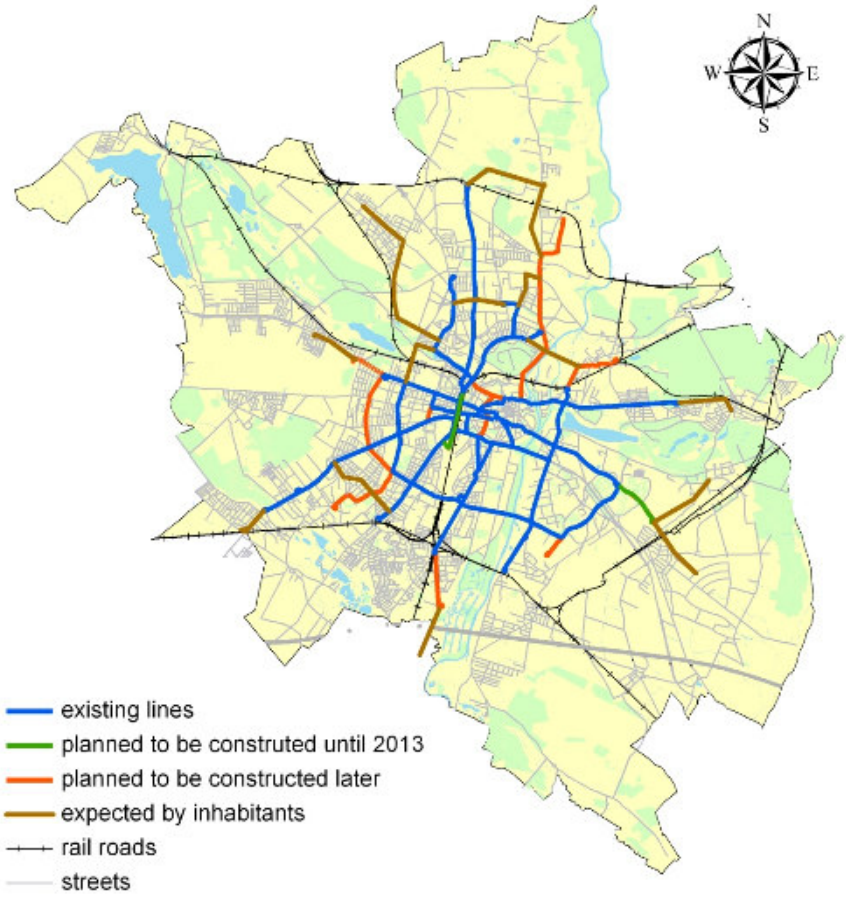

Fig. 1. Tramways in Poznań – existed and planned

Spatial development plans are more ambitious but they do not always meet the inhabitants' expectation – some important residential areas or travellers' destinations (e.g. Adam Mickiewicz University – campus Morasko) are still far away from tram network. Although the plans of tram network optimization have the biggest chance to be realized in the city centre.

Beside the plans described in investment plans or spatial development plans, there were several programs for tram-train system introduction and for rail tracks usage to connect metropolitan rail network and airport. These ideas do not have any chances for realization in the nearest future.

5 PUBLIC TRANSPORT NETWORK AND ORGANIZATION

Local public transport in Poznań is organized by Public Transport Authority and served by Urban Transport Company (MPK). Suburban, regional buses and local trains do not belong to public transport system of Poznań. During daily hours MPK is operating 19 tram and 54 bus lines and nightly – one tram line and 21 bus lines. Only one bus line is an express line and there is a necessity for passengers to pay an additional fee.

In 1993 in Poznań it was done a huge revolution in the system of tram lines. The number of lines was reduced from more than 20 up to 13. Simultaneously the frequency of the tram connections was improved. In result every weekday in rush hours (6:00-19:00) the trams are moving (with small exceptions) with 10 minutes frequency. On Saturday in rush hours they shuttle every 15 minutes and on Sundays and Saturday early mornings and evenings – every 20 minutes.

The bus lines are divided in three classes of frequency: main lines (15 lines), basic lines (11 lines) and supplement lines (26 lines). The main lines are coursing in peek hours (about 6:30 – 9:00 and 14:00 – 17:00) with a 12 minutes frequency and the basic lines – with a 15 minutes frequency. The supplement lines are coursing with different frequency: from every 8 minutes (for line connecting the Poznań Fast Tram with the university campus Morasko) till 60 minutes for some lines to suburbs within the city limits. During the summer vacation trams and buses have lower frequency (maximum: every quarter).

The length of the tram routes amounts to 66 km and of the bus routes – 318 km. The total length of the tram lines is 212 km and the bus lines – 573 km. The tariff system is based on short time tickets (for 15 min and 30 min) and long period tickets (mainly monthly tickets).

Poznań has the best buses and trams among Polish cities. Poznań was the first Polish city which decided to make a general modernization of its bus fleet. In 1996 first low-floor buses appeared on roads. They were bought in huge tender for 122 vehicles. In next years MPK or the city of Poznań were purchasing systematically new buses (usually several vehicles per year). Since 2004 monitoring has become a standard and since 2005 – an air condition. Present, the fleet consists of 310 buses (including 10 in leasing and 2 financed by one shopping mall) and 337 tram wagons (215 trains). Most of the buses are low floor vehicles but only 25 of trains have low floor. Next 45 low floor vehicles were ordered at the beginning of 2010. The average age of the tram fleet amounts to about 29 years but usually vehicles are well maintained. Modern fleet allows minimizing the troubles for passengers, e.g. delays, cancelled courses etc.

6 PROBLEM OF ACCESSIBILITY MEASURING

Accessibility of public transport system may be considered as one of the fundamental problems, which are faced by the modern city. This fact makes it necessary to develop appropriate mechanisms to assess its level. Often problems of accessibility and its level are not clearly understood – in literature could be found many different research methodologies. Litman (2008) presents some guidelines, which should characterize all the analyses on the accessibility of transport:

- Accessibility should generally be measured door-to-door, taking into account the travel links from origins to vehicles and from vehicles to destinations. For example, delays finding a parking space should be counted as part of travel time costs.
- Travel time costs values should reflect qualitative factors such as comfort and convenience. For example, unit time costs should increase with crowding and congested conditions.
- Travel distances should be measured based on actual network conditions, rather than as-the-crow-flies.
- Accessibility analysis should consider costs such as vehicle ownership and parking, not just vehicle operating costs.

According to these statements, researchers should take into account all aspects of travelling. It is necessary to concentrate investigations on comprehensive analyses which include all issues that could make public

transport more or less accessible. In result competitiveness between means of transport should be analyzed not only as the time-competitiveness.

In researches on public transport accessibility, it is also necessary to notice that each travel consists of a few stages, and each of them last a certain period. The total travel consists of sequentially:

- 1) coming to public transport stop,
- 2) waiting for the bus or tram arrival,
- 3) riding the public transport vehicle,
- 4) transfer operations, including:
  - a. move to stop to reach other line of public transport,
  - b. waiting for the bus or tram arrival,
- 5) passage of another means of public transport,
- 6) reaching the destination.

Attempts to shorten and facilitate all this stages are the necessity in modern and sustainable transport planning.

7 ACCESS TO PUBLIC TRANSPORT STOPS

In 2009 in Poznań there were made comprehensive and unique investigations on accessibility in public transport. At first ranges of the bus and tram stops were estimated. Acceptable distance to get them amounts to 300 meters for bus stops and 400 for tram stops (according to literature – Loose 2001), and this distance should be measured basing on actual network conditions, rather than "as-the-crow-flies" (Litman 2008, Tyler 2002). In Poznan this real distance is longer by 26% (it was measured by using GPS tools during the investigations).

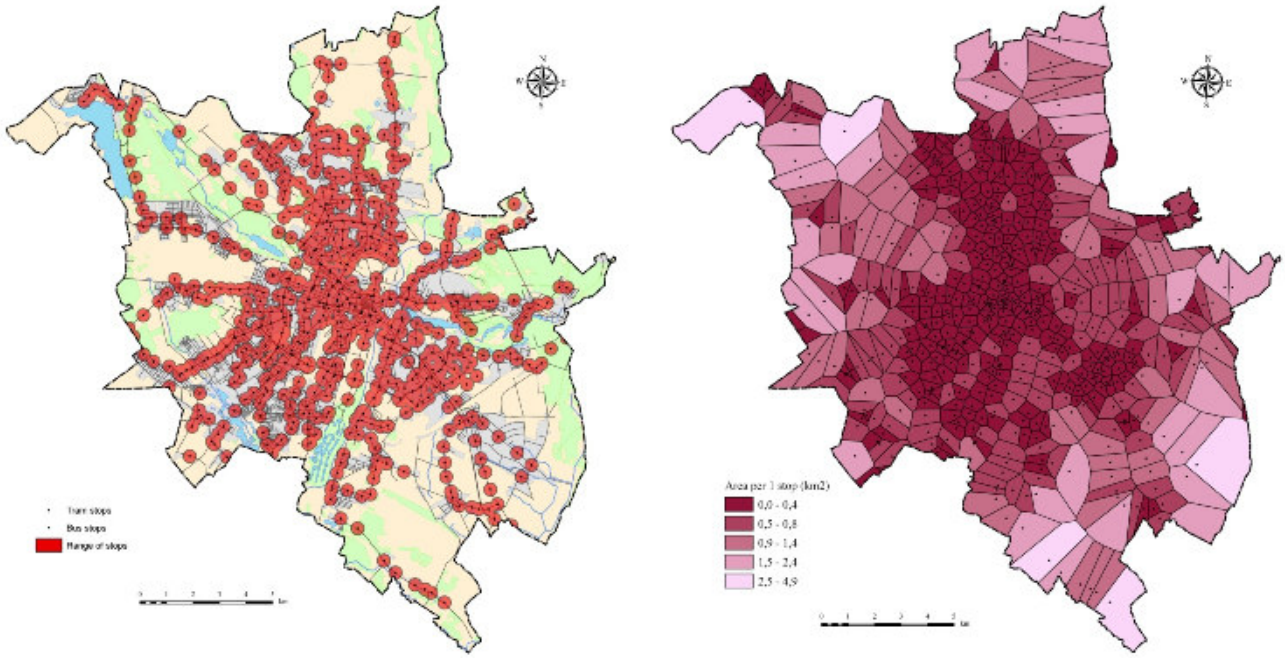

Fig. 2. Location (left) and density (right) of public transport stops

According to the study, 20% of Poznan's area is under the impact of public transport system. For built-up areas it is over 60%. The central area of the city is almost entirely covered by the bus and tram stops. But further away from the downtown, areas of coverage are losing their continuity. This situation reflects the rule that with growing distance from the city centre population density is decreasing and number of factories and commercial targets is going down. It could be also noticed that in many new settlement areas, public transport network is poorly developed. There are many "white spots" and in these locations a lot of people could have problems in reaching mass transport service.

One of advantages of public transport system in Poznań is the fact that the most of industrial and service areas are located in the sphere of stops influence. But still some services (the best example is one of district courts) could not be reached by tram or by bus. It is danger situation which could cause exclusion of some social groups with a low mobility (especially old and disabled people).

Overall it should be noted that development of public transport system in Poznań is not related with the growth of the urban space. Only in older city districts bus and tram stops were located in relatively rational and relevant distances. In areas of residential multi-family buildings it can be clearly seen that public transport lines do not cross this districts. Buses and trams are going only on the edges of such settlement areas. It is the result of old planning conditions, which was estimating acceptable path to stops to a distance of 500-1000 meters. Nowadays, when having a car is much easier, citizens of such districts often are choosing this mode of transportation. Cars are usually parked few meters from the block and it is much easier to reach them then to reach the bus or tram stop (Newman, Kenworthy 1999).

According to the principles of sustainable development policy in land use and transportation, very important case is locating new settlements areas along existing networks of public transport (especially tram-lines). On a smaller scale, it is very important to provide different facilities to promote walking and cycling. These solutions could help the city to overcome problems with crowded and noisy streets and to shorten times of travelling across the city.

Fig. 3. Tram line located on the edge of the biggest estate in Poznań (Photo: Jędrzej Gadziński)

8 ROLES OF TRANSFER STATION IN PUBLIC TRANSPORT ACCESSIBILITY

No direct connection between two stops cause that passengers have to travel by two or more public transport vehicles. The transfers between them are made on transfer stations – the places where at least two lines of public transport are crossing. Such a change in modes of transportation is always associated with a loss of time. It is caused by: possible walking to another bus or tram stop and waiting for the vehicle arrival. In order to minimize travel times, authorities, who are responsible for the city transport, should try to reduce the number of transfers - particularly between areas generating big traffic movements, as well as to facilitate moment of the transfer (Avishai, Marguier 1985, Larsen, Sunde 2008).

On the other hand, changing vehicles cause that the number of objects and areas, which can be achieved from the initial stop, significantly increase. Unreasonable and impossible it would be keeping the number of communication lines, which are connecting directly all areas of the city. Transfers are therefore a necessity and with appropriate planning they could be the great advantage of the communication network of the city and also could significantly improve its integrity (Brown, Hess, Shoup 2004).

Very important for passengers of public transport is the distance between the stop where they leave the vehicle, and the stop of the line, which they intend to continue their journey. No less significant are the barriers like communication traces with heavy traffic (especially roads). To increase the security of pedestrians, there are often crossings (which are often badly localized) and traffic lights. Another solution is building underpasses or overpasses over the streets. It provides to avoid collisions in the way to the bus or tram stop. However, usually that kind of solution is associated with the necessity to climb to the stairs or slopes or with waiting for the elevator (if installed) and often involves the elongation of the road, and the need of greater physical effort (Khisty 1994).

In the beginning of 2009 in Poznań, there were proceeded a detailed assessments of main transfer stations in the public transport network. It was selected 31 key points and all of them were connected by tram lines. During the study, it was measured the time needed to walk between all stops located on transfer station. There were also indentified the most important difficulties for travellers (especially for older or disabled people). The measurements were carried out during daylight hours at normal or increased traffic (from 800 to 1800)

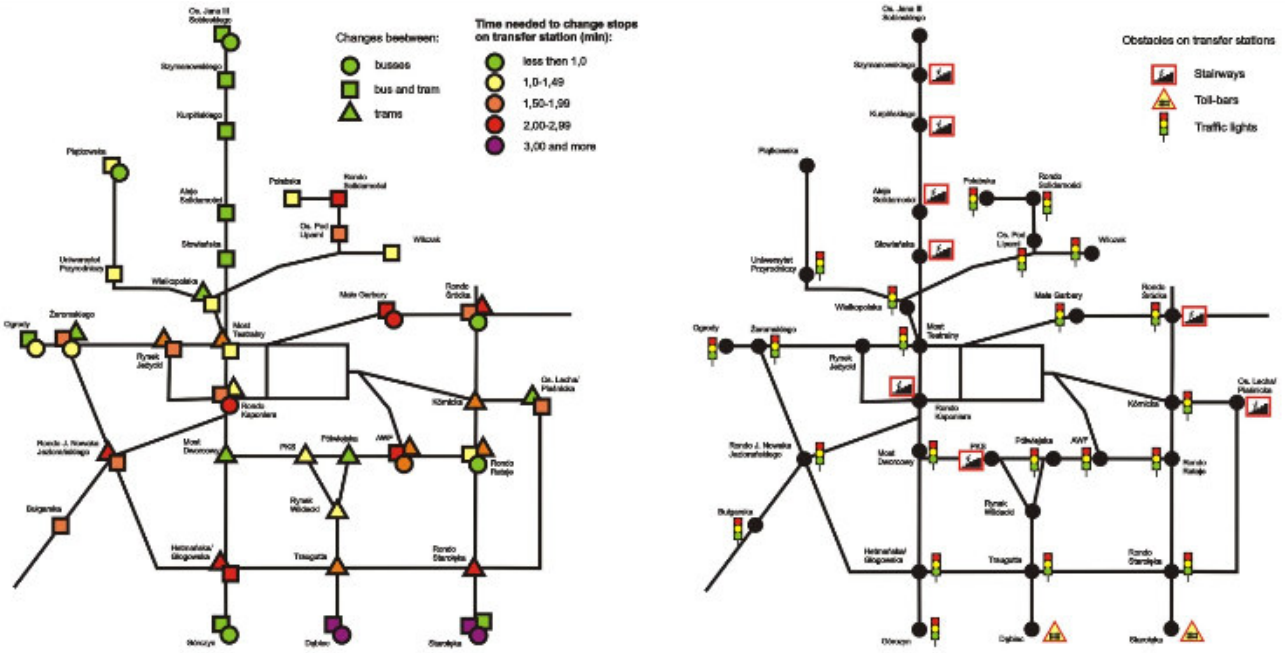

Fig. 4. Evaluation of the main transfer stations in Poznań: left: time needed to change; right: obstacles on transfer stations.

The above analyses shows that in most cases, the way between stops on transfer stations in Poznan is taking a long time. In addition, some transfer nodes are characterized by other serious difficulties that may exclude some groups of passengers with possibility to change the modes of transportation and in result to achieve the final destination. Time loss during the transfers should be significantly reduced through appropriate infrastructure improvements and investments in modern, integrated transfer stations. It is also necessary to make attention on the appropriate locations of new transfer stations. In the same time it should be implemented new projects, which include roads and railways passenger-friendly solutions.

In terms of architectural solutions very important problem is to supplement the existing underways and overways in elevators, which would allow access to persons in wheelchairs. Escalators also could be a good facilitate to improve the movement of disabled and weak people.

On the most transfer stations in Poznań the best solution to improve their integration is appropriate coordination of traffic lights. It should be given high priorities to pedestrians at intersections. Of course it would cause the deterioration of the conditions in cars movement at some points. But for cities, which want to implement rules of sustainable urban transport, such decisions are necessary.

Fig. 5. Lack of crossings to public transport stops causes dangerous situations on the street (Photo: Jędrzej Gadziński)

Another option, which might improve the accessibility of bus and tram stops, could be introduction of additional pedestrian crossings. Such solution would both: shorten the way to reach public transport stops, and improve traffic conditions at the bus stop. In many Polish cities very visible is the tendency to build the smallest platforms for passengers as possible. This bad practise could be also seen in many public transport stops in Poznan, even at some major transfer stations. The most vivid examples are Most Teatralny (Theatre's Bridge), Most Dworcowy and Polwiejska (all located in the city centre). A typical passenger reaction to that situation is crossing the road in forbidden places.

9 LEVEL OF TIME-ACCESSIBILITY IN PUBLIC TRANSPORT

Time-accessibility is one of the best factors, which can be used to estimate level of public transport services. According to this, it was made comprehensive analysis of time-accessibility for five important points located in Poznan's territory. First of them is Rondo Kaponiera – the main transfer station, which is critically important for public transport in the city. It is located in the central area of Poznań. Other points are situated on the outskirts of the city and are the objects, which are generating high traffic volumes. These facilities are: Ławica Airport (in the western part of the city), Adam Mickiewicz University Campus (on the northern outskirts of Poznań), the biggest cinema complex – Kinepolis (eastern part of the city) and shopping gallery – Panorama (south of the city). The selection of objects, allowed comparing the level of time-accessibility in different districts in Poznań.

The main purpose of the analysis was the identification of the major gaps in the bus and tram network, which could begin the discussions in Poznań about the competitiveness between public transport and other forms of movement: bicycles and cars.

According to the researches, the best time-accessibility was estimated for the central point – Rondo Kaponiera. This is mainly due to well developed bus and tram network, for which Rondo Kaponiera is the focal point. The most of tram lines (11 of 19) are crossing this transfer station. Other objects in comparison with the Rondo Kaponiera are poorly accessible. It is a negative phenomenon mainly due to the fact that they are one of the most popular destinations in the city. Many citizens are trying to get them every day, especially during rush hours, and they need and demand transport services on the high level. The average travel time to these objects (more than 40 minutes) makes the public transport loser in the competition with other transport modes.

One of aspects of suburbanization is shifts of public institutions, commercial centres and research units outside the downtown (Nijkamp, Pepping, Banister 1996). Poznan faces this process very deeply. Good examples are new buildings of Adam Mickiewicz University, which were located near the city borders. Also

some new hospitals, district courts and other public institutions are being moved from the city centre to the peripheral areas.

Dispersion of population and potential aims of travelling causes new problems in local transportation system. Direct travel connections between different suburban areas are getting more important. Deficiencies of transport infrastructure can already be seen today. For example between neighbouring districts – Podolany and Morasko – a trip by public transport takes over 45 minutes. To ride the same distance car needs only several and bike nearly 20 minutes.

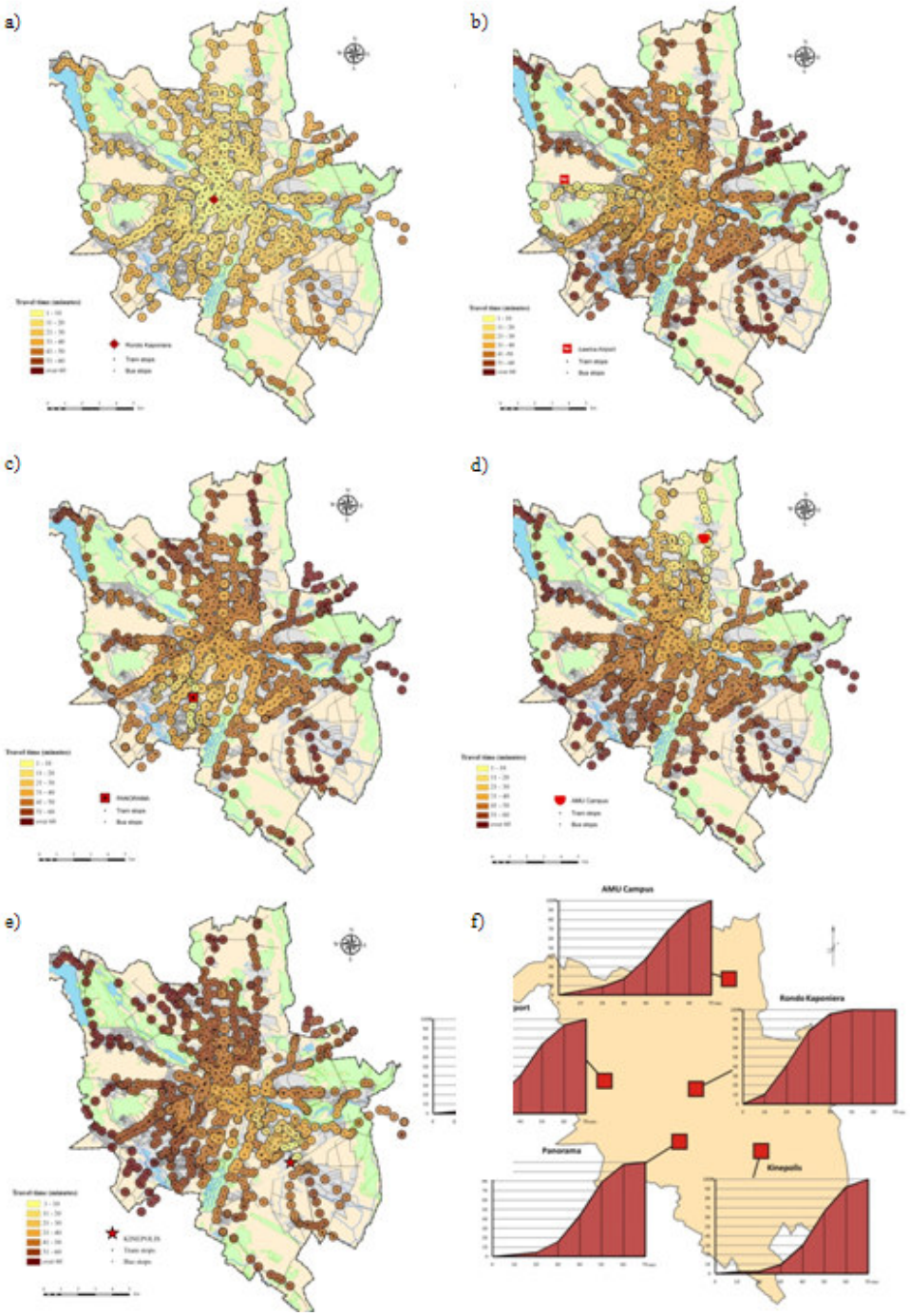

Fig. 6. Public transport in Poznań – time-accessibility level of the main travellers' destinations. : a) Rondo Kaponiera, b) airport Ławica, c) Panorama - shopping mall, d) campus of Adam Mickiewicz University (Geosciences faculty), e) leisure centre Kinepolis; f) comparison of accessibility to these destinations.

At the same time, under the influence of changes in the economy (growing importance of services sector), communication behaviours of inhabitants are changing. People are travelling more and more in many directions. In the same time, the importance of existing transport lines is declining – mainly these lines are ensuring only access from residence areas to major production facilities. Together with suburbanisation

process, it leads to the further dispersion of citizen's travel directions. The result is new challenges for public transport system in the city (Banister 2001).

10 CONCLUSIONS

Poznań's experiences show that the modern solutions in economy and policy do not guarantee sustainable transport. Although MPK has one of the best fleet in Poland, every year local public transport is losing passengers. Main reason is car oriented transport policy and the lack of integrated urban and transport planning. The special importance has suburbanization process. While public transport is following new investments within city limits with huge delay, outside the city many new districts have not any connections or there are only a few per day. Development of road network is a strong competitor to public transport. New roads paradoxically are deepening transportation problems.

The isochronal analysis shows that there is a big lack of radial tram lines establishing rapid connection between districts (especially in northern part of the city) and there is also a need to extend tram network to new settlements and to the most important destinations of the daily trips. Small improvements like priorities at the intersections with intelligent traffic lights or the optimization of tram network in the city centre are not sufficient to make public transport winner in the competition with private cars and – in many cases – with cycles.

11 POSSIBILITIES FOR TIME-ACCESSIBILITY IMPROVEMENT

Ensuring good time-accessibility in the local public transport in Poznań is strongly difficult. The city growth seems to be chaotic due to relatively liberal urban planning law. Often new settlements are appearing far away from existed tram network and new bus connections have been establishing after several months, (sometimes up to 2-3 years) since the settlement has been constructed. Additionally the local transport policy put more stress on road construction than tram network development.

The most important method to improve the time-accessibility is construction of ring tram tracks establishing direct connections between neighbouring districts. Only southern part of the city has tram track connecting big settlements without transit through the city centre. Northern part of tram network is star-shaped pattern. All trips to northern districts have to be done through one, overcrowded tram intersection (Most Teatralny). This solution lengthens travel time significantly but also enlarges the risk of delays caused by broken vehicles, impropriate work of intelligent traffic lights, problems with switches etc. The ring lines of buses are not an interesting alternative. Most of them have low frequency and small average speed because of traffic jams. Moreover, the public transport authority treats these lines usually as "social lines" which should bring children to schools, elderly people to shops etc. The routes are sometimes enormous lengthened to the way which can be done by car. These bus lines should be redefined and partly changed for rapid transit between main districts as long as new ring tram track will be built. The second task to improve Poznań's public transport is developing tram network and extending it to the biggest settlements and the most important destinations (e.g. AMU campus, airport Ławica). These extensions usually meet the inhabitants' expectations presented on fig. 1.

Administrative decisions or low cost investments could also be a chance to shorten travel time. Creation of new bus lines, construction of common bus and tram routes, priorities at intersections and etc. can improve the traffic flow of busses and trams. Nevertheless it is solution mostly for the city centre and does not answer to main problems on peripheries.

Some potential is hidden in regional rail. Recently regional trains have mostly low frequency and relatively small average speed. They are not integrated in Poznań's fare system. Furthermore, the location of train stops is usually away from new settlements or industrial areas.

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Rankings and networks – global cooperation and competition

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1 ABSTRACT

Due to strong economic and technological changes over the last decades cities and regions are facing growing competition for high ranked economic activities (see Begg 1999) within the information society. On the urban level, cities aim at improving their competitiveness and their position in the national or international urban system. This trend enhances the importance of specific local characteristics, which provide comparative advantages competing for increasingly footloose and mobile global enterprises, investors, tourists and capital (Parkinson et al. 2004; Giffinger et al. 2003). Hence, the comparison of cities can support investors in their choice of location on the one hand, but it can also be an important guide for future city development on the other. But not only from the perspective of cities themselves the increasing competitive pressure and adequate handling of new challenges for urban management, planning and urban politics matters, but also urban research and analysis considers cities in competition increasingly, as, for example, the ongoing discussion on global cities shows (Sassen 2001, Taylor 2004).

Therefore, this paper discusses two different approaches to compare cities and to see them in global competition:

City rankings and current concepts of city networks. City rankings increasingly attract public attention, supported by the media, and serve as “flagship” for city marketing. A multiplicity of city rankings can be found both on a national and on an international level, showing up with considerable differences in form and content. Concepts of urban networks try to see cities as a network above their nations. Within those networks competition and cooperation takes place, forming the image, ranking and status of a city within that networks (Castells 2000, Sassen 2002).

Within that paper the conceptual differences of these concepts as well as their meanings and implications for cities (planning, politics, city marketing) in a global challenge will be discussed. Thereby, special emphasis will be put on indicators measuring the concept of “quality of life”.

2 BACKGROUND

2.1 Competition between cities

Within the last decades, the challenges for and tasks of city planning and urban politics have changed as, for example, the positioning of cities and city marketing gain more and more importance within the ongoing global and regional competition (cp. Jensen-Butler 1997).With respect to a global level, cities and regions are facing growing competition for high ranked economic activities as a consequence of strong economic and technological changes over the last decades (cp. Begg 1999). On the urban level, cities aim at improving their competitiveness and their position in the European or national urban system. This trend enhances the importance of specific local characteristics, which provide comparative advantages competing for increasingly footloose and mobile global enterprises, investors, tourists and capital (Parkinson at el. 2004; Giffinger et. al. 2003). Facing this development, urban competitiveness and corresponding strategic approaches with specific goals and modified instruments have become important efforts of urban politics. The comparison of cities within rankings can support investors in their choice of location on the one hand, but it can also be an important guide for future city development on the other. As rankings reveal particular strengths and weaknesses of the cities, policy makers are enabled set specific actions to work on certain problems and to implement measures for sustainable development when considering the results of a high-quality ranking or benchmarking. In addition to that, positive results in a widely published and approved city-ranking can also be used as a central part of a city’s marketing strategy: a top-rank in a highly reputed city-ranking definitely helps to improve the international image of a city. Thus, city-rankings have become an important empirical base for disclosing comparative advantages and sharpening specific profiles and consequently for defining goals and strategies for future development. But not only from the perspective of

cities themselves the increasing competitive pressure and adequate handling of new challenges for urban management, planning and urban politics matters, but also urban research and analysis considers cities in competition increasingly, as, for example, the ongoing discussion on global cities shows (will be further examined in chapter 4).

2.2 Cities as „produced places“

Before going into detail on the specific research questions of this paper, two important statements have to be premised: first of all – as Häußermann and Siebel notice to the point – cities are not an “independent variable”, but an object of social patterns and a location for various social and economic developments (cp. Häußermann/Siebel 2004). A city is not a „place per se“, but the result of (and at the same time also the precondition for) the (co-)actions of stakeholders, spatial structures and social processes. Taking this statement in combination with the considerations of Bökemann, that places can be seen as the products of political decisions (cp. Bökemann 1999), the political dimension of city rankings is revealed: rankings on the one hand reflect these political decisions; on the other hand, they again influence decisions and measures of stakeholders and politicians, which “produce places”. In general, theatricality and production/stating of (mass-media oriented) policy gain more and more importance, not only caused by media themselves, but also supported by the self-promotion of cites and promotion of policies by politicians themselves (cp. Meyer/Schicha/Brosda 2001). These two assumptions (cities as “products” of complex interactions and decisions as well as the political dimension of rankings) somehow build up the frame for the critical analysis of different types of city rankings and city networks as outlined at the beginning.

3 CITY RANKINGS

3.1 Characteristics of city rankings

A multiplicity of city rankings can be found both on a national and on an international level. These ranking show up with considerable differences in form and content, but they have one aspect in common: again and again they become topic of press releases and subject to the public discussion, urban politics and other key players, either with happiness or consternation. Obviously, people (and cities) tend to aim at competing with others and “to be the best” (can be observed throughout history in different areas of life like sports, art and music contests etc.). On the urban level, one has to consider the following questions: Who profits from the discussion about rankings? Why is it worth discussing rankings – in general and especially in scientific analysis - if rankings are rumored to be a problematic and methodologically questionable issue?

Often rankings work on different scales and tend to “compare oranges to apples”, producing inconsistencies and contradiction between different studies and analysis approaches (cp. Dangschat 2001). The objectivity of rankings is highly influenced as well by the selection of cities and indicators, by the available data quality and the comparability of data, as of the calculation method itself. Therefore, it has to be questioned whether rankings are a useful instrument for cities or not. How (and to which extent) do city rankings really refer to the local characteristics and the quality of life in cities?

Basically, the concept of comparing cities by using certain criteria is a known point of view in urban research ranging from the very first calculation of a rank size rule, to the theory of Christaller on the centrality of places and, currently, to the ongoing discussion on global cities. These concepts focus on an overall classification of cities (often based on network-oriented criteria), but in the content of this paper, the term “ranking” is used in a more precise way, as one is confronted with a very broad spectrum and conceptual confusion when examining the state-of-the-art on city rankings: many different terms like “city ranking”, “comparison of cities“, „benchmarking“, „city-scan“ etc. can be found.

Therefore, a definition of city rankings – as used in this paper – has to be positioned here. Constitutive elements of a city ranking are:

- At least two cities are included
- The cities are structured in an ascending/descending order resp. arranged in a hierarchy
- A combination of at least two indicators are used for building up the order/hierarchy

In the following, the most important areas and effect patterns how city rankings – in relation to their specific characteristics – influence urban politics and planning are discussed.

3.2 Benefits and potentials of city rankings

It is quite obvious that rankings attract attention and stimulate a broad public discussion as multiple reactions on newly published rankings often show (cp. Dangschat 2004; Fertner et al 2007; Mäding 2001). In combination therewith, rankings stimulate the discussion on regional development strategies by accountable actors (cp. Schönert 2003); certainly influenced more or less by media. Furthermore, as theatricality and production/stating of (mass-media oriented) policy gain more and more importance in general (not only caused by media, but also supported by the self-promotion of cites and promotion of policies by politicians themselves; see Meyer/Schicha/Brosda 2001), rankings can be applied to issues of city marketing (Rankings as "flagships") and, generally spoken, for presenting the characteristics of the city to the outside.

In addition, potentials of city rankings emerge out of the fact that there are a competitive instrument working on the basis of disparities and differentiation. This may initiate learning effects (Why is another city better?) and contributes to make positive characteristics public outside the city itself. Cities are enabled find their position within the ongoing urban competition and to sharpen their profile (cp. Fertner et al. 2007). However, these initiated learning effects of rankings can only come into operation if regional actors make their decisions transparent and comprehensible (probably rankings force actors into more transparency). But unfortunately the required transparency of rankings themselves can only be found within a few elaborated ranking approaches and, moreover, there's no empirical proof that ranking results are reflected in the (future) economic power of a city (cp. Schönert 2003).

3.3 Disadvantages and limits of city rankings

One of the limits of rankings can be summarized under the terms "beauty contest" and „recursive self-affirmation" (cp. Schönert 2003); meaning that the discussion about city rankings focuses on final ranks and complex interrelations and causalities are unattended or neglected. Public attention is mainly focused on the final ranking without considering the methodological aspects behind the ratings. In combination with that, the selective public perception of results enforces a confirmation of existing stereotypes and clichés (cp. Schönert 2003). The non-reflected handling of results is made worse out of the fact that the city selection is often not transparent and excludes certain cities systematically from being taken into account (furthermore, big cities are disproportionately often included in rankings).

Another risk of city rankings is that rankings are excessively acclaimed by the "winners" and ignored by the "losers". Cities (mainly badly ranked cities) oppose comparisons with others („benchmarking") in general. In addition to that, rankings tend to follow a "generalistic" approach, as many financiers ask for clear results which can easily be communicated in public and so most rankings aim at finding the "best" or "most attractive" city in general terms totally ignoring the fact that different activities need different conditions (cp. Fertner et al. 2007; Schönert 2003).

As indicated before, rankings strengthen competition between cities, which may have negative consequences like deregulation, structural and spatial problems, risk for socially acceptable city development etc., so that long-term development strategies may be threatened (cp. GIFFINGER et al. 2003).

4 CITY NETWORKS

There is not just one theory about city networks; this is a growing field in the last years. In the last 20 – 30 years more and more theories about evolving networks between cities began to develop. Of course all these theories are different in their details, but some considerations and opinions are quite similar and should be introduced at the beginning of this chapter. Further on, four of these "city-networks-approaches" will be analysed in detail in the following (named by their author in alphabetical order): Manuel Castells, John Friedman, Saskia Sassen and Peter Taylor. At the end the closer look at these four single theories and their common knowledge about city networks leads to a conclusion what makes this approach similar or different to that one of the city rankings.

All theories about city networks describe the organization and the relation that big, „Global"- or „World"-Cities have to each other. The most common thing that the theories of networks state is that the globalization of companies and the rise of technology (the so-called information age), made the development of big city

networks possible. Beside that they differ in the details about how networks are formed exactly or what was the most important point in the evolution of these systems. All of the theories agree that there are not only networks of cities that consist out there by their own. Every theory argues that the network of cities (or the networks) is just one among many networks like company networks, economic networks etc. The most important point about the city-networks is in all theories that the international network of companies made this system of cities possible. These company-networks with headquarters in all big cities to be able to perform global and also do business 24/7 (time-zone-shifting between the big cities) are on the one hand the base for the global network system of cities and produces so some kind of cooperation within the network. On the other hand the same system produces also a big competition between the cities because each big cities wants one of the headquarters located in their downtown to stay in the game of economy and power.

4.1 Castells and the network society

Manuel Castells' theory about city networks bases on his thoughts about the network society. His research started form a Marxist background when the informational revolution started. Castells especially focuses on the Internet as the first among all networks, the network that made networks possible. For him this revolution changes everything, beginning from work and the way work is organized to society and so also the places where society is densely organized – the cities. His theory „the space of flows" deals with a meta-network, where cities stand completely outside their nations and build their completely, almost independent networks, just depending on the companies which are located there, it can be understood as the network of cities: global cities – collaborating and controlling economies, where the „global people" travel and work. This network is located „above" the nations. (cp. Castells 2003)

4.2 World city hypothesis by Friedman

John Friedman also formulated and did research about global cities and city networks. Together with Goetz Wolff he formulated the „world city hypothesis" which consists of 7 points about the world city, its origin, its power and its future. For Friedman and Wolff again all is about the economic power, which the city controls, which develops the position in the hierarchy. The hierarchy of the cities consists of different levels of importance, which is seen as the area the cities can influence. The power a city has within the global economy is due to the flow of money and the capital accumulation processes; the position in the hierarchy is caused by the power and under a constant competition to the other cities. Also they saw (based as well on Castells theory) that there is a special class of „global citizens" moving, traveling, working and controlling the cities and the flows of money and power there. (cp. Friedman 1986)

4.3 Sassens' global cities

For Saskia Sassen the beginning of the global network was (different to Manuel Castells) the start and the rise of the transnational companies (first production, then service companies). Of course she also claims the importance of the informational development of communication infrastructure, which made the global city itself possible. For her the global cities are the locations where the most information is available. On the one hand because of the communication infrastructure (technological), on the other hand she sees the network of the cities as a hierarchy. Global cities are the cities with the best connections within the network. Within the global city itself she claims a change in society and the living conditions for the citizens. This approach is for Saskia Sassen a living one, which she also changes, if it is necessary. It means that it is not fixed which city is on the top of the hierarchy and which on the bottom. So for her there is cooperation and competition within the network of cities. She also sees the power that a global city can get, also over a nation. (cp. Sassen 2001, Sassen 2002)

4.4 World city network by Taylor

Also Peter J. Taylor bases the city network on the economy. His approach itself tries to form a ranking within the cities in the world. After his approach the network is based on the economy and business. Again the multinational company and the flows within the single offices in the different cities are the center of the research. Like Saskia Sassen Taylor argues that the service company is the central point in this process. With this method Taylor and the research group (Globalization and World Cities – GaWC) also build a ranking or

hierarchy of the world cities, which distinguishes them in 3 different levels (as well as sub-levels) They permanently work on this issue and keep it actual and dynamic. (cp. Taylor 2004)[1]

So Taylors approach differs from the three described before. One can say Taylors intent was to find a ranking and he found it through the network of cities. The other authors worked and thought about the network and found the ranking of the cities. So it can be seen that rankings and networks are closely bound to each other. The theory could be described as on of the concept of rankings and rankings are one of the practical outcomes of the theories.

5 MEASURING QUALITY OF LIFE

Along with resent key words like globalization, glocalization, etc., "quality of life" has gained importance in scientific and public discussion. When considering the different definitions of quality of life, a broad variety of concepts can be found. There is no common definition, but, however, some similarities can be identified within the varied approaches: most of the researchers in this field argue that quality of life is a multidimensional construct and has to reflect personal values. Furthermore, there is a consensus among scientists that a comprehensive definition of quality of life has to contain both objective and subjective elements. As shown in the next figure, three different dimension of quality of life can be distinguished[2]:

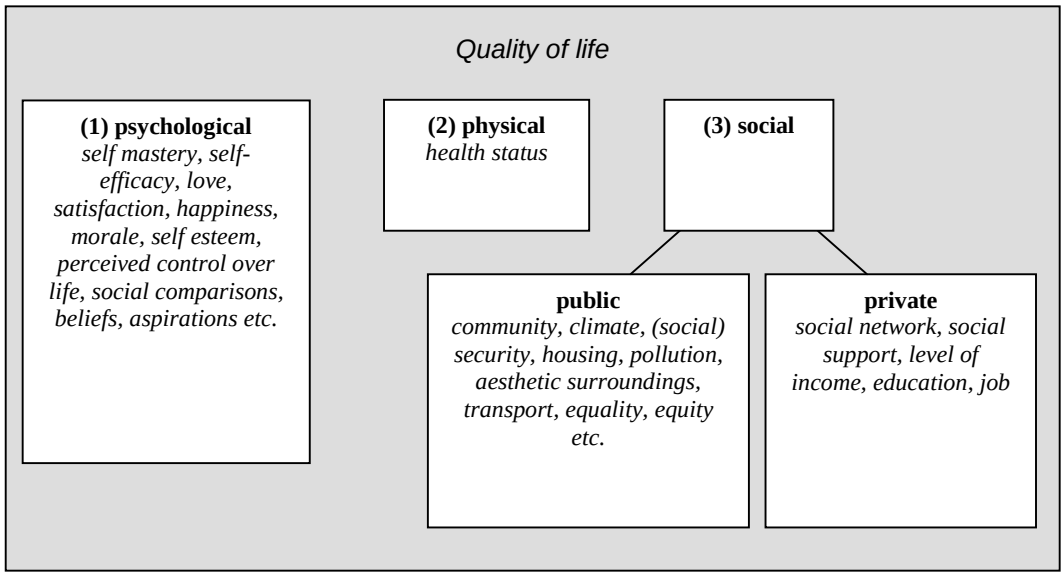

Figure 1: Three dimension of "quality of life"

These three dimensions of course interact with each other: for example, the health status of a person influences his or her possibilities to take part in social activities. The psychological dimension reflects the potential of fulfilling individual needs and therefore has a strong connection with the subjective well-being of a person. Also for the third dimension, the social preconditions, interrelates with the other elements, e.g. if people become immobile (for what reasons ever), social care is needed for the fulfilment of their basic needs causing additional costs for society. Therefore, analysis of quality of life has to take into account not only single aspects of these dimensions, but also the interactions between them.

6 IMPLICATIONS FOR CITIES – DISCUSSION

Today many cities claim for themselves to be very „liveable" – "quality of life" has become an omnipresent keyword in many areas, especially in planning (and social) discicplines. But is a "high quality of life" a desireable and – all above – a realisable goal resp. concept for cities? How are the different dimensions of quality of life reflected in rankings resp. how are they considered within the various concepts of city networks?

[1]World City Ranking: http://www.lboro.ac.uk/gawc/data.html
[2]Vgl. u.a. Cummins 1999; Finlay 1997; Hagerty et al. 2001

6.1 Rankings and quality of life

As shown in a research project on city rankings[3], within a sample of 20 different city rankingsfive city rankings explicitly deal with quality of life. These rankings are of very heterogeneous quality – they show up with varied methodological characteristics:

- Two of them are measuring solely quality of life indicators and comprise many indicators for calculation the ranking.
- Three rankings are treating quality of life among other points of interest. The assessment of quality of life is mainly done with the help of questionnaires and (not clearly specified) expert judgements. The number of indicators used in these rankings show up with broad variation.

Remarkable, many other rankings also deal with indicators measuring parts of quality of life without explicitly naming the concept. Mainly these rankings belong to the more sophisticated types of rankings in terms of methodological quality. When going into detail on the indicators used within these rankings by following the definition on the three dimensions of quality of life, it comes apparent that mainly indicators measuring social-public dimension can be found, followed by indicators on the social-private level. The following figures shows the key issues tackled within these rankings and some examples of the used indicators:

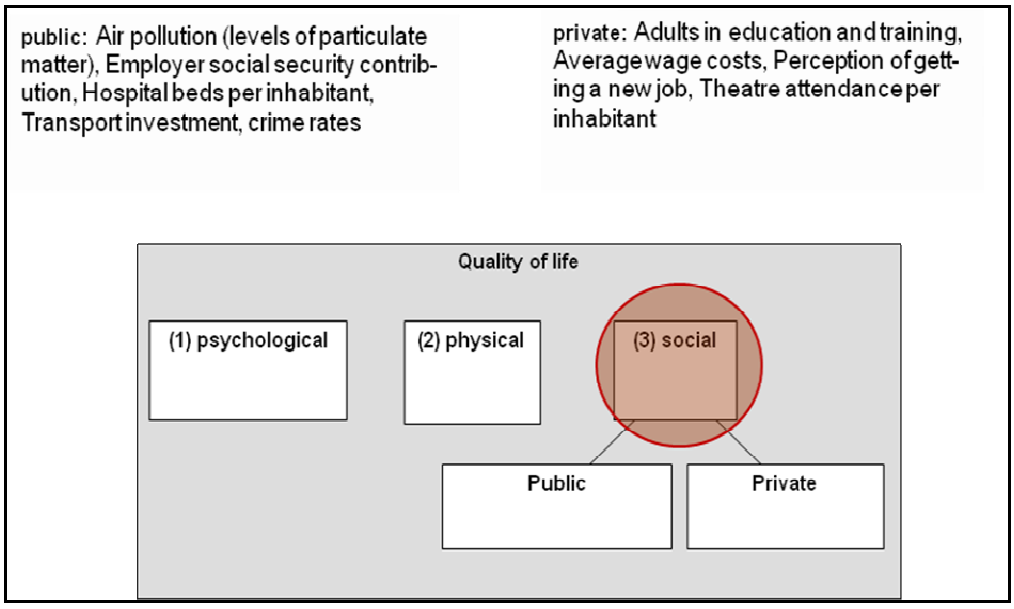

Figure 2: Focus of indicators on quality of life used in city rankings

Within the concept of city networks the quality of life of the citizens is not a big issue. If the theories consider the citizens and their life quality they mention that the network of cities improves the life of some citizens (global citizens) and the rest of the population is not affected or suffer from worse living conditions (cp Sassen 2002, Castells 2003). Friedmanns' and Taylors' approach are much more focused on economy and technology, therefore they do not center social categories or (subjective) evaluations of citizens regarding "liveable cities".

6.2 Are there implications of rankings and networks for city development?

Often long-term strategies for city development are threatened by short-term policy goals or the claims to power of various actors and lobbies (cp. Fusshöller et al. 1995). City rankings (and as well city networks) are quite ambivalent instruments as they are exploited both for short-term-goals as well as for long-term concepts of e.g. city marketing ("flagships"). In this context, city marketing works in an area of conflict between these long and short-term goals of a city. As Ilse Helbrecht shows with the help of her regulation theory on an international level, the traditional structures of city planning and politics have changed (cp. Helbrecht 1994). Tendencies of deregulation, decreasing formalisation of decision processes as well as the

[3] Current phD-project on the quality of city rankings and their implications for positioning of cities and city planning started in 2009 at the University of Technology Vienna (Centre of regional science) and the University of Vienna (Institute of Sociology).

increasing privatization of municipal tasks play a decisive role in dealing with these new challenges for city planning. Especially in the US the trend towards the "entrepreneurial city" is obvious as local authorities are forced into more individual responsibility and to find new funds for projects and municipal tasks due to the shortening of national funds (cp. Helbrecht 2004, Jensen-Butler 1997). Furthermore, "soft locational factors" gain more and more importance compared to traditional „hard locational factors" (cp. Fusshöller et al. 1995 Giffinger et al. 2003), but the traditional structures of regional development are not able to react adequately thereon. Cooperation is one of the key word mentioned in this context. Basically, city networks (as well as city rankings) would be a chance for cities to establish cooperation with cities on the same level resp. cities with similar conditions and characteristics. However, city network approaches are more perceived as rivalry than as the beginning of cooperation, as Castells points out: cities that do not belong to the network, do not exist – this could be stated pessimistically for city rankings as well.

When talking about networks all theories automatically build up a hierarchy within these city-networks. It can be a hierarchy of single cities or a hierarchy of different levels of cities. So it can be concluded that city network approach implies cooperation as a base of the network. They are formed out of cooperation. On the other hand it also has to be considered that competition is a big issue within the networks because cities trying to attract companies to accumulate more power then there "neighbour cities". Seen from the city ranking approach, one can say that every city network theory includes a city ranking, but all authors highlight that these hierarchies are quite dynamic and can never be static. The difference to city rankings is that these hierarchies come out of theories and noticeable is that all four described theories named the same cities in the top three: New York, London and Tokyo.

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🏆 *reviewed paper*

Raumplanung als Alltagsmanagement für ALLE? Herausforderungen des demographischen Wandels – Werkstattbericht DEMOCHANGE

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1 ABSTRACT

The title suggests and the authors argue that spatial planning shall be understood as a service to support best the everyday life of ALL for overcoming disfunctions of regions and communites caused by rapid demographic, economic and societal changes.

The EFRE-funded Alpine Space project DEMOCHANGE–demographic change in the Alps: Adaption strategies in spatial planning and regional development is the framework. Land Salzburg regional project will experiment with local and regional stakeholders with these topics in the 3 southern districts Tamsweg, St. Johann/Pongau and Zell/See (the most mountainous area). The paper confronts the different approaches from planners inside (Dollinger) and outside administration (Wankiewicz) as well as from research and spatial analysis methodology (Spitzer, Prinz). As the project activities did only start in January 2010, the paper is work in progress and will evolve.

Demographischer Wandel als Dynamik ist nicht neu, demographischer Wandel findet seit Jahrhunderten statt, auch wenn er erst in den letzten 10 Jahren im Zusammenhang mit der Finanzierung des Wohlfahrtsstaates immer stärker in die politische Diskussion kommt. Aktuell sind dessen Auswirkungen auf die Regionen und Gemeinden und auf den Lebensalltag der Bewohner und Bewohnerinnen immer stärker ins Bewusstsein und in den politischen Diskurs auf europäischer, wie auf regionaler und lokaler Ebene gerückt.

Der Beitrag zeigt die enge Verbindung der Thematik mit den Kernaufgaben der Raumplanung, wenn sie als Dienstleistung an den Bedürfnissen der Menschen einer Stadt, einer Region, ob jung oder alt, ob Frau oder Mann, ob arbeitslos oder Unternehmerin, ob geschieden, verheiratet, in Lebensgemeinschaft, oder solo, ob krank oder gesund - gesehen wird.

Die konkrete Arbeit im Team zwischen dem Raumplanungsexperten des Landes (Dollinger), der Regionalplanerin und Gender Planning-Expertin (Wankiewicz[1]) und dem Forschungsinstitut (Spitzer, Prinz) im Rahmen des ETZ-Projekts „DEMOCHANGE: Demographischer Wandel in den Alpen – Anpassungsstrategien im Bereich der Raumplanung und Regionalentwicklung“ (2009-2012) ist der Anlaß für die Überprüfung der Anwendbarkeit der klassischen regionalanalytischen Instrumente und Raumplanungsstrategien für die Aufrechterhaltung der Alltagsinfrastruktur für die südlichen Landesteile von Salzburg, die Bezirke Tamsweg, St. Johann/Pongau und Zell/See.

2 DEMOGRAPHISCHER WANDEL – EINE RAUMPLANUNGSAUFGABE? (WANKIEWICZ)

2.1 Definitionen und Themenfelder

Demographischer Wandel findet seit Jahrhunderten statt; aber erst in den letzten 10 Jahren wird der Begriff Teil des europäischen und nationalen Politikdiskurses, meist im Zusammenhang mit der Finanzierung des Wohlfahrtsstaates und dem Verlust an Infrastruktur in Städten und Regionen immer stärker in die politische Diskussion kommt.

Sucht man auf google.com nach einer Definition, dann findet man die lapidare Definition „change of age and size of population“. Darum geht es also. Geänderte Alterszusammensetzung und Bevölkerungszahl und alle damit zusammenhängenden Wirkungen auf Städte, Regionen und Dörfer.

[1] Die Co-Autorin ist Mitglied im europäischen Netzwerk GDUS, das sich um die Integration von Gender und Diversitäts-fragen in Raumplanung und Städtebau in Europas Regionen einsetzt http://www.rali.boku.ac.at/gdus.html

Und das ist der Beginn der Diskusission um Ursachen, Folgen, geänderte gesellschaftliche Werte, Pillenknick nach dem Babyboom, geänderte Familienmodelle und Patchworkfamilien, Bildungsrevolution auf dem Lande, erhöhte Erwerbsbeteiligung von Frauen und Verlängerung der Lebensarbeitszeit.

Im 20. Jahrhundert kommen noch die tiefgreifenden wirtschaftlichen und technologischen Veränderungen von der Agrar- über die Industrie zur Informationsgesellschaft hinzu, die sich in Europas Städten und Regionen sehr unterschiedlich auswirken: Tourismusboom, Konzentration im Einzelhandel, Verlagerung von Produktionsstätten ins Ausland, enorme Veränderungen in der Arbeits-, Freizeit und Versorgungsmobilität und im Konsumverhalten etc.

Wenn sich die Zusammensetzung der Bevölkerung ändert, muss sich auch das regionale und lokale Angebot an Einkaufs-, Mobilitäts- Kultur-, Freizeit, Bildungs- und Gesundheitsinfrastruktur ändern.

Aufgaben für die Raumplanung und Regionalentwicklung gibt es daher viele dazu?

- z.B. die Anpassung der Infrastrukturen – Verkehrsinfrastrukturen, Bildungs- und Gesundheits-infrastrukturen, Kultur- und Freizeitinfrastrukturen.
- z.B. die Anpassung des Gebäude- und Wohnungsbestandes an geänderte Bevölkerungszahl, Haushalts¬größe, sich ändernde Bedürfnisse der Bewohner und Bewohnerinnen, z.B. die Adaptierung des Angebots von Versorgungsinfrastruktur (Einzelhandel, Gastronomie, Treff¬punkte und Kommunikationsplätze) und deren Erreichbarkeit
- z.B. die Umgestaltung von öffentlichen Freiräumen und die Entwicklung von Zielgruppen
- z.B. organisatorische Innovationen, wie z.B. die systematische Weiterentwicklung von interkommunalen Kooperationen, um bedarfsgerechte Infrastrukturen und Dienstleistungen finanzieren zu können und um im Wettbewerb um die besten Köpfe und Bewohner attraktiv zu bleiben.
- z.B. neue Formen der Kommunikation und Politik von Standortqualitäten im Werben um die jugend¬lichen Frauen und Männer (sollen bleiben und Unternehmen gründen) und um die jungen Alten (sollen sich bürgerschaftlich engagieren, investieren und konsumieren).

2.2 Gleichwertige Lebensbedinungen – Städte und Dörfer für ALLE

Ein Blick auf die Raumordnungsgesetze in Österreich ruft den gesetzlichen Auftrag zur vorausschauenden Planung nach den Bedürfnissen der Bevölkerung und zum Abbau von räumlichen Disparitäten in Erinnerung.

2.2.1 Vorausschauend die Bedürfnisse der Bevölkerung berücksichtigen:

Raumplanung im Sinne des Gesetzes war und ist immer schon auf die bestmögliche Nutzung und Sicherung des Lebensraumes orientiert und hat auf die abschätzbaren wirtschaftlichen, sozialen gesundheitlichen und kulturellen Bedürfnisse der Bevölkerung Bedacht zu nehmen (§ 1 SROG 2009). „Bedürfnisgerechte Raumplanung“ im Sinne der Salzburger Publikation von Zibell 2007 wäre daher immer schon Auftrag und Ziel jeder Planungstätigkeit.

Dies ist nur möglich, wenn sich die politisch Verantwortlichen die Zusammensetzung der Bevölkerung und deren Veränderung (Altersstruktur, alters- und geschlechtsspezifische Wanderung, alters- und geschlechtsspezifische Freizeit und Versorgungsansprüche, unterschiedliche Lebensstile und Nachfrage nach Wohnformen und Infrastrukturen etc.) genau anschauen.

Darüber hinaus ist zu berücksichtigen, dass sich - im Gegensatz zur „klassischen“ Kommunalentwicklungs- und Flächennutzungsplanung - auch die Betrachtungszeiträume für das Thema „demographische Wandel“ verlängern, sowohl was den Blick zurück als auch den Blick in die Zukunft betrifft.

2.2.2 Ausreichende und qualitätvolle Versorgung der Grundbedürfnisse sichern:

Ziele der Raumordnung sind weiters: „die Herstellung möglichst gleichwertiger Lebensbedingungen sowie deren Verbesserung durch die Schaffung einer ausgeglichenen Wirtschafts- und Sozialstruktur. § 2 Salzburger Raumordnungsgesetz SROG 2009 Zi. (1)

Und die Versorgung der Bevölkerung in ihren Grundbedürfnissen ist in ausreichendem Umfang und angemessener Qualität sicherzustellen. Insbesondere bezieht sich diese Vorsorge auf Wohnungen,

Erwerbsmöglichkeiten, die Versorgung mit Gütern und Dienstleistungen, Kultur-, Sozial-, Bildungs-, Sport- und sonstige Freizeit-, Informations-, Kommunikations- und Verkehrseinrichtungen. § 2 SROG 09 Zi. (5)

Die Verhandlung und gemeinsame Sichtweise von „gleichwertigen Lebensbedingungen" – oder besser über das gute Leben in einer Stadt/einem Dorf ist wohl eine der neuen Kernaufgaben für die Politik.

Ebenso die Verhandlung über „spatial justice" und eine gerechte Verteilung der Finanzen und Investitionen in einem Land, einer Stadt: dies beginnt mit der Frage „wie viel ist uns der Öffentliche Verkehr und die Mobilität von Kindern, Jugendlichen, Menschen ohne Auto wert? Dies endet bei der Frage, wie gerecht ist der regionale Finanzausgleich und wem kommen die Investitionen, Förderungen und Steuerzuckerl zugute (z.B. gender budgeting).

2.2.3 Unterschiedlichkeit von Raum- Zeitnutzungen und Alltagsmustern wahrnehmen:

Neben der Erweiterung des Analyse- und Planungshorizonts ist auch eine Erweiterung der Themen auf den Lebensalltag von Frauen und Männern, Buben und Mädchen einer Gemeinde und Region vorzunehmen. Jüngere Publikationen zu Genderplanning aus dem europäischen Raum zeigen, dass in der Raumplanung die Alltagsroutinen und die Versorgungsökonomie ausgeblendet wird (BURGESS 2009, DAMYANOVIC 2008, HUDSON 2006, , TUMMERS 2007, WANKIEWICZ 2009, ZIBELL 2007).

Die Diskussion, welche Mobilitätsangebote, Infrastrukturen, öffentliche und private Dienste, Bildungsangebote, Versorgungs- und Erholungsangebote, Gesundheitsdienste, Wohnungsformen und Frei¬räume brauchen Kinder und Jugendliche, Frauen und Männer in unterschiedlichen Lebenszyklen und Lebensformen zur bestmöglichen Gestaltung ihres Alltags und wie verändern sich diese Ansprüche und wie können die öffentliche Hand, private Vereine und Nachbarschaften und Einzelpersonen zusammenwirken, ist aktiv zu führen und zu gestalten.

2.2.4 Integrativ planen und entwickeln – sektorübergreifend – partizipativ – lösungsorientiert

Mit dem demographischen Wandel planen, heißt integrativ, sektorübergreifend und in unterschiedlichen Maßstabsebenen (multi-level-governance) zu planen.

Sofern man Raumplanung als Dienstleistung an den Bewohnern und Bewohnerinnen einer Region sieht, um die Infrastruktur, Siedlungen, Versorgungs- und Dienstleistungen, Mobilitätsangebote, Öffnungszeiten an die Bedürfnisse der Bewohner anzupassen, braucht es einen breiten Dialog mit möglichst vielen Akteuren/-innen vor Ort.

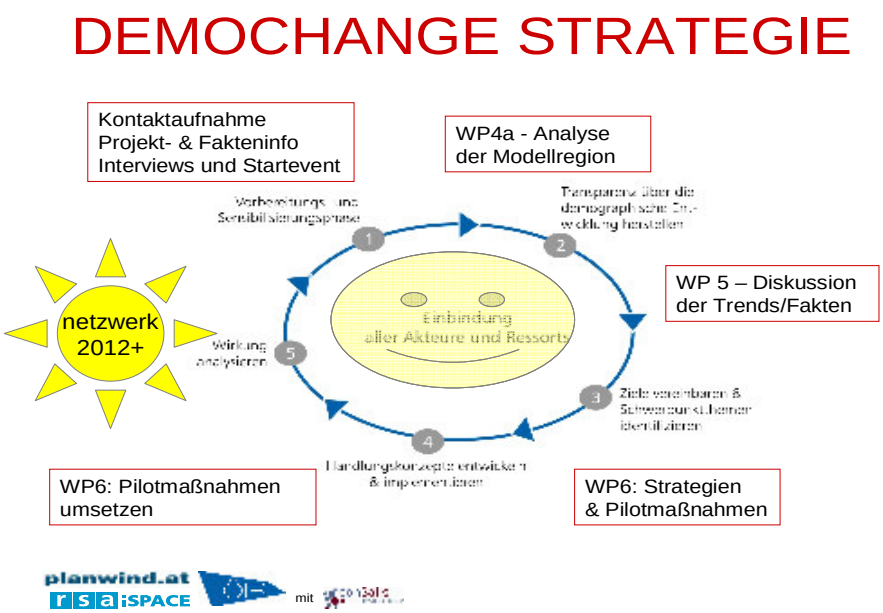

Abb. 1: DEMCHANGE Projektansatz basierend auf dem Strategiezyklus für die Entwicklung einer ressortübergreifenden Gesamtstrategie zum demographischen Wandel - (Adaptierung von Bertelsmann Stiftung 2006)

Zielgruppen im Salzburger Projekt sind die Gemeinden und Regionalverbände der 3 Bezirke, die Landesabteilungen, die Kammern und Interessensvertretungen, regionale Arbeitsmarktservice-Stellen,

Gesundheits-, Sozial- und Bildungseinrichtungen, sonstige infrastrukturrelevanten Einrichtungen, Tourismusverbände/Vereinigungen, Raum- und Regionalplaner der Länder und Büros und die Bewohner und Bewohnerinnen.

3 RAUMENTWICKLUNG UND DEMOGRAFISCHER WANDEL IM ALPENRAUM

3.1 DEMOCHANGE – das Projekt (Dollinger/Wankiewicz)

Im Mittelpunkt des internationalen Projekts „Demochange“ stehen der demographische Wandel im Alpenraum und die Entwicklung von Anpassungsstrategien in den Bereichen Raumplanung und Regionalentwicklung. Projektpartner aus Anrainerstaaten der Alpen[2] analysieren interdisziplinär und kooperativ die demographische Veränderungen und ihre Auswirkungen auf unterschiedliche Alpenregionen. Sie erarbeiten Strategien für die Raumplanung und Regionalentwicklung der Zukunft und setzen Pilotmaßnahmen um.

Das Land Salzburg und die Universität Salzburg, Fachbereich Geographie und Geologie, Arbeitsgruppe Sozialgeographie, sind die österreichischen Projektpartner von DEMOCHANGE. Als Auftragnehmer des Landes Salzburg sind die Büros planwind.at, die Research Studios Austria, Studio iSpace, das Österreichische Institut für Raumplanung (Büro Salzburg) sowie das Beratungsunternehmen ConSalis Mitglieder im Salzburger Projektteam.

Das gemeinsame Salzburger Projektteam

- analysiert den demografischen Wandel und Trends in der Region „Innergebirg“,
- sensibilisiert Entscheidungsträger und Multiplikatoren für diesen Wandel und seine Herausforderungen,
- entwickelt gemeinsam mit ihnen Strategien sowie Handlungsempfehlungen und lernt aus anderen Alpenraumregionen,
- initiiert Pilotmaßnahmen in der Raumordnung und Regionalentwicklung in ausgewählten Teilregionen,
- und baut ein Wissensnetzwerk auf, welches nach Projektabschluss aktiv weiter arbeitet.

Das Projekt läuft von Oktober 2009 bis September 2012. Die regionalen Arbeiten im Rahmen dieses Projektes betreffen das Gebiet der politischen Bezirke St. Johann im Pongau, Tamsweg und Zell am See. Diese begannen im Februar 2010 in Form von standardisierten Interviews zum Thema des demographischen Wandels. Im Rahmen der Startveranstaltung "Innergebirg 2030" am 22. April 2010 wird ein regionaler Lenkungsausschuss konstituiert werden, der das Projekt in der Folge begleiten soll.

Für dieses Projekt wird neben der transnationalen und mehrsprachigen Homepage www.demochange.org auch ein regionaler Internetauftritt eingerichtet. Unter der Internetadresse www.demochange.at wird somit eine öffentliche zugängliche Kommunikationsplattform bestehen.

3.2 Motivation der Raumplanungsabteilung Salzburg zur Mitwirkung an DEMOCHANGE und Erwartungen an das Projekt (Dollinger)

Der demographische Wandel wird in den nächsten Jahrzehnten die ländlicher geprägten Regionen des Landes Salzburg vor gewaltige Herausforderungen stellen. Wie eine Studie der Landesstatistik aus dem Jahr 2006 zeigt, wird insbesondere die Änderung der Altersstruktur für Land und Gemeinden bedeutende finanzielle und gesellschaftliche Verschiebungen und Veränderungen nach sich ziehen (vgl. Raos 2006: Salzburg altert. Trends, Ursachen, Konsequenzen. Salzburg).

Von den demographischen und den damit indirekt verbundenen gesellschaftlichen Veränderungen werden die südlichen Bezirke des Landes in besonderem Maße betroffen sein, wobei die intensive

[2] Projektpartner von „Demochange“ sind: Hochschule für Angewandte Wissenschaft – FH München (D), Land Salzburg, Abteilung für Raumplanung (A), Universität Salzburg, Fachbereich Geographie (A), Kanton Graubünden (CH), University of Applied Sciences Hochschule Luzern – Soziale Arbeit (CH), Interface Institut für Politikstudien (CH), Zentralschweizer Konferenz der Volkswirtschaftsdirektoren (CH), Planungsverband Region Oberland (D), Libera Università di Bolzano, Facoltà di Economia (I), Regionale Autonoma Valle d`Aosta, Osservatorio economico e sociale (I), UNCEM Delegazione Piemontese (I), UPIRS - Urbanistični Inštitut Republike Slovenije (SLO)

Tourismuswirtschaft im Vergleich zu anderen Alpenregionen manche negative Entwicklungen noch abfedert und verzögert.

Diese Abfederung durch die Tourismuswirtschaft ist ein wesentlicher Grund dafür, dass die lokalen und regionalen Entscheidungsträger die mit dem demographischen Wandel einhergehenden zukünftigen Herausforderungen noch nicht erkennen (wollen) und daher keine grundsätzliche Umorientierung in den betroffenen Politikbereichen vornehmen wollen und zum Beispiel auf traditionellen Familienleitbildern beharren. Aktuelle Analysen der Entwicklung der letzten Jahre zeigen jedoch, dass auch der ländliche Raum des Landes Salzburg von zukünftigen dramatischen Veränderungen nicht verschont bleiben wird. Da es in noch späterer Zeit immer schwieriger und auch immer teurer werden wird, um die notwendigen Umorientierungsmaßnahmen einzuleiten, ist es daher notwendig, so rasch wie möglich das Bewusstsein für die Anpassung an den demographischen Wandel in den Köpfen der lokalen und regionalen Entscheidungsträger im sogenannten "Innergebirg" zu heben. Dies war die wesentliche Motivation der Abteilung Raumplanung zur Mitwirkung an diesem transnationalen Projekt.

Die Abteilung Raumplanung erwartet sich vom Projekt neben einer Mobilisierung der lokalen und regionalen politischen Entscheidungsträger und der Belebung einer Diskussionskultur über diese Herausforderungen auch die Initiierung konkreter Umsetzungsprojekte im Bereich von Raumplanung und Regionalentwicklung. Diese Umsetzungsprojekte sollten idealerweise im Rahmen der Überarbeitung bzw. Neubearbeitung von Instrumenten der örtlichen und regionalen Raumplanung definiert und entwickelt werden (z.B. ein den demographischen Wandel berücksichtigendes Siedlungsleitbild einer Gemeinde, das die Abhängigkeit vom motorisierten Individualverkehr zu reduzieren hilft).

3.3 Der methodische Ansatz für die Regionalanalyse: leitbildorientierte Indikatorentwicklung zur Abbildung raumrelevanter demographischer Trends im Alpenraum

Indikatoren ermöglichen als vereinfachte Modelle der Wirklichkeit, Komplexität zu reduzieren, Information zu verdichten und damit die Wirklichkeit beschreib- und messbar zu machen (vgl. Prinz 2007, Birkmann et al. 1999). Somit sind sie - als Messwerkzeuge und Anzeiger nicht direkt messbarer oder komplexer Sachverhalte - eine Entscheidungsgrundlage für die Erstellung von Entwicklungskonzepten sowie Voraussetzung für die Realisierung und Erfolgskontrolle von Strategien und Maßnahmen (Raumbeobachtung).

In der Projektstartphase (Grund- und Detailanalyse) erfolgt daher die Entwicklung einer indikatorenbasierten Herangehensweise, um die zentralen raumwirksamen demographischen Entwicklungen quantitativ fassbar zu machen (Abb.3). Diese Analyse zur Erstellung innovativer Grundlagen für die Bewusstseinsbildung baut auf etablierten GIS-gestützten Methoden der leitbildorientierten Indikatorenentwicklung auf und stellt sich u.a. folgenden Herausforderungen (vgl. Prinz, Reithofer und Herbst 2008):

- Zielbezug: Bezug der Indikatoren zu den in Leitbildern formulierten Zielen
- Trenderfassung: Erfassung/Darstellung von Entwicklungstrends (Zeitreihen)
- Regionale Vergleichbarkeit: vertikale und horizontale Integrität und Vergleichbarkeit (je nach Möglichkeit auch der Vergleich zu anderen Regionen im Alpenraum)
- Adressatenorientierung: Orientierung an den Zielgruppen in der Indikatorenauswahl (Verständlichkeit, Lesbarkeit, Aussagekraft, etc.)
- Raumbeobachtung/Nachführbarkeit: Berücksichtigung zukünftiger Datenverfügbarkeit

Angestrebt wird eine leitbildorientierte Indikatorenentwicklung in Anlehnung an bestehende Planungsgrundlagen und -instrumente des Landes Salzburg, wodurch auch planerische Zielvorstellungen und Leitbilder schrittweise konkretisierbar werden. Dazu ist die Ableitung und Entwicklung von Zielen für eine Region im Wandel notwendig (allgemeine und raumstrukturelle Ziele der Region für den demographischen Wandel).

Zur Abbildung von regionalen raumrelevanten demographischen Entwicklungen werden folgende Daten bis auf Gemeindeebene und nach Männern/Frauen bzw. Altersgruppen differenziert aufbereitet:

- Bevölkerungsentwicklung 1960-2010 + Prognose 2030 (Hauptwohnsitze, Nebenwohnsitze)

- Wanderungsbilanz/-kennziffern 1960-2010 + Prognose 2030 (inkl. alters- und geschlechtsspezifische Zu-/Abwanderung)
- Geburtenbilanz/-kennziffern 1960-2010 + Prognose 2030
- Altersstruktur 1960 – 2010 – 2030
- Wirtschafts- Arbeitsplatzstruktur 1960-2010-30
- Erwerbsbeteiligung nach Geschlecht /Alter
- Haushaltsentwicklung/Veränderung der Haushaltsgrößen
- Pendelwanderung nach Alter/Geschlecht

Die integrierte Indikatorenentwicklung erfolgt u.a. durch den Einsatz vielseitiger GIS-gestützter Analysemodelle (bspw. regionalstatistische Indikatorenmodelle, ÖPNV-Erreichbarkeitsmodelle, fußläufige Erreichbarkeiten) auf Basis verfügbarer SAGIS- und regionalstatistischer Datengrundlagen. Für eine zielorientierte Kommunikation der Arbeitsmaterialien erfolgt die Entwicklung verschiedener Kommunikationsinstrumente (Karten, Diagramme, Tabellen etc.). Die Ergebnisaufbereitung findet damit in Abhängigkeit vom jeweiligen Adressaten ergebnisorientiert sowie maßstabsspezifisch auf unterschiedlichen räumlichen Bezugsebenen statt (Abb. 3; vgl. Prinz 2007, Klooz 2000, Coenen 2000). Das indikatorenbasierte Messkonzept sieht also eine zeilgruppenorientierte Nutzbarmachung auf unterschiedlichen Ebenen vor (Kernindikatoren – Planungs¬indikatoren - Projektindikatoren). Kategorisierungen und Schwellwerte in zu entwickelnden Indikatoren orientieren sich u.a. an Grundlagen der Bevölkerungsprognosen der Österreichischen Raum¬ordnungskonferenz, an der Salzburger Landesstatistik sowie am Salzburger Landesentwicklungsprogramm.

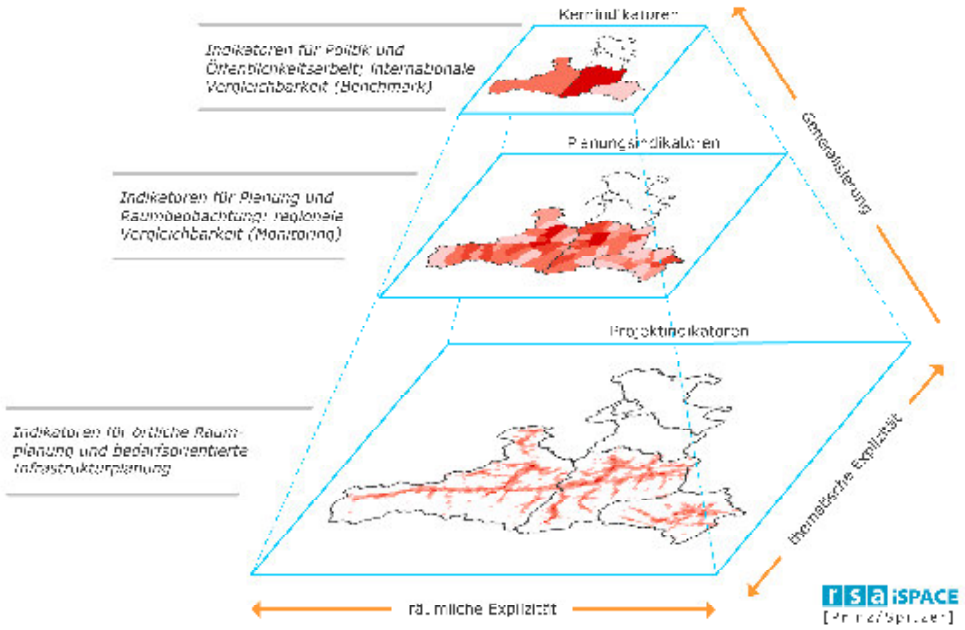

Abb. 2: Zielgruppenorientierte Ergebnisaufbereitung auf unterschiedlichen räumlichen Bezugsebenen der Pilotregion

3.4 Trends, Entwicklungen und Szenarien im Alpenraum: Erste Ergebnisaufbereitungen für die Pilotregion Pinzgau Pongau und Lungau

Die im Land Salzburg ausgewählte Modellregion „Innergebirg“ - das sind die 3 Bezirke Tamsweg, St. Johann und Zell am See - umfasst 68 Gemeinden, in denen 93.750 Frauen und 91.236 Männer leben, das sind knapp 35% von Salzburgs Bevölkerung mit einem Durchschnittsalter von 39,4 Jahren (Raos-Faschinger 2008). 2032 wird das Durchschnittsalter in der Modellregion auf 46,3 Jahre angestiegen sein, die Frauenerwerbsquote sich der von den Männern angenähert haben und die Zahl der über 80-Jährigen von 15.157 auf 27.860 Personen angestiegen sein. Diese Veränderungen in der Altersstruktur sind in Abb. 4 für das Projektgebiet illustriert (1971, 1991, 2009; Volks-/Registerzählungen von Statistik Austria).

Die Region wird immer älter, immer gebildeter, immer „bunter“ in der Herkunft und immer mobiler im Tages-, Wochen- und Lebensrhythmus. Es gab noch nie so viele über 80-Jährige, und es gab noch nie so viele gut ausgebildete, auch akademische und hochmobile (d.h. reisefreudige, tatendurstige) allein lebende Pensionisten/-innen. Parallel mit dem gesellschaftlichen Wandel, der sich in Geburtenrückgang, geänderten Familien und Partnermodellen, geänderten Erwerbsbiographien von Frauen und Männern, sowie einer Bildungsrevolution für Buben und Mädchen in der Modellregion zeigt, hat ein enormer wirtschaftlicher Strukturwandel weg von der Landwirtschaft und dem Gewerbe hin zu Tourismus und Dienstleistungsbranchen stattgefunden. Seit den 60er Jahren wurden 142.000 Betten im Winter eingerichtet und 19 Mio. Gästenächtigungen im Jahr 2008 zeigen die Dimension des Tourismus in der Modellregion. Es erfolgt eine saisonale „Zuwanderung“ von Millionen von Touristen, die Arbeitsplätze und Einkommen für viele - auch für Saisonarbeiter/-innen - schafft und die Verkehrs- und Infrastrukturausstattung der Regionen, die Werte und den Lebensalltag der Bewohnerinnnen und Bewohner in den Gemeinden tiefgreifend beeinflusst.

Die kurzfristige Entwicklung (Zeitraum 2001 bis 2009) der Einwohnerzahl (Hauptwohnsitze) ist in Abb. 5 auf Gemeindeebene dargestellt. Im Vergleich zum Salzburger Zentralraum weist die Modellregion „Innergebirg“ eine bedeutend stärkere Differenzierung in der Bevölkerungsentwicklung (Zu- bzw. Abnahme) mit regionalen Zentralisierungs- und auch Suburbanisierungstendenzen auf. Vor allem touristische Zentren sowie höherrangige zentralörtliche Gemeinden erfahren tendenziell ein Wachstum während ländliche und periphere Gemeinden (Talschlüsse) teils Rückgänge verbuchen.

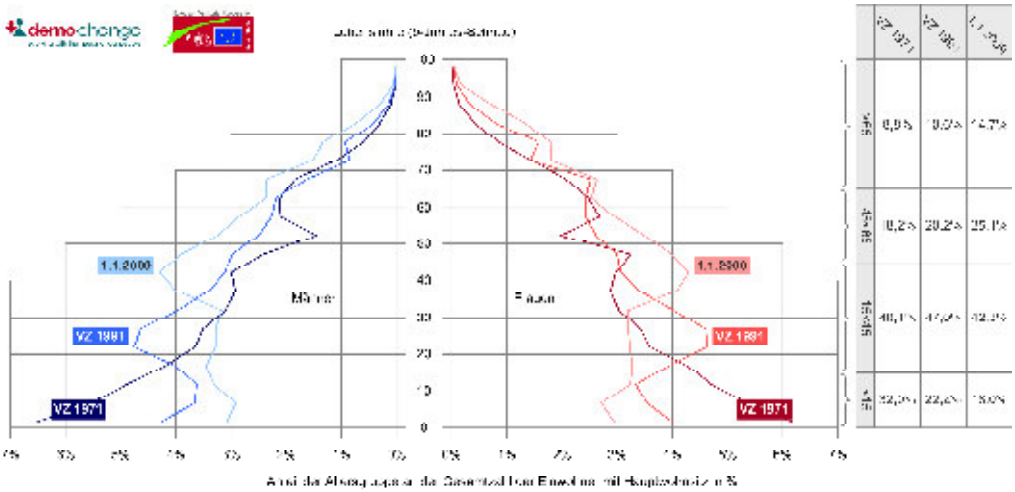

Abb. 4: Alterstruktur 1971, 1991 und 2009 im Demochange-Projektgebiet (Pinzgau, Pongau, Lungau)

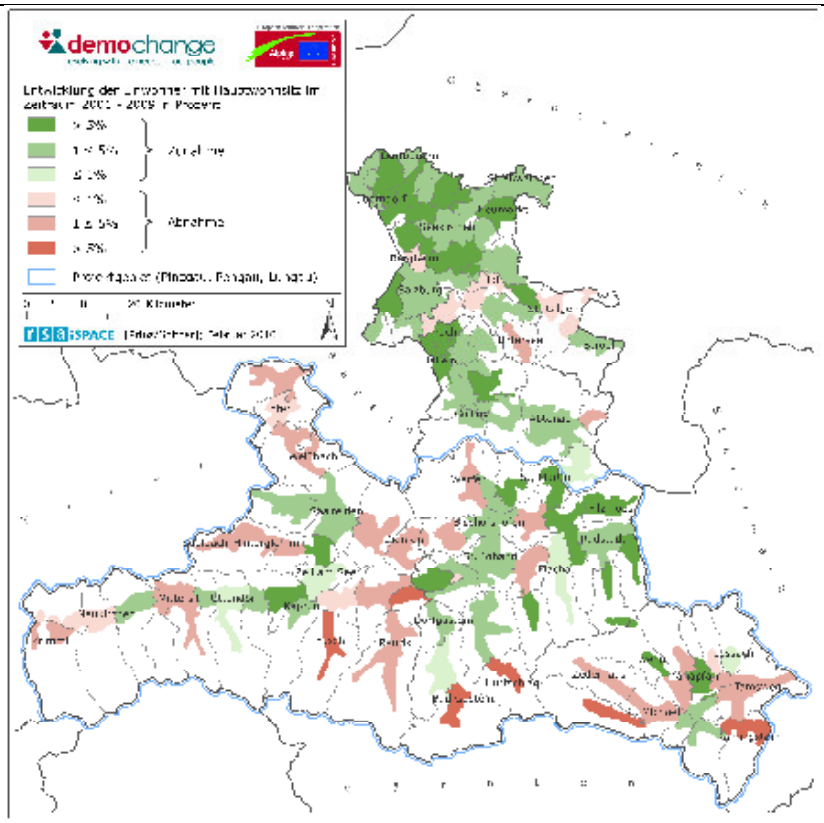

Abb. 5: Entwicklung der Einwohner mit Hauptwohnsitz (2001-2009) im Demochange-Projektgebiet

Eine fundierte Analyse erfordert jedoch auch die differenzierte Betrachtung der beiden Komponenten der demographischen Grundgleichung und damit der Bevölkerungsentwicklung. Abb. 6 zeigt die durchschnittlichen jährlichen Wanderungs- und Geburtenbilanzraten (‰) der 68 Innergebirg-Gemeinden im Zeitraum 2002-2007 differenziert nach Gemeindegrößenklassen. Die Diagonale (Bevölkerungsstagnation: von oben links nach unten rechts) trennt Bevölkerungswachstum (rot) von -rückgang (blau). Die grüne Schraffur zeigt eine positive Wanderungsbilanz bei negativer Geburtenbilanz, die orange Schraffur das umgekehrte Verhältnis. Dabei zeigt sich, dass die Gemeinden durchwegs positive Geburtenbilanzen aufweisen und daher die Gesamtentwicklung einer Gemeinde entscheidend von Zu- und Abwanderung beeinflusst ist. Damit lassen bereits wesentliche Ursachen und Problemfelder des demographischen Wandels identifizieren.

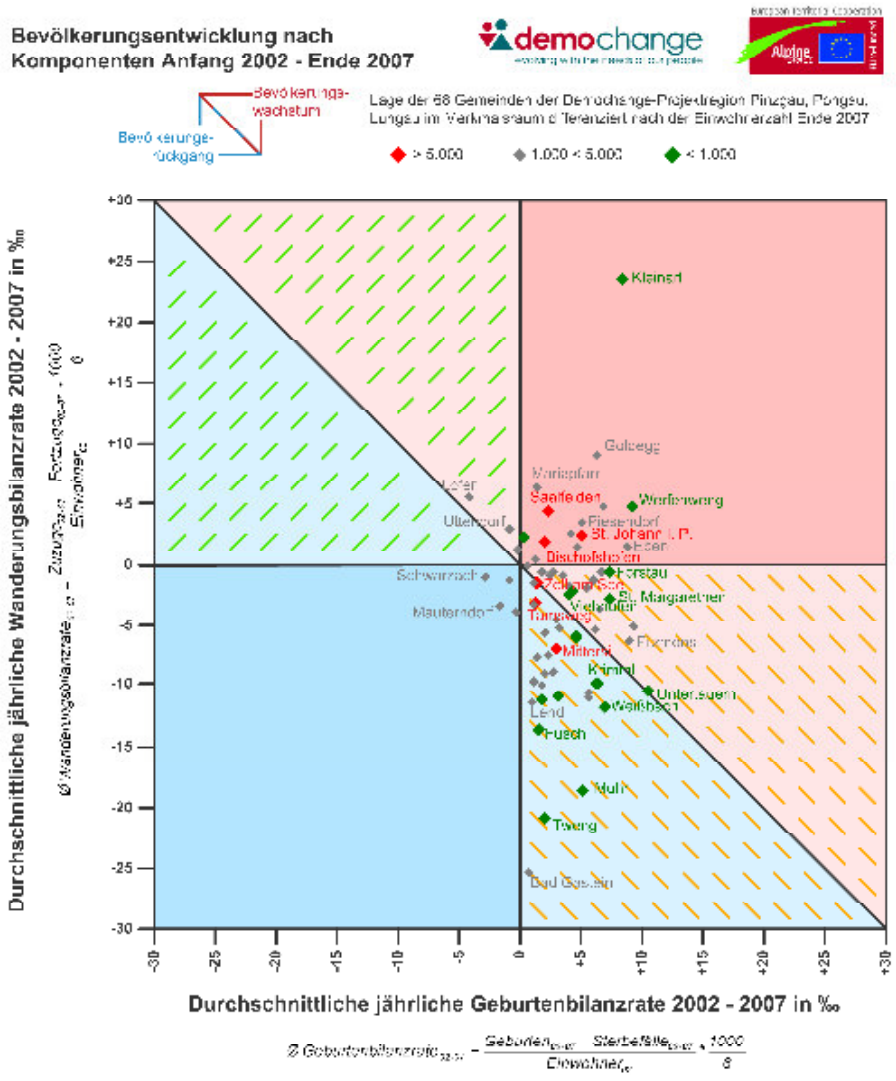

Abb. 6: Komponenten der Bevölkerungsentwicklung (Wanderungs-/Geburtenbilanzraten in ‰) der Gemeinden in der Modellregion, verändert nach Prinz et al. (in press)

4 AUSBLICK

Aufbauend auf diesen präzisen sozio-ökonomischen Analysen der längerfristigen Entwicklung und deren Diskussion mit den Bewohnern/-innen, wird die Gegenüberstellung dieser Bevölkerungszahlen mit den Raumstrukturen und den bestehenden Versorgungsinfrastrukturen der Region folgen.

Die Entwicklung der Angebote für Einzelhandel, Einkauf, Bildung, Gesundheit und öffentliche und private Dienstleistungen in den Ortschaften im Land Salzburg wird seit den 90er Jahren beobachtet und ist Grundlage für die Raumplanungsentscheidungen.

Eine zentrale Herausforderung im Projekt DEMOCHANGE sein, mit der Region Strategien und Kooperationen zu entwickeln, um eine ausreichende Qualität, gute Erreichbarkeit auch ohne Auto für ALLE Menschen einer Region zu entwickeln und zu sichern im Sinne einer bedarfsgerechten Raumplanung.

Dabei geht es um Standortfragen gleichfalls, wie um „Geschäftsmodelle“ in der Organisation, den Öffnungszeiten und im Betrieb von Einrichtungen.

DEMOCHANGE Salzburg hat Mitte Jänner seine Arbeit aufgenommen und wird im März/April eine intensive Diskussion mit den regionalen und lokalen Akteuren/-innen gestartet. Im Juni wird der Dialog mit einem regionalen Lenkungsausschuss aus allen 3 Bezirken begonnen und eine gemeinsame Sicht der demographischen Entwicklungen erarbeitet und Ziele für die Region definiert.Darauf aufbauend sollen im Herbst Anpassungsstrategien für die lokale und regionale Ebene erarbeitet werden.

2011 soll ein gemeinsam umgesetzte Wanderausstellung als Lernplattform das Know How der Regionen aus Salzburg und der anderen Partnerregionen Allgäu und Garmisch-Partnekirchen, der Kanton Nidwalden aus der Schweiz Oberkrain und Bled aus Slowenien, Aostatal und Berggemeinden aus Piemont von Italien mit der Region die Diskussion fortführen und zu Umsetzungsmaßnahmen führen.

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🏆 *reviewed paper*

Reduzierung der durch Stadtverkehr verursachten Umweltbelastungen: Integrierte Planungsverfahren sind gefordert!

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1 ABSTRACT

Zu "STÄDTE FÜR ALLE: Lebenswert, gesund, prosperierend" gehört eine gesunde Umwelt. Hier er-halten Maßnahmen im Verkehrsbereich zunehmend Bedeutung, da der motorisierte Straßenverkehr der Hauptverursacher von Lärm ist und erheblich zur Belastung der Luft mit Schadstoffen beiträgt. Die EU hat hier in den letzten Jahren Maßstäbe mit der Umgebungslärmrichtlinie und der Luftqualitätsrichtlinie gesetzt. Hinzu kommt die Selbstverpflichtung der EU zur CO2-Minderung.

Bisher ist zu beobachten, dass diese Umweltthemen nicht nur auf EU-Ebene sondern bis hinunter auf die kommunale Ebene isoliert und nicht integriert betrachtet werden, obwohl vielfache Zusammenhänge und Abhängigkeiten bestehen. Eine wirkungsvolle, effektive und letztlich auch nachhaltige Entlastung der Umwelt ist nur mit integrierten und vernetzten Konzepten zu erreichen.

Der Beitrag gibt unter Nutzung jüngster Forschungsergebnisse über die Wirkung unterschiedlicher Maßnahmen und ihre Einbindung in den kommunalen Planungskontext Hinweise, wie ein integrierter Planungsansatz gestaltet werden kann.

2 AUSGANGSLAGE

Der Stadtverkehr hat Einfluss vor allem auf drei aktuell diskutierte Umweltbelastungen:

- Lärm, Wirkungsebene: lokal,
- Schadstoffe, Wirkungsebene: regional,
- Treibhausgase, Wirkungsebene: global.

Das Europäische Parlament bestimmt mit seinen Richtlinien in immer stärkerem Maße den nationalen Rechtsrahmen. Dies betrifft zwei der drei genannten Belastungsarten: Lärmminderung und Luftreinhal-tung:

- Mit der "Richtlinie 2002/49/EG des Europäischen Parlaments und des Rates vom 25. Juni 2002 über die Bewertung und Bekämpfung von Umgebungslärm", kurz Umgebungslärmrichtlinie, werden die zuständigen Behörden verpflichtet, Lärmkarten auszuarbeiten und bei auftretenden Lärmproblemen Lärmaktionspläne aufzustellen. Die Richtlinie legt fest, wie schädliche Auswirkungen – einschließlich Belastung durch Umgebungslärm – zu verhindern, ihnen vorzubeugen oder zu mindern sind. Das Besondere an der Umgebungslärmrichtlinie ist, dass sie Termine für die Erstellung der Lärmminderungspläne setzt (18. Juli 2008 bzw. 18. Juli 2013).
- Seit Januar 2010 gilt die "Richtlinie 2008/50/EG vom 21. Mai 2008 über Luftqualität und saubere Luft für Europa", kurz Luftqualitätsrichtlinie. Das Besondere hier ist, dass neben Terminen zur Einhaltung teilweise auch neue bzw. verschärfte Grenzwerte festgelegt werden. Bei abzusehenden oder bereits eingetretenen Überschreitungen der Grenzwerte sind Luftreinhaltepläne zu erstellen.
- Zudem hat sich die Europäische Union 2008 im Rahmen des "Energie- und Klimapakets" dazu verpflichtet, die Treibhausgas-Emissionen (THG) bis zum Jahr 2020 um 20 % (Basisjahr 1990) zu reduzieren. Hier gibt es keine rechtsverbindliche EG-Richtlinie, aber eine politisch beschlossene Selbstverpflichtung.

Entsprechend diesen drei unterschiedlichen Historien werden die Minderungsverpflichtungen formal wie fachlich bisher weitgehend isoliert betrachtet.

3 SEKTORALE MASSNAHMEN ZUR UMWELTENTLASTUNG

3.1 Maßnahmen zur Lärmminderung

Bei der Aufstellung eines Lärmaktionsplans geht es vorrangig darum, Lärm bereits am Emissionsort zu vermeiden bzw. zu mindern. Weiterhin wird die Möglichkeit der räumlichen Verlagerung der Emittenten in weniger konfliktbehaftete Gebiete betrachtet. Erst wenn diese Lärmminderungspotenziale ausgeschöpft sind,

kommt eine Minderung am Immissionsort in Betracht. Diese Rangfolge hat eine umwelt- und stadtgerechte Lärmminderung zum Ziel. Sie leitet sich aus dem Grundprinzip des Umweltschutzes ab, Umweltauswirkungen vorrangig an der Quelle und möglichst nicht am Einwirkungsort zu vermeiden:

- Zunächst ist zu prüfen, in welchem Umfang Emissionen vermieden werden können,
- nachfolgend sind die Potenziale auszuschöpfen, die die verbleibenden Emissionen vermindern,
- erst dann stellt sich die Frage nach einer Verlagerung der Emissionen.

Nur, wenn diese drei Schritte keine ausreichende Lärmminderung erreichen, kommen Maßnahmen zur Verringerung der Immissionen in Betracht. Diese Vorgehensweise ist notwendig, weil sonst mit einer alleinigen Ausrichtung der Lärmminderung auf die Immissionsseite keine umfassende, sondern nur eine punktuelle Lärmminderung (z. B. in der Wohnung, aber nicht im Wohnumfeld) erreicht werden kann.

Die Ausschöpfung der meisten Lärmminderungspotenziale bedarf baulicher Maßnahmen. Bei der Maßnahmenwirkung ist zu unterscheiden zwischen

- Vermeidung von Emissionen und
- Verlagerung von Emissionen,

die nur innerhalb einer systematischen gesamtstädtischen Förderdung lärmwirksam werden, sowie

- Verminderung von Emissionen und
- Verringerung von Immissionen,

die mit lokal wirksamen Maßnahmen zur Lärmminderung beitragen. Entsprechende Maßnahmen sind vor allem in vier Feldern zu suchen:

- verkehrsrechtliche Maßnahmen,
- straßenbauliche Maßnahmen,
- städtebauliche Maßnahmen, sowie
- kompensatorische Maßnahmen im Umfeld eines belasteten Straßenraums.

Vor diesem Hintergrund sind insbesondere folgende Maßnahmen erfolgversprechend für die Lärmminderung:

- Verstetigung des Verkehrsflusses,
- Einsatz lärmmindernder Fahrbahnbeläge,
- Verlagerung / Bündelung Pkw-Verkehre,
- Verlagerung / Bündelung Güterverkehre.

Verkehrsdaten	Wohn- und Sammelstraßen	Verkehrsstraßen, Geschäftsstraßen, Sammelstr. mit Schleichverkehr	Hauptverkehrsstraßen, Ortsdurchfahrten	Ortsumgehungen
DTV in Kfz/d	1500	5000	12000	16000
Spitzenbelastung in Kfz/h	100	300	720	1000
Lkw-Anteil in %	3	6	12	15
davon schwere Lkw	0	30	50	50
mittl. Geschwindigkeit in km/h	50	50	50	100

	Einzelmaßnahmen	Minderung des Mittelungspegels in dB(A)			
1	Reduzierung Verkehrsmenge (von - auf Kfz/d)	2,0 1500 - > 1000	3,0 5000 - >2500	2,0 12000 ->7500	
2	Reduzierung Lkw-Anteil	1,0	1,0	1,0	1,0
3	Lärmarme Lkw	0,5	1,0	2,0	1,0
4	Temporeduzierung (von - auf km/h)	2,5 50 -> 30	2,5 50 -> 30	2,0 50 -> 30	2,0 100 -> 70
5	Lärmarmer Fahrbahnbelag	3,0	2,0	2,0	3,0

	Maßnahmenkombination	Minderung des Mittelungspegels in dB(A)			
6	Verkehrsberuhigung (VB) (mit baulichen Maßnahmen) 1+2+4	5,5	6,5	5,0	3,0
7	Verkehrsberuhigung plus lärmarmer Fahrbahnbelag 1+2+4+5	8,5	8,5	7,0	6,0
8	VB + lärmarme Fahrbahn + lärmarme Lkw 1+2+3+4+5	9,0	9,5	9,0	7,0
9	VB + lärmarme Fahrbahn + Lkw-Verbot 1+2+3+4+5 (nachts)	10,0	10,5	10,0	8,0

Tabelle 1: Wirkung von Einzelmaßnahmen und Maßnahmenkombinationen

Flankierende Maßnahmen sind:

- Förderung des Umweltverbundes,
- Förderung eines stadtverträglichen Güterverkehrs,
- Verlangsamung des Kfz-Verkehrs.

Die Umsetzung einzelner Maßnahmen zur Lärmminderung bringen in der Regel nicht den gewünschten Erfolg, nämlich unter die Werte von 65 dB(A) ganztags und 55 dB(A) nachts als Grenze zu nachgewiesenen gesundheitsschädlichen Auswirkungen durch Lärm zu kommen. In der Regel ist angesichts der hohen Qualität der Verkehrsinfrastruktur in Europa ein abgestimmtes Maßnahmenbündel erforderlich, um eine spürbare Lärmminderung zu erreichen, ohne dass im Einzelfall damit immer sichergestellt werden kann, die gesundheitsschädlichen Werte auch unterschreiten zu können.

Die Tabelle zeigt, dass einzelne Maßnahmen im Verkehrsbereich in der Regel nur 1-2 dB(A) Minderung leisten. Bei sinnvollen Maßnahmenkombinationen sieht die Wirkung jedoch ganz anders aus: 3-7 dB(A) sind hier realistisch, bis zu 10 dB(A) sind möglich.

3.2 Massnahmen zur Luftreinhaltung

Die von der deutschen Bundesanstalt für Straßenwesen bereitgestellte Datenbank "Maßnahmen zur Reinhaltung der Luft in Bezug auf Immissionen an Straßen" (MARLIS) enthält die Maßnahmen aus vorliegenden Luftreinhalteplänen mit einer groben Bewertung der Minderungswirkung für PM10 und NO2. Für alle 1.404 dokumentierten Maßnahmen (Stand: September 2006) sind Einschätzungen der Minderungswirkung auf PM10 und NO2 enthalten.

Sowohl für die PM10- als auch die NO2-Minderung führt die Auswertung der Datenbank zu einem ernüchternden Ergebnis: Die große Mehrheit der Maßnahmen hat nur einen geringen oder gar keinen Einfluss auf die Schadstoffbelastung. Nur rund ein Achtel aller Maßnahmen lässt eine hohe bzw. mittlere Wirkung erwarten. Die Minderungswirkungen sind für PM10 und NO2 zumeist sehr ähnlich.

Überwiegend erfolgt die Erfassung der Luftschadstoffbelastung über Messstellen. Dieser punktuellen Erfassung folgend, wurde in bisherigen Luftreinhaltplänen häufig versucht, die punktuell nachgewiesene Überschreitunge von Grenzwerten mit punktuellen Maßnahmen zu begegnen (z. B. Lkw-Durchfahrverbote im Bereich der Messstelle). Ausreichend starke Wirkungen für eine nachhaltige Reduzierung der Schadstoffbelastung oder gar eine dauerhafte Unterschreitung der Grenzwerte bleiben bei diesem Vorgehen in den meisten Fällen aus. Das bedeutet, dass massivere Anstrengungen als bisher unternommen werden müssen, um die EU-Grenzwerte dauerhaft einzuhalten Hierzu müssen die Handlungskonzepte über den in der bisherigen Planungspraxis üblichen Umfang hinausgehen.

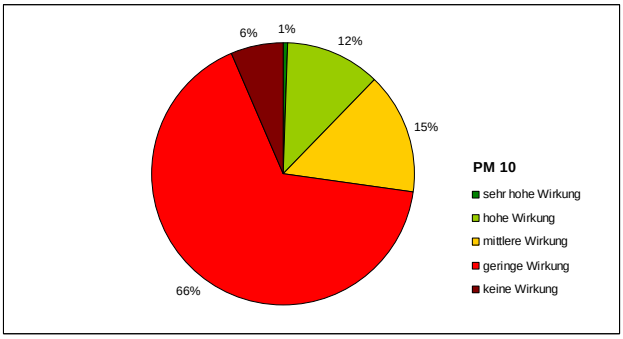

Abbildung 1: Wirksamkeit der Maßnahmen bezogen auf PM10 (Grundgesamtheit 1.404 Maßnahmen) (Quelle: PRR)

Es gibt nur wenige Maßnahmen, die aus sich heraus ein hohes Potenzial zur Minderung der Schadstoffbelastung besitzen. Eine konsequente Umsetzung dieser Handlungsansätze und deren Ergänzung durch flankierende (Push- oder Pull-)Maßnahmen können in erheblichem Maß zur Steigerung der Effizienz der einzelnen Maßnahmen beitragen. Die Strategie der Minderungskonzepte sollte deshalb ausgewogen aus den beiden Dimensionen

- Kombination von Kernmaßnahmen mit flankierenden Maßnahmen und
- darauf abgestimmte Push- und Pull-Wirkungen

bestehen.

Den entscheidenden Faktor für den erzielbaren Erfolg stellen in den zu entwickelnden Handlungspaketen die Kernmaßnahmen dar. Das sind die Maßnahmen, von denen nach derzeitigem Erkenntnisstand die höchste Entlastungswirkung erwartet werden können:

- straßenbauliche Maßnahmen, wie z. B. Ortsumfahrung mit Rückbau der Ortsdurchfahrt,
- Maßnahmen, die den Lkw-Verkehr beeinflussen, wie z. B. Lkw-Verbote,
- Maßnahmen, die den Verkehrsteilnehmer direkt finanziell belasten, wie z. B. City-Maut.

Sie werden durch flankierende Maßnahmen ergänzt, die als Hebel die Wirkung der Kernmaßnahme erhöhen. In diesem Zusammenhang können auch weniger wirksame Maßnahmen in der Summe ihrer Entlastungswirkung eine erhebliche, zur Unterschreitung der Grenz- bzw. Auslösewerte vielleicht sogar entscheidende Bedeutung erhalten. Geeignete flankierende Maßnahmen lassen sich in folgende Kategorien einteilen:

- Maßnahmen, die isoliert keine oder eine nur geringe Wirkung besitzen, für die Ausschöp-fung des Wirkungspotenzials der Kernmaßnahme aber hilfreich sind (z. B. Verhinderung der Entwicklung von Einzelhandelsflächen an nicht integrierten Standorten als flankierende Maßnahme zur Einführung einer City-Maut).
- Maßnahmen, die isoliert bereits starke Wirkungen ermöglichen, als flankierende Maßnahme aber leichter zu realisieren sind, da sie zur Ausschöpfung des Wirkungspotenzials der Kernmaßnahme hilfreich sind (z. B. Verknappung des Parkraumangebots als flankierende Maßnahme zur intensiven Förderung des öffentlichen Nahverkehrs).
- Maßnahmen, die isoliert trotz hoher Wirkung nicht durchsetzbar, zur Ausschöpfung des Wirkungspotenzials der Kernmaßnahme aber unverzichtbar sind (z. B. innerstädtische Zone mit Lkw-Durchfahrverbot als flankierende Maßnahme zur City-Logistik).

Beispielhaft erscheinen nach derzeitigen Erkenntnissen folgende Maßnahmenpakete erfolgversprechend:

		Bezugsraum	Reduzierung des Pkw-Verkehrs [%]	Steigerung des ÖPNV [%]
PUSH	City-Maut	Mautzone	20	
	Parkraummanagement	Parkraum-bewirtschaft-ungsgebiet	10	
	Verkehrsmanagement/ITS			
PULL	Förderung des ÖPNV - Netzauf- und -ausbau - Taktverdichtung - Neue Haltepunkte			
	Tarifliche Anreize im ÖPNV schaffen			13
	Einführung/Ausbau der Straßenbahn			
	Car-Sharing-Angebot ausbauen	Stadtgebiet	20	
	Förderung des Radverkehrs	k.a.	13 [*]	
	Betriebliches Mobilitätsmanagement	Mitarbeiter-wege	13 [*]	
	Mobilitätsmanagement (Dialog-Marketing)	k.a.	15	17
	Park+Ride-Angebot ausbauen			

Erläuterungen

Bei den grau hinterlegten Feldern handelt es sich um unterstützende Maßnahmen

[*] = Durchschnittswert

Wert gilt für Maßnahmen innerhalb der Markierung

k.a. Über den Bezugsraum wurde keine Angabe gemacht. Es kann sich hierbei sowohl auf das gesamte Stadtgebiet als auch auf ein städtisches Teilgebiet bezogen worden sein.

Abbildung 2: Maßnahmenpaket Mobility Pricing

		Bezugsraum	Reduzierung des Lkw-Verkehrs (LNFZ und SNFZ) [%]
PUSH	LKW-Fahrverbot	k.a.	32 [*]
	Rückbau Ortsdurchfahrt	Rück-bauge-biet	15 [*]
	Einrichtung einer Umweltzone	Umwelt-zone [***]	24 [*]
PULL	Einbindung der Paketlogistik in City-Logistik		
	Gütertransport mit Cargo-Tram	k.a.	50
	LKW-Führungsnetz [**]	Unter-geord-netes Netz	44
	Virtuelles GVZ		
	Auf- und Ausbau von Be- und Entladestationen		
	Verkehrsmanagement/ITS		

Erläuterungen

Bei den grau hinterlegten Feldern handelt es sich um unterstützende Maßnahmen

[*] = Durchschnittswert

[**] Die Reduzierung des Lkw-Verkehrs bezieht sich auf das untergeordnete Straßennetz. Auf dem Vorbehaltsnetz selbst steigt die Fahrleistung um 27 %.

[***] Die Angaben der Verkehrsreduzierung beziehen sich auf die Schadstoffklassen 2 und 3.

Wert gilt für Maßnahmen innerhalb der Markierung

k.a. Über den Bezugsraum wurde keine Angabe gemacht. Es kann sich hierbei sowohl auf das gesamte Stadtgebiet als auch auf ein städtisches Teilgebiet bezogen worden sein.

Abbildung 3: Maßnahmenpaket Güterlogistik

		Bezugsraum	Reduzierung des Pkw-Verkehrs [%]	Steigerung des ÖPNV [%]
PUSH	Rückbau Hauptverkehrsstraßen/ Ortsdurchfahrt			
	Ausbau von Ring- und/oder Ausfallstraßen	Rückbau-gebiet	15 [*]	
	Ortsumfahrung	k.a.	30 [*]	
	Parkraummanagement	Parkraum-bewirtschaf-tungsgebiet	10	
	Tempo 30/40-Zone			
PULL	Förderung des ÖPNV - Netzauf- und -ausbau - Taktverdichtung - Neue Haltestellen			
	Tarifliche Anreize im ÖPNV			13
	Einführung/Ausbau der Straßenbahn			
	Car Sharing ausbauen	Stadtgebiet	20	
	Förderung Fahrradverkehr	k.a.	13 [*]	
	Betriebliches Mobilitätsmanagement	Mitarbeiter-wege	13 [*]	
	Mobilitätsmanagement (Dialog-Marketing)	k.a.	15	17
	P+R-Angebot ausbauen			

Erläuterungen

Bei den grau hinterlegten Feldern handelt es sich um unterstützende Maßnahmen

[*] = Durchschnittswert

k.a. Wert gilt für Maßnahmen innerhalb der Markierung. Über den Bezugsraum wurde keine Angabe gemacht. Es kann sich hierbei sowohl auf das gesamte Stadtgebiet als auch auf ein städtisches Teilgebiet bezogen worden sein.

Abbildung 4: Maßnahmenpaket Infrastruktur

3.3 Massnahmen zur Minderung der Treibhausgase (THG)

Der Verkehrssektor ist nicht nur in Deutschland ein maßgeblicher Verursacher der Treibhausgas-Emissionen (THG). Im Jahr 2004 besaß er bundesweit einen Endenergieverbrauchsanteil von etwa 30 % und einem sich daraus ableitenden Anteil von 20 % am Gesamt-CO2-Ausstoß. Innerhalb des Gesamtverkehrssystems stellt der motorisierte Straßenverkehr die mit Abstand größte Emittentengruppe dar. Von den Straßenverkehrsemissionen wiederum werden bundesweit etwa zwei Drittel durch Pkw-Fahrten verursacht.

Problematisch stellt sich die Entwicklung der THG-Emissionen im Verkehrsbereich der letzten zwei Jahrzehnte, bedingt durch starke Zuwächse in der Personen- und Güterverkehrsleistung des Straßen- und Flugverkehrs, dar. Im gleichen Zeitraum haben sich die Gesamtemissionen aller übrigen Sektoren (Energiewirtschaft, Industrie, Haushalte) verringert. Der Verkehrsbereich wird deshalb zukünftig eine tragende Rolle im Klimaschutz einnehmen müssen, um die Klimaschutzziele zu erreichen und irreversible globale Schäden zu vermeiden.

Die Darstellung von geeigneten Minderungsmaßnahmen konzentriert sich auf die Bereiche, in denen die kommunale Verkehrsplanung über Handlungsspielräume verfügt. Bisher gibt es erst wenige Untersuchungen, die sich mit der Auswirkung einzelner verkehrsplanerische Maßnahmen auf die Treibhausgasemissionen beschäftigen. So ergeben sich bei der Wirkungsanalyse von Einzelmaßnahmen methodische Probleme, da sich die Maßnahmen in ihrer Wirkung ergänzen und verstärken, überlagern oder gar neutralisieren können. Zudem lassen sich die Wirkungen so genannter weicher Maßnahmen, wie z. B. Öffentlichkeitskampagnen, nur bedingt abschätzen.

In der folgenden Tabelle wird ein erster, noch kritisch zu betrachtender Versuch unternommen, den einzelnen Maßnahmen einen Wirkungszeitraum und mögliche Minderungspotenziale zuzuordnen.

Handlungsfeld	Kommunale Maßnahmen und Instrumente	Wirkungs-zeitraum	Globale Minderung
Bauleit-planung	dezentrale Nutzungsmischung von Wohnen, Einkaufen, Arbeit	lang	mittel
Wirtschaftsverkehr	**umfassendes City Logistik-Angebot**	**lang**	**mittel/hoch**
Fahrradverkehr	hochwertiges Radverkehrsnetz	mittel/lang	mittel
	funktionale und komfortable Infrastruktureinrichtungen für den Fahrradverkehr	kurz/mittel	mittel
	Optimierung Radverkehrswegweisung	kurz/mittel	mittel
ÖPNV	**hochwertige ÖPNV-Erschließung**	**mittel/lang**	**mittel/hoch**
	schnelle ÖPNV-Verfügbarkeit	**mittel/lang**	**mittel/hoch**
	hochwertiges Komfort- und Service-Angebots	**mittel/lang**	**mittel/hoch**
Wirtschaftsverkehr	**Güterverlagerung auf Schiene- und Wasserstraße**	**lang**	**mittel/hoch**
	Ausbau kombinierter Ladungsverkehr	lang	mittel
	betriebliches Mobilitätsmanagement	kurz/mittel	mittel
	Einführung City-Maut	lang	mittel
	zeitlich und räumlich beschränkte Kfz-Fahrverbote	**mittel/lang**	**mittel/hoch**
Verkehrssteuerung	Einsatz von Verkehrstelematik	kurz/mittel	mittel
Antriebstechnologie, Kraftstoffe	Umrüstung städtische Busflotte auf emissionsarme Fahrzeuge	mittel/lang	mittel
Elektromobilität	**Elektrofahrzeuge im Wirtschaftsverkehr**	**mittel/lang**	**mittel/hoch**

Tabelle 2: Wirkungszeitraum und Minderungspotenziale der Maßnahmen

Zur kommunalen CO2-Minderung im Verkehrsbereich sind zu den Kernmaßnahmen zu zählen:

- umfassendes City Logistik-Angebot,
- hochwertiges ÖPNV-Angebot,
- Güterverlagerung auf Schiene und Wasserstraße,
- zeitlich und räumlich beschränkte Kfz-Fahrverbote,
- Elektrofahrzeuge im Wirtschaftsverkehr.

Zu den flankierenden Maßnahmen gehören:

- dezentrale Nutzungsmischung von Wohnen, Einkaufen, Arbeit,
- umfassende Förderung des Fahrradverkehrs,
- Ausbau kombinierter Ladungsverkehr,
- betriebliches Mobilitätsmanagement,
- Einführung City-Maut,
- Einsatz von Verkehrstelematik,
- Umrüstung städtischer Busflotten auf emissionsarme Fahrzeuge.

Naturgemäß haben theoretisch die Maßnahmen die höchste Minderungswirkung, die eine Verlagerung aus Verkehrsmitteln mit Verbrennungsmotoren zu Verkehrsmitteln mit Muskelkraft bewirken, also Zu Fuß gehen und Fahrradfahren. In der Praxis zeigt sich jedoch, dass nur der kleinere Teil der Zuwächse im Fahrradverkehr von Pkw-Benutzern kommt, sondern überwiegend aus dem Fußgängerverkehr (und damit ohne Wirkung auf die THG-Bilanz) oder aus dem ÖPNV kommt (damit auch nur geringe oder gar keine Wirkung auf die THG-Bilanz). Auch bei der THG-Minderung wird deutlich, dass nur mit Push- und Pull-Maßnahmen (z. B. Einschränkung für die Pkw-Nutzung, verbessertes Angebot für die Fahrradbenutzung) die Bilanz nachhaltig verbessern können. Auch die THG-Minderung ist wegen der notwendigen Push- und Pull-Maßnahmen somit auf intelligente Maßnahmenkombinationen angewiesen.

4 INTEGRIERTE VORGEHENSWEISE

4.1 Abgestimmte Maßnahmenkonzepte

Die bisherigen Ausführungen machen deutlich, dass in allen drei Handlungsbereichen – Lärm, Luft, Treibhausgase – einzelne Maßnahmen keine ausreichende Minderungswirkung erzielen können. Selbst bei den bisher eingesetzten Maßnahmenkombinationen ist nicht sicher, dass sie das Ziel – Unterschreitung gesundheitsgefährdender Lärmwerte, Unterschreitung der Grenzwerte zur Luftreinhaltung, Reduzierung des CO2-Ausstoßes – erreichen. Vor diesem Hintergrund wird deutlich, dass die unabgestimmte Umsetzung von Minderungsmaßnahmen aus diesen drei Handlungsbereichen keinen Sinn macht. Im besten Fall gehen nur Synergieefekte verloren, im schlimmsten Fall sind die Maßnahmen kontraproduktiv.

Bisher ist die integrierte Bearbeitung von Luftreinhalte- und Lärmaktionsplänen zumindest in Deutsch-land noch die Ausnahme. Die Ursache liegt in der zeitlich versetzten Bearbeitung beider Pläne, unterschiedlichen Zuständigkeiten von Behörden, teilweise auch in unterschiedlichen fachlichen Zuständigkeiten innerhalb einer Behörde.

Jahr	Luft	Lärm	THG	Verkehr
2010	2. Stufe Luftreinhaltung			Verkehrszählung Bund
2012		Strategische Lärmkarten 2. Stufe, Fortschreibung Lärmkarten 1. Stufe (Daten nicht älter als 3 Jahre)		
2013		Lärmaktionsplan 2. Stufe, Fortschreibung 1. Stufe		
2015	3. Stufe Luftreinhaltung			Verkehrszählung Bund
2017/18		Fortschreibung Lärmminderungsplanung 1. und 2. Stufe (Daten nicht älter als 3 Jahre)		
2020			20 % Minderung	Verkehrszählung Bund
2022/23		Fortschreibung Lärmminderungsplanung 1. und 2. Stufe (Daten nicht älter als 3 Jahre)		
2025				Prognosehorizont Verkehrsplanung, Verkehrszählung Bund

Tabelle 3: Zeitplan der einzelnen Stufen zur Umweltentlastung

Vergleicht man die Minderungswirkung von Einzelmaßnahmen auf die Schadstoff- und Lärmbelastung, kommen nach dem derzeitigen Wissensstand vor allem folgende Maßnahmen in Frage:

- Ortsumfahrungen mit Straßenrückbau
- Lkw-Verbote (bei entsprechender Reduzierung der Lkw-Anteile) und Lkw-Nachtfahrverbote,
- Förderung des ÖPNV (bei entsprechender Verschiebung des Modal Split).

Die verbleibenden Maßnahmen

- Geschwindigkeitsreduzierung,
- Lkw-Umweltzone,
- Lkw-Abwrackprämie,
- City-Logistik,
- Erhöhung Anteil schadstoffarme Lkw und

- lärmarmer Straßenbelag

sollten ihrer Wirkungsweise entsprechend als flankierende Maßnahmen in Luftreinhalte- bzw. Lärmaktionspläne aufgenommen werden.

Gleicht man diese Maßnahmen wiederum mit den Maßnahmen zur THG-Minderung ab, wird deutlich, dass fast alle identifizierten Kernmaßnahmen den drei Zielen der Umweltentlastung dienen – ein offensichtlicher Beweis, dass nur ein integriertes und abgestimmtes Vorgehen effizient und erfolgreich die städtische Umwelt schützen kann.

4.2 Abgestimmtes Handeln

Berücksichtigt man Minderungsmaßnahmen in einem kommunalen Planungsmanagement von Beginn an in der Verkehrs- und Infrastrukturplanung, so kann vieles in ohnehin geplante Maßnahmen eingebunden werden. Ein solches Vorgehen führt dazu, notwendige Maßnahmen zur Umweltentlastung

- völlig zu vermeiden, weil von Beginn an umweltschonend geplant wurde,
- kostenneutral im Zuge einer optimierten Baumaßnahme auszuführen oder
- mit nur geringen Mehrkosten vorzunehmen.

Die Kombination aus Luftqualitäts- und Lärmaktionsplänen stellt, wie oben ausgeführt, eine nahezu zwingende Voraussetzung dar, ein wirtschaftlich (Datenbereitstellung, Umsetzung) und fachlich (Nutzung von Synergieeffekten) integriertes städtisches Umweltentlastungskonzept zu erstellen. Für die Umsetzung der Aktionspläne ist dies aber nicht ausreichend. Die Handlungskonzepte zur Umweltentlastung sind in andere Planwerke auf zwei Ebenen zu integrieren:

- Inhaltliche Abstimmung: Luftreinhaltung, Klimaschutzkonzept, Stadtentwicklung und Bauleitpläne, Verkehrsentwicklungsplanung, Nahverkehrsplan und andere verkehrmittelspezifische Konzepte, Gefahrgutnetz, Unfallhäufungspunkte. Die Verknüpfung mit anderen Fach- und Gesamtplanungen, insbesondere mit der Verkehrsentwicklungsplanung, geht weit über eine formale 1:1-Umsetzung der EG-Richtlinien hinaus, bildet aber einen wesentlichen Erfolgsfaktor. Instrumentell ist die Verkehrsentwicklungsplanung das Umsetzungsinstrument der Umweltpläne, da hier eine integrierte Betrachtung aller Verkehrsarten unter Berücksichtigung städtebaulicher Belange erfolgt. Nur integrierte Verkehrsentwicklungskonzepte für Stadtteile oder ganze Stadtgebiete bilden ein zielführendes Instrument zur Senkung der verkehrbedingten Umweltbelastungen. Zudem wirken Luft- und Lärmminderungsmaßnahmen positiv auf die Verkehrssicherheit und städtebauliche Belange, was für die politische Argumentation und die Kosteneffizienz von hoher Bedeutung ist.
- Verfahrensmäßige Abstimmung: Einbindung in Förderkulissen, Straßenunterhaltung, Straßenneubau, Sanierung Abwasserkanäle, Konjunkturprogramme. Für die Umsetzung der Maßnahmen verfügen die Gemeinden nur über geringe eigene Haushaltsmittel, wenn überhaupt. Hier muss die Umweltplanung Verbündete mit entsprechenden Geldmitteln finden. Ohne eine solche Verknüpfung gibt es nur geringe Umsetzungschancen. In einer jüngst vom Deutschen Institut für Urbanistik (difu) veröffentlichten Studie sind Zahlen zum Investitionsbedarf in Deutschland bis 2020 zu finden: Städtebau 10,1 Mrd. EUR, ÖPNV 38,4 Mrd. EUR, Abwasser 58,2 Mrd. EUR, Straßen 161,6 Mrd. EUR. Das sind insgesamt 268,3 Mrd. EUR. Nimmt man konservativ an, dass 10 % dieser Investitionssumme durch Verknüpfung mit anderen Planungs- und Investitionsinstrumenten direkt oder indirekt einer umweltschonenden Verkehrsplanung zur verfügung stehen, wären dies 2,44 Mrd. pro Jahr – und das sind nur die kommunalen Investitio-nen!

Dazu ist aber auch ein abgestimmtes Handeln innerhalb der Kommunalverwaltung und mit den Trägern öffentlicher Belange (insbesondere Straßenverkehrsbehörde und fremde Straßenbaulastträger) erforderlich, was im Grunde neue Verwaltungsstrukturen erfordert, zumindest aber andere, nämlich vertikale und horizontale "Dienstwege". Dies betrifft folgende Phasen:

- Datenbereitstellung: Die Verknüpfung zwischen Stadt-, Verkehrs- und Umweltplanungsinstrumenten ermöglicht erhebliche Kosteneinsparungen bei der Datenbereitstel-lung.
- Konzeptbildung: Im Vergleich zu unabgestimmten, sektoralen Planungen bietet eine verknüpfte Bearbeitung fachliche Synergien. Die Planungsqualität wird erhöht und die Kosteneffizienz

gesteigert. Die verknüpften Planungen qualifizieren sich im Rahmen des Abstimmungsprozesses untereinander. Die Verknüpfung ermöglicht eine umfassende Analyse und Bewältigung von Konflikten im Schnittfeld der Stadt-, Verkehrs- und Umweltplanung, da sie zur argumentativen Unterstützung von Maßnahmen anderer Planungen dienen kann. Durch eine abgestimmte Prioritätensetzung für die Maßnahmen kann der (finanziell) begrenzte kommunale Handlungsrahmen effektiv genutzt werden. Durch die Verknüpfung werden zudem kontraproduktive Maßnahmen der Stadt-, Umwelt- und Verkehrsplanungen vermieden und Doppelarbeiten und unnötige Überschneidungen verschiedener Planungen (Mehrfacherhebungen, Konkurrenzplanungen usw.) vermieden.

- Planungsprozess: Die Verfahrenslast, z. B. bei der Öffentlichkeitsbeteiligung oder in verwaltungsinternen Arbeitsrunden, kann durch eine verknüpfte Bearbeitung reduziert und Kosteneinsparungen erzielt werden. Abgestimmte Planungen lassen sich zudem in der Information und Beteiligung der Öffentlichkeit besser darstellen als eine Vielzahl unkoordinierter Einzelkonzepte. Durch die Verknüpfung der Fachplanungen können tragfähige verwaltungsinterne Kommunikationsstrukturen aufgebaut werden.
- Umsetzung: Die Umsetzung der meisten Minderungsmaßnahmen fällt in den Aufgabenbereich anderer Fachbereiche. Die Realisierung kann daher insbesondere durch eine bessere Zusammenarbeit und Kommunikation zwischen den Fachbereichen erst ermöglicht bzw. beschleunigt werden. Die Verknüpfung mit anderen Fach- und Gesamtplanungen bietet zudem Vorteile bei der Maßnahmenfinanzierung.

Diese Vorteile müssen den angestrebten Verknüpfungspartner frühzeitig kommuniziert werden, dait ihnen die Win-Win-Situation deutlich wird und umgekehrt die von den Kooperationspartnern befürchteten Nachteile (Zeit- und Personalaufwand, Kompetenzverlust, zeitliche und verfahrenstechnische Abhängigkeiten usw.) rechtzeitig entkräftet und so sektorale Widerstände und Egoismen überwunden werden.

5 QUELLEN

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Retailing and proximity in a liveable city: the case of Barcelona public markets system

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1 ABSTRACT

Retailing and especially food retailing has always been a fundamental element for the organization of the compact and more liveable city furthering the relations of proximity. From the nineteenth century specially the system of public markets acquired very considerable importance and was considered one of the basic service of metropolis in the urban planning policy.

Despite this, liberal policies, new modes of transportation, delivery and selling, along with suburban growth and the relative commercial “sprawl”, arising first in the cities in northern Europe and in the United States, undermined the development and conservation of this traditional public element, associated intimately with the compact city.

In some southern and eastern European cities, markets are still functional landmarks. In Barcelona they have proven their considerable urban potential. In the 1980s, the extensive network of neighbourhood markets were seen as very effective focal points for restructuring a retail sector. Since then, municipal intervention in the reorganization of the city’s markets and their immediate surroundings has formed part of an urban planning vision integrated into the defence of the neighbourhood structure, of close contact and, definitely, of the compact city. Barcelona has a clear policy of limiting oligopolies, and large commercial areas are seen as a threat to the equilibrium that allows for the coexistence of the traditional city and a high population density which helps to support public spending for the construction and administration of public markets, but also to enjoy the derived benefits.

2 INTRODUCTION

Even though livability is primarily a subjective experience, and one of the main questions that planners are concerned with, there is currently a growing consensus regarding the characteristics of a livable city for designing livability.

In fact, cities are now emphasizing the importance of competing on the basis of livability and the quality of life offered, and it is becoming an increasingly important factor in modern business location decisions, especially among high technology and knowledge firms (Richard Florida, 2008).

Standard economic criteria for the livable city comes fundamentally from Mercer's Quality of Living Survey and from Monocle Magazine.

In the first case, they adopt 39 criteria that include safety, education, hygiene, health care, culture, environment, recreation, political-economic stability and public transportation. On the other hand, Monocle Magazine includes some non-scientific criteria, such as safety/crime, international connectivity, climate/sunshine, quality of architecture, public transportation, tolerance, environmental issues, access to nature, urban design, business conditions, proactive policy developments and medical care.

But the criteria adopted by citizens are, at least in part, different. The Livable City Organization has as its goal to help create "new community models that focus on the interconnected relationships among growth issues such as transportation, housing, environment, affordability, neighborhoods, culture and the economy in an equitable and sustainable manner".

But from the early 1960s, economists and planners such as Jane Jacobs, Gordon Cullen, Lewis Mumford and Kevin Lynch, who shared a mainly negative image of suburbanization after the massive construction during the 1950s and 1960s and during the first petroleum crisis in Europe and the United States, were focusing on the change in the meaning of the livability of public space, reclaiming, basically, the missing sense of identity in the territory. More recently, Michael Sorkin (1992) demands a more authentic urban reality, a city based on physical and cultural proximity, beginning an appreciable chapter in the recuperation of public

space. Relations of proximity that not only improve security on the street but also encourage economic and cultural creativity as a consequence of the fluidity of connections.

Our article stresses the idea of the importance of a livable and sustainable society, based on the relation of proximity, as one of the basic criteria of a livable city within the compact city model, linked to its territory. In the nineteenth century, Barcelona markets, as well as those in other European cities, became public facilities that distinguished their different districts and controlled food prices during periods of crisis, maintaining a close relation with local agriculture. Nowadays, cities that continue to have an active market system are at a crossroads regarding the meaning of maintaining markets without falling over to a situation of exclusive gentrification, or an uncompromising “touristization” using the publbic sistem market just en economical term and for a direct profit forgetting al the important externality in social term. Historically, the experience of markets has been a cross-class experience and essentially popular. Markets can increasingly combine links with the past, new habits and new forms of urban multiculturalism, but for markets to continue this "milestone in understanding human relationships within practices of the neighbourhood, they should never lose their ability to become privileged pockets of sociability, and not to leave aside the ever inexhaustible quality of being genuine sources of proximity, the essential quality, the very stuff of which is made in the city."

In fact, a description of the implementation of covered markets in European cities, and specifically in Barcelona, refers to very different phenomena that points to a more livable city: a) the social and gender impact (creation of a very powerful source of life and sociability where visibility in the public space of women as buyers and sellers was defining); b) the political-administrative impact (element of strengthening/weakening of the management of urban public supplies, public management versus private or non-negligible source of income in a municipal context of chronic deficit); c) urban impact (new characterization of public space, distribution of new markets in the city and the polarizing role –neighborhood and/or center– in the daily purchases and distribution of retail trade); d) territorial impact (related to more or less industrialized cities or more a developed agrarian economy, relationship with the rail network, selective role in the regional urban network of cities with new markets) e) the economy impact either in term of forcing the day by day selling items but a place where to aplicate the strategy of the of the “experience economy” .

2.1 From the traditional market to the market as a commercial facility

Commerce and food sources are elements that structure the city; they foster the urban economy and also develop the place and systems of relations.

Market buildings are the quintessential structures for feeding the city, and they are elements that make up the city organization.

Small scale retail, as Jane Jacobs exposed very well, represents the opportunity to walk and shop in the city, improving security, proximity relations and more employment and economic opportunities to the residents of the area.

Interpretations on the economic base of cities have traditionally shown preference for productive activities. A vision probably induced by the experience of the city of the industrial age that does not respond, to historical reality, or to the current conditions of cities. According to J.R. Lasuén (Lasuén, 2007) , many of the shortcomings of urban policy are caused by the limitations of its basic assumptions. Among them, the priority given to productive activities, understood as production of tangible goods that are easiest to measure. For Lasuén (Lasuén, 2007), the origin of cities was in fact, “consumption in common, not joint production”. In recent years, there are warnings of a growing attention to anything that affects consumption, but there are still few works that enrich our hindsight (Deutsch, 2005). Examining the history of the relationship of markets with cities can be, in this regard, a good exercise for reviewing some aspects that significantly liveability of the city

In his classic thesis, Henri Pirenne (1927) attributed the rebirth of the medieval city to merchant activity and the long distance trade of sumptuary goods. Today, however, we think that the process was fed by the countryside farmers and that the modest trade in local markets boosted the long growth cycle of medieval Europe (Bois, 1991,1992; Guerreau, 1990, Verlhust, 1991). The great commerce and the birth of capitalism would only be later consequences. This original and generating function of local markets is readable in the

shape of the cities of medieval origin. In their growth process, markets were the generator focal point of many cities and the irradiating centre of their commercial fabric. The very morphology of the traditional city, in both the north and south of the Mediterranean, reveals the extent to which markets and the commercial network were, and still are, the backbone of urban structure. Thus, it is not surprising that in their character of universal models, Christaller considered markets the raison d'être of cities and structuring agents of the rural world.

Consumption and safety are thus prime factors at the base of the social contract that stimulates city development. Jordi Borja (2008), an urban geographer, emphasizes that "Cities originated to protect and integrate their inhabitants, guaranteeing them minimum standards of security and well being." Present-day sociologists argue that contemporary "city construction" can be explained to a large extent by the phenomenon of fear (Bru, Vicente, 2005; Davis, 1991): fear of diversity in urban situations where coexistence is the rule and conflicts are often unavoidable; fear of inequality or differences in purchasing power; and fear of uncertainty in all its aspects.

The first market renewal, in the second half of the eighteenth century, was closely tied to new enlightenment attitudes, and to an emerging new "urban knowledge", that in some way, was anticipated by the ideas of Voltaire (1749) about city embellishment. He thought that it was not only a question of aesthetics, but depended essentially on the development of a set of facilities, based on safe communications, and on the homogenous distribution of markets, theatres and churches.

These ideas were developed in the field of architecture by Laugier and Patte and became part of the progressive medicalization of urban space, and the theory and practice of the Administration or "Police". Thus, it was an urban type of thought that took form and flight with a revolutionary rupture (Monclús, 1989).

In the France of 1790, manorial rights were abolished. The new liberalizing laws maintained, however, strong public control over the markets governed by the moral imperative of ensuring the livelihood of a growing urban society, and markets became the exclusive responsibility of municipalities.

The expropriation of ecclesiastical plots and those of emigrated nobility allowed new state institutions to substitute the old structures. The centralized organization of the French State made the substitution process unique in its coherence and amplitude. Under the supervision of the Conseil des Bâtiments Civils, a homogenous management technique and a programmed method of evaluation of the need, distribution and construction of spaces were adopted (Teyssot, 1980; Lepetit, 1988). City facilities became signs of institutional and technical modernity and a way to have control over the population, enforcing discipline rather than using the expulsion method. The market spaces and buildings, such as market halls, public granaries, and abattoirs were considered to be facilities, as were prefectures, hospitals, public schools, judicial establishments, jails, police stations, theatres, museums and religious buildings, which since then have been understood as public services.

This idea of the market as a facility was already implicit in the Parallèle by Durand (1801) and his Précis de leçons d'architecture (1817). It is especially evident in the Collection des Marchés de Paris (1813) that the bridge and road engineer, Bruyère, devoted to the markets of Paris. Hence, in his urban inscription, from the smallest markets –constrained by the vicissitudes of the urban fabric– to the newest and most extensive projects designed for the Empire, there is the implicit idea of associating a market with a certain area of influence in the city. The market building appears as an element of centrality and identity for the population. It secures the healthiness of the products on sale and the control of tax payments, and the area reserved for the market leaves the street free for circulation.

Markets were enclosed to leave streets and squares free from the invasion of buyers and sellers, to eliminate obstacles blocking the way and the public gaze, in accordance with the "visibility" ideal and, in these new covered markets, stalls were put in order, circulation facilitated, hygienic conditions guaranteed, and the same ideal of transparency to the public gaze and control found in prisons and hospitals was somehow sought. According to Foucault, Rousseau's dream was for a transparent society, visible and legible in each of its parts, avoiding dark areas, enclaves of privileges or disorder, and avoiding all obstacles to the public gaze.

In Spain the changes were late in arriving and initially timid. Moreover, in 1834 trade was deregulated and permission was granted to deal in "all the objects for eating, drinking or burning", except bread. In 1836, the disentailment of ecclesiastical property allowed a set of interventions aimed at adapting the inherited city to the liberal notion of the "service city" (Teyssot, 1980; Le Petit, 1988). The first two markets, San José (now

called Boqueria) and Santa Caterina were designed and built in Barcelona emulating the French experience. San José was in the shape of a monumental porticoed square and the other, which drew its inspiration from the Saint-Germain market in Paris, was in the shape of a porticoed rectangular building surrounding an extensive free space.

For decades, however, three of Barcelona's five markets continued to be held on squares and streets (Domenech, 1990; Guàrdia and Oyón, 2008). The municipal commissions themselves were extremely critical of the serious lack of sanitation, scant functionality and great congestion of their markets in a city with a steadily growing population. Nevertheless, the budgetary difficulties of the municipality prevented any progress.

In the middle of the 19th century, the public granaries still responded to memories of famine in traditional cities. But in the second half of the century, the systematic increase in the flow and the fluidity of exchanges, promoted by the spread of new forms of transport, exerted a decisive influence on the rapid renewal of marketing procedures and on consumer habits. From this time onwards, the problem was no longer hunger caused by a lack of grain supplies. The system became more complex and scarcity resulted in an increase in prices and in the cost of living for the workers in relation to their salaries. Crises caused by supply shortages and cost-of-living increases would become recurrent. Because of this, city life was periodically affected by protests and serious social conflicts. The subject of market security reemerged in terms of availability of goods at a fair price and of public order.

Important changes took place in cities and in retail marketing throughout the nineteenth century. In the early decades, one of the main preoccupations of the city council was supplying basic subsistence. Whereas in latter decades, the abundance of supply was guaranteed and consumption habits had completely changed, the main problem was prices rising over the wages of the working-class. A sign of this change is the progressive vanishing of public granaries.

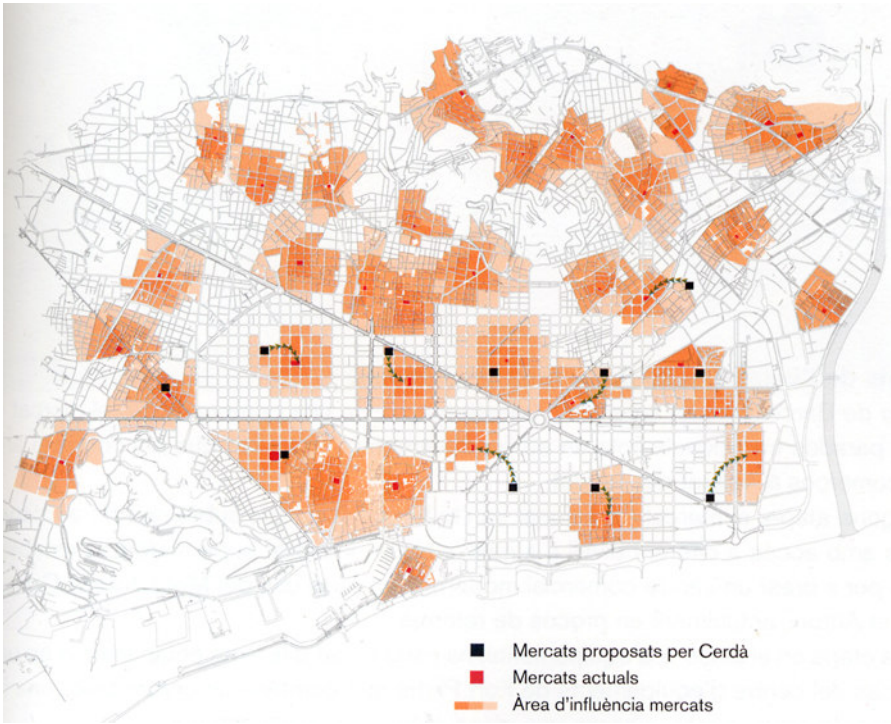

Figure 1. Markets projected by Cerdà; nowadays system market in Barcelona, area of influences of the markets (By Magrinyà, Francesc., Cerdà 150 any de modernitat, Barcelona : Fundació Urbs i Territori Idelfons Cerdà (FUTIC) : ACTAR, DL 2009.)

The proposals and reflections made by Idelfonso Cerdà (1867-1868) clearly heralded a sign of change. In his project in 1859 for the ensanche (extension) of the city of Barcelona, he planned an ambitious system with 12 markets. On the other hand, he himself can be used as an example of an important historical change: the end of the public granaries or grain stores, typical of the traditional city, which marked the passing from a very focused concern about staple food supplies to a situation characterized by greater abundance in which consumer habits changed. In fact, in his "Theory of City Construction" (1859) he conceded great importance to the public granary, while a few years later in his "General Theory of Urbanization" (1867) he wrote: "We

are no longer in the age in which the Public Administration has to keep vast public granaries in the city to meet the subsistence needs of its citizens (...) The freedom of contract encompasses everything, even the basic necessities...".

But the Cerdà plan was carried out little by little and not exactly according to his project

The period between 1874 and 1900 was that of the effective construction of the first examples of modern wrought-iron market halls. Within the municipality of Barcelona, there had been built before 1888 the markets of El Born (1876), Sant Antoni (1882), Barceloneta (1884), Hostafrancs (1888) and Concepció (1888). To these facilities should be added the markets built in the various municipalities of the plain of Barcelona: Llibertat (1888), Clot (1889), Unió (1889), and Abaceria Central de Gràcia (1892), which would be integrated into the market halls system of Barcelona with the amalgamation of their respective towns in 1897. Most of the new iron markets halls were designed and built by the most important metalworks factory of Barcelona, the Maquinista Terrestre y Marítima.

Accordingly, compared to the cities of Great Britain, France or the United States, in terms of the renewal of the market system, Barcelona was a latecomer, but could maintain and strengthen its system to the present day as a tool of governability.

The markets covered were in the early twentieth century functional poles very important to structure the neighborhoods to city. The concentration of power stations in many downtown markets, especially in the English, where even during the Saturday night market was opened to receive many working families, not confined to any type of food items but household items also included a very varied type, such as cheap clothing items, crockery and cutlery and toys. His ability to attract buyers everyday was not negligible if we study also the stores that generated about him. In many continental cities such as Barcelona this influence is also noted in the neighborhood markets. The interior was more strictly for fresh foods, but in its immediate perimeter shops settled fresh and not fresh (salt fish, nuts or dried pasta), pubs and cheap cafes and shops of domestic consumption in the broad sense as the aforementioned. As Miller suggests the market in case of the Revolution in Barcelona, many of the vendors of those stores established relations of complementarity rather than competition and market stalls acquired "as a way of extending horizontally the commercial business of the family". That made the market a real center of economic interrelations Small-scale breeding environment in the mix of activities they had in their day old open-air markets. Such attractiveness of retail, which is sometimes made against own ordinances prohibiting selling some competitive products in a radio next to butchers and fishmongers ripped to municipalities, was indisputable and, although declining, is perceptible today. The environments of the markets were also a privileged place of residence for sellers. As shown in that same story, over half of the tenderers stop within the walls of Santa Caterina Market in Barcelona lived in the old town and almost a third did so within a block radius of the market, more than two thirds of the vendors or vendors of the Market Llibertat, they did in the Gràcia district with 25% in the radius of the adjacent block. Clearer still was the attraction in the case of wholesale markets. In the central market of the Born, where opening hours very big sudden movements, we have found that half of the largest sellers residing in the blocks closest and only 8% worked in households which suggest that moved using any means of mechanized transport.

2.2 The impact of urban markets: a gender perspective

In case of the food markets we can not forget the importance of to be an public service for the nearly exclusive use of women during the XIX century: a public urban spaces designed for women as buyers and as sellers. Their collective contribution make the markets a space of socialization and cohesion basically interclassist, and a tool of the a top-down administrative strategy in the urban planning procedures(Damyanovic D. ,2009)

Market deserves special mention as gender specific location . In a century that, according to early histories of women in the city, made the seclusion of women in the domestic sphere of their brands in a few places like markets was more dominant presence incontestable women . There is already a remarkable literature on women in the public sphere of consumption of the burgeoning middle class and the bourgeoisie, particularly in department stores (Dennis, 2008), but we know almost nothing about his role in one of the popular public spaces where visibility was unquestionable. In the converged markets women of all social conditions, from the servants who made the purchase on request, to the sellers or the modest housewives buying much every

day after weighing the price or waiting at the last minute to buy food at prices bargain. Montserrat Miller in this volume recalls the vital role of women from Barcelona as vendors and owners of stalls. In the mid-nineteenth century, when there were a covered market and almost all vendors working in the open, the seats were served by women by 90%. After construction of the powerful network of markets, and despite the undeniable increase in the presence of men, particularly in positions requiring more capital, such as butchers, on the eve of the Civil War, 58.4% of the permits to operate 15 posts in the municipal markets were granted to women. Contrary to what was happening in other economic activities, the municipal laws of the market be allowed to own their business and transferred with the same rights as men (men were absolutely hegemonic change in wholesale trade). Women also tended to establish privileged relationships with a largely female clientele, relationships that did not come but to be the extension of everyday relations in the immediate environment: on the basis of neighborhood and kinship were woven around the markets powerful networks of sociability primary based on territoriality. Many festive events generated from the associations' own sales assistants crowned in festive celebrations that structuring social role of women in the internal market, the projected symbolically to the public sphere as "queen of the market."

2.3 A strong system of public markets born from historical weaknesses and lags

Between the years 1930 and 1970, when a progressive erosion of the markets was being observed in the more dynamic countries, an active policy was unfolding in this area in Spain. In the 1930s, it was of a fundamentally theoretical character and was led by the corps of municipal architects and their journal CAME. Here one finds numerous articles with topics ranging from the construction of modern exemplary wholesaler markets, such as that of Frankfurt, to the follow-up of the projects and accomplishments of diverse Spanish cities. One of the aspects to which it lent special attention was that of the initiatives which were undertaken in Madrid in those years, including the project and the construction of the Legazpi central wholesaler market for fruits and vegetables, and the market plan promoted by the architect Ferrero. The proposals in the 1920s and 30s were more modest in Barcelona. The example of Madrid, however, like that of other European cities, shows that the public market halls were far indeed from losing their relevance and that they were the object of a marked typological renovation, associated in part with the use of reinforced concrete.

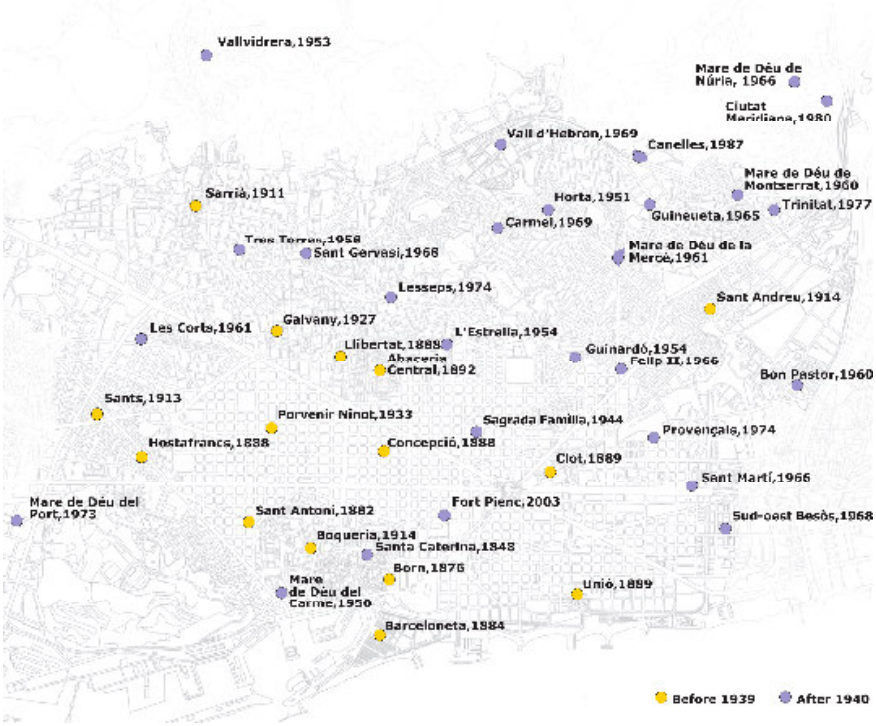

Figure 2. Location and building years of Barcelona market halls. (Source: by authors.)

In the so-called Autarchy period, between 1939 and 1959, which was the most depressive and interventionist phase of the dictatorship, a decided impetus was lent to the building of markets. The gradual liberalization of the economy and the “developmentism” of the 1960s did not halt the expansion of the market system, which grew significantly in both Barcelona and Madrid to serve the districts which had arisen with immigration. In

contrast to post-war Europe, which incorporated more advanced commercial formulas in unequal competition with the markets, in Spain the selfsame weaknesses of the economy allowed a surprising expansion and consolidation of the public market system especially in the case of Barcelona.

The activation of the economy fostered by the Francoist municipal policy in Barcelona entailed a greater private participation. In 1955 the requirements and conditions for the possible installation of private markets were being studied. Indeed, the new regulations approved at the beginning of 1956 simplified the introduction of markets of private construction and operation with reversion to the City Council in a pre-established time, as opposed to what had happened with the first generation of markets. This whole process laid the base for the most active stage in the construction of market halls. The idea was that all the people of Barcelona should have a market hall at a distance of less than one kilometre from their home. Between 1957 and 1977, 18 neighbourhood market halls were built in the areas with the least service. Moreover, as from 1966, "the possibility of constructing zonal market halls and providing parking space" was systematically considered. This circumstance affected both the new constructions of the expanded network of retailer markets and the renewal of the previously existing ones.

With respect to the district markets, in 1975 the municipal records clearly reflect the growing difficulties in completing the network with peripheral centres like the one envisaged for La Trinitat, which became the last of the series. Since the calls for tenders had remained vacant, on 21 January 1975 it was considered that the system which had been applied until then was not possible at La Trinitat market hall because it was not profitable for the contractor. Some city councillors compared the system followed in Madrid since 1930 and the system followed in Barcelona since 1960. Their conclusion was that if the Barcelona system had not been copied, it was because it did not work properly. A commission was charged with studying an appropriate contracting system. The cycle was already closing, however. It had established 40 market halls homogeneously distributed in Barcelona's small municipal territory of 92 square kilometres. On the basis of these data, the threefold economic, political and urban-model crisis marking the 1970s deprived these markets of all protagonism in the city council's discussions.

The considerable share of the overall consumption which was held by the zonal municipal market halls built throughout the long cycle of the Francoist city councils could still be observed in 1983. Despite the drop subsequent to 1975, the city's markets concentrated 53% of the total food consumption per inhabitant. The study served as a basis for the development of the Special Plan on Food Facilities of Barcelona (PECAB, 1984), which adopted the municipal markets and above all their areas of concentration and commercial polarity, where the greater part of the food purchasing acts was concentrated, as its main instruments of action . If the responsibility of the city councils had traditionally been to assure provisioning, in this new stage an overall coherent policy in matters of commerce and consumption was required: it was necessary to "exercise a veritable commercial urbanism" . Within this new context, it was held that the municipal market halls could be its fundamental pillars because it was feasible to turn them into a dynamic, modern, balanced and exemplary commercial sector.

2.4 Markets as tools of urban planning and community development

In Spain during the seventies, in spite of the modernization process, retailing was in a much more traditional stage, if we compare it with other European countries. For example, the impact of new shopping centers was delayed until the period between 1984 and 1996. The crisis of the 70s ate away at the fabric of foodstuff sales, which, in many cases, had become the last refuge of those who had lost their jobs. As a result, the market question arose during the second half of the eighties, when the entire market system had grown disproportionately and reached a point of serious inefficiency. The proliferation of dispersed units was saturating the sector, and the traditional retailing fabric was incapable of adapting.

The impact of the new shopping malls, located in the outskirts of large cities, weakened traditional trade that had given life to urban centers life, was well known. In France in 1973, the Royer law had already begun. It was a very restrictive policy towards new shopping centers, and favorable to small retailing. The law was not expressed properly in city-planning terms; it tried mainly to avoid the crushing of the small companies and the waste of commercial facilities. The attitude has been, since then, more and more restrictive. In Spain, during the eighties, the rapid expansion of the new large retailing centers coincided with the adoption of the restrictive model of French commercial urbanism by the Spanish administration, and in the Catalan community the traditional marketing defense has been very strict. The law of 1987 is, in many aspects, like

the French one. The city-planning policy in Barcelona, developed by the democratic city council from the beginning of the 1980s, did not formerly consider market halls, but established a set of guidelines that in the long-term will favor them. It envisaged the "reconstruction" of the consolidated city, and preferred to think of the city as neighborhoods rather than from a general plan. It vindicated public spaces and collective signs of identity, and proposed precise programmed actions, adapted to the existing morphologies and uses.

In 1990, a Special Plan of Food Retailing Facilities (Pla Especial d'Equipament Comercial Alimentari de la Ciutat de Barcelona, 1990) was approved by the City Council that emphasized, from the city-planning point of view, the importance of fostering traditional food retailing. The municipal markets were the fundamental polarities of proximity retailing, and the main tool to update the whole system The Special Plan concentrated its proposal on the renovation of the existing market network. In 1991 the Municipal Institute of Markets of Barcelona was created, with the mission to manage, administer and modernize municipal markets, "aiming to maintain their social, civic and cultural centrality" (See Figure 4). They have become another tool in the strategic administration that seeks to unify criteria of sustainability and social cohesion.

From that time, it has provided integrated management and promotion of the Barcelona market halls system, and has not only modernized and renovated the existing markets, but even built some new markets. In fact, markets are inseparable elements of the model of a Mediterranean city: compact, complex, efficient and with social cohesion, which is defended in the documents of the Ministry of the Environment (Libro Verde de Medio Ambiente Urbano, 2001). Barcelona has shown its effectiveness in the revitalization of commercial and social fabric of the consolidated city. Nevertheless, one important aspect of environmental potential has been forgotten, which it has been acquiring in recent decades.

Figure 3. Areas of Clientele of Local Municipal Markets according to data from 1983-84 by the PECAB. The three crowns mark the source of 25%, 50% and 75% of the clientele of each market. (Source: Pla especial d'equipament comercial alimentari de Barcelona, 1999)

In the United States, where the old systems of municipal markets could not withstand the rapid modernization of commercial formulas, some voices have defended, since the 1960s, farmers' markets as "totally functional anachronisms". Supermarkets were cheaper, but farmers' markets had been able to respond to consumers' desire of fresh products, of high quality and, if they had long been considered as inefficient anachronisms, the energy crisis of the seventies, and growing environmental awareness contributed convincing arguments in their favor. At the same time the emergence of New Urbanism during the 1980s, demanding a walkable mixed use neighborhood and a smart growth (Katz, 1994), has given a new

impulse to the development of the phenomenon of farmers markets as demonstrated by their growth from 1,755 in 1994 to 4,685 in 2008. Open air markets are present today in every country around the world and several arguments are adduced in their defense. In the less developed areas, they are the main source of retailing; in the industrialized world, they are an alternative form of retailing and in some areas they are the only source of fresh produce. They are also a useful help to small farmers, and work “as business incubators and survival safety nets for people on the lower economic rungs”. In the same Western countries in which market halls had progressively vanished, they have had the ever growing support of consumers, and their number has significantly increased in the last few decades. Although they carry little significant weight in quantitative terms, and we are still far from reversing the extraordinary expansion in the radius of exchanges, they are experiences that are headed in the right direction.

3 CONCLUSION

Retailing is a multiform and changing environment, increasingly segmented because consumption depends today more on desires and cultural choices, than on massive “necessities”. Markets tend to recover their traditional character of being an event: a completely different experience from the generic and controlled environment of shopping centers. Moreover, the survival of markets must be a strategic bet to increase diversity, to revitalize city centers, enliven the public space (Moore, 1965) and make the city more livable and sustainable. In the present phase, the experts predict a remarkable contraction of the great commercial centers that at the moment dominate the retailing trade. We can already see, in the United States and England, the phenomena of the “demalling” (Chiesi, 2006). In the United States of America, the time spent in malls has already fallen, and it is accepted that the new online trade, that can guarantee better prices, will cause a retailing concentration in a small number of giants (Harvard Design School, 2001). In addition, the consumption sphere will be filled more and more with ‘leisure’ and ‘experiences’; thus, traditional markets provide good assets (Kooijman, 2006). Face to face buying and selling, the different kinds of fresh, quality products, and the differences themselves between markets, can offer a wide range of experiences, richer and more authentic than other generic formats. If they are appropriately managed, they can revitalize city centers linking them with their own past and fitting, at the same time, new urban multicultural habits; two suitable features in a time of city planning `cultural turn' (Freestone, Gibson, 2006). They can be a planning tool within an urbanism that can adopt different adjectives (strategic, commercial, cultural and so on) but that as a general rule is today “less concerned with the disposition of more or less permanent objects, stable configurations or definite crystallization, and more interested in accommodating processes to adopt strategic guides”.

The experts on the future transformation of cities remark on the importance of the territory in the era of globalization. Markets, and more a system of public markets, “mark” the terrain inside the urban fabric as a space of sociability, security, identity, creativity, diversity and in the and as a mirror of the tendencies of the population as livable city needs.

After the neoliberal excesses and the failure of the market mechanism to address long-term problems, Amartya Sen proposes a return to the roots of economic thought starting with Adam Smith, because “the present economic crisis demands a new understanding of older ideas”. It also seems appropriate to return to the old ways of an organic economy and the law of proximity. In this regard, one of the highlights of farmers' markets lies in their close connection to the farms near to the city and the possibility of returning to less predatory economic forms. It is an option that would provide more local responses, more sustainable habits and a greater "diversity".

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🏆 *reviewed paper*

Räumliche Risikovorsorge zur Beherrschung der Risiken von Störfällen technischer Anlagen

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1 ABSTRACT

Der raumbezogene Umgang mit Risiken, die sich aus dem Bau bzw. dem Betrieb technischer Anlagen ergeben, ist bislang ein wenig beachteter Bereich in der Raumplanung. Insbesondere jene Gefahren, die sich aus einem unvorhersehbaren Störfall für die Umwelt ergeben, stehen im Bereich der räumlichen Risikovorsorge im Mittelpunkt.

In diesem Zusammenhang gilt der Regelungsbereich der Richtlinie 96/82/EG - SevesoII- Richtlinie – als weitergehender, raumbezogener Ansatz, Risiken für bestimmte Nutzungen durch eine geordnete räumliche Entwicklung beherrschbar zu machen. Die etwa in verdichteten Ballungs- und Ag-glomerationsräumen sowie in Metropolen planerisch unvermeidbare bzw. historisch gewachsene Nachbarschaft von Industrie sowie Gewerbe und einwirkungssensiblen Nutzungen, wie etwa dem Wohnen, stellt unter Gesichtspunkten des Risikomanagements besondere Anforderungen an ein geordnetes Land-Use-Planning, welches sich im Kern auf bestimmte Regelungen zu Abständen und Passivschutz konzentriert.

Als Teil der Umsetzung eines möglichst umfassenden Risikomanagements steht ein langfristig angelegtes, gesteuertes und geordnetes Standortmanagement, das sowohl die Flächen- als auch der Nutzungsplanung im Betriebs- und im Siedlungsbereich im Sinne einer planerischen Risikovorsorge beachtet, im Zentrum der Betrachtung.

2 EINFÜHRUNG

Neben vielen anderen Faktoren ist ein angemessener Schutz der Bevölkerung und der Umwelt vor Katastrophen- und Unfallrisiken ein – wenn auch bislang nur teilweise wahrgenommener – zentraler Bestandteil gesunder Wohn- und Arbeitsverhältnisse im Siedlungsraum. Grundsätzlich ist das Management natürlicher und technischer Risiken im Raum aus Sicht der Raumplanung eine Aufgabe, die nicht risikoquellen- bzw. anlagenorientiert ausgerichtet ist, sondern eine holistische, die Gesamtqualität des betrachteten Raums berück-sichtigende Herangehensweise voraussetzt. Sie bezieht sich somit nicht auf die punktuelle Bewältigung von Einzelkonflikten, sondern ist Ausdruck des Vor-sorge- und Kooperationsprinzips unter Berücksichtigung und Abwägung der relevanten öffentlichen und privaten Belange in transparenten, rechtsstaatlichen Verfahren. Während der Handlungsspielraum der Raumplanung bei natürlichen Risiken – zum Beispiel Hochwasser-, Erdbeben- oder Hangrutschungsgefahren – eher gering ist (am Risiko selbst und seiner räumlichen Ausprägung kann nichts verändert werden; es geht letztlich „nur“ darum, empfindliche Nutzungen in Gefährdungsbereichen zu vermeiden), ist sie bei Risiken technischer Anlagen in einer Doppelfunktion. Sie ist über Raumordnung und Bauleitplanugn nämlich gleichermaßen für die bedarfsgerechte Versorgung mit Standorten für risikointensive Nutzung als auch für den Schutz und die Entwicklungsperspektiven empfindlicher Nutzungen verantwortlich.

Die Raumplanung nimmt damit wesentlichen Einfluss auf eine systematische Ordnung und Sicherung zukünftiger räumlicher Entwicklungen und somit auch auf eine diesem Gedanken entsprechende umweltbezogene Planung des Raums und seiner Komponenten. Im Zentrum steht dabei sicherlich die Beachtung der Dimensionen der Nachhaltigkeit, die es gilt, in einen intermediären Ausgleich hinsichtlich ihrer raumrelevanten, bodenbezogenen Ansprüche und Wünsche zu stellen.

3 AUSGANGSLAGE

Entscheidungen zur Bodennutzung und städtebaulich-räumlichen Entwicklung sind in aller Regel ambivalent: Einerseits werden im positiven Sinne nach einer planerischen Logik und Ägide bestimmte Aktivitäten vorbereitet und zur Umsetzung gebracht, die notwendig und erwünscht sind, da sie zum Anstoß, zur Sicherung oder Fortentwicklung einer bestimmten Nutzung oder Funktion im Raum dienen. Andererseits können dadurch bestehende Zusammenhänge gestört und benachbarte Räume in ihrer zukünftigen Entwicklung beschränkt werden. In diesem Sinne werden raumrelevante Konflikte geschaffen, wenn verschiedene Nutzungsinteressen sich verorten lassen, sich überlagern oder überschneiden und hieraus

Spannungen aufgebaut werden, die in eine inhaltliche Divergenz münden. Dies trifft insbesondere auf Interessensüberlagerungen zu, die in eine raum- und flächennutzungsbezogene Konkurrenz münden oder auf Konflikte aus räumlichen Nachbarschaften unverträglicher Nutzungen hinauslaufen.

Ausgangspunkt und grundlegende Zielsetzung für die räumliche Risikovorsorge ist also die Minimierung von Gefahren für die Allgemeinheit oder die Nachbarschaft, also die integrierte Betrachtung im Hinblick auf die Schutzobjekte und Schutzmaßnahmen unter dem Gesichtspunkt der (möglichen) negativen Auswirkungen – dies unter möglichst weitgehender Wahrung der mit risikorelevanten Aktivitäten verbundenen Chancen.

Ein Schlüsselbegriff ist dabei die Nachbarschaft. Nachbarschaftssituationen sind auf Grund ihrer räumlichen Lage und Verbindung sowie ihrer raumbezogenen Verschneidung von besonderer Bedeutung, wenn Nutzungen selber oder im Zusammenhang mit ihrer Umgebung eine Gefährdung darstellen und so ein Schutzregime auslösen. Dabei treten bei technischen Anlagen Risiken in Art und Umfang auf, die - anders als im Bereich der Naturgefahren - bekannt und belegbar sind, jedoch auf Grund der Häufigkeit ihres Auftretens oder des damit in Verbindung stehenden erzielbaren Nutzens oftmals differenziert eingeschätzt werden und somit auch einer individuellen Bewertung unterliegen.

Der Umgriff dieser Bewertung unterliegt dem Regelungs- und Einflusskreis des Bewertenden und der Vulnerabilität hinsichtlich Schadenspotenzial und Resilienz des Risikoobjekts selbst, so dass etwa zwischen privatem und öffentlichem Interesse unterschieden werden kann. Dabei spielt eine differenzierte Betrachtung der Beteiligten eine große Rolle, da es sich um eine Aus- und Einwirkungsseite hinsichtlich der Risikobeherrschung handelt und dementsprechend Maßnahmen realisiert, installiert und abgestimmt werden müssen.

In diesem Zusammenhang steht die Beherrschung von Risiken in Nachbarschaften ergeben, die durch technische Gefahren aus der Errichtung und dem Betrieb bestimmter Nutzungen herrühren und zu einer einseitigen Belastung führen.

Historische Entwicklung

Siedlungsstrukturbezogenen Nachbarschaften sind, insbesondere in (hoch)verdichteten Räumen, mit unvermeidlichen Belastungssituationen verbunden. Diese können oftmals einem Entwicklungsprozess zugerechnet werden, der die beschriebene Konstellationsverschärfung als ein Spiegelbild technischer Weiterentwicklung und der Siedlungstätigkeit darstellt. Dabei nahm der Störgrad, also das Ausmaß einer potenziellen oder realen negativen Einflussnahme auf die Umgebung, hinsichtlich des qualitativen und quantitativen Ausmaßes mit der Ausweitung und Intensivierung der Mechanisierung und Technisierung deutlich zu. Zu Belastungen führende oder unterstützende Nachbarschaften sind historisch belegt und in ihrem Auftreten unstrittig. Diese resultierten aus einer gewollten, da sinnvollen oder erzwungenen, da notwendigen, Nähe unterschiedlicher Nutzungen in einem dichten Geflecht. Dabei wurden die Überlagerungen verschiedener Funktionen in einem gewachsenen System bewahrt, so dass sich siedlungsstrukturell charakteristische Muster ausbilden konnten, die in tradierter Form weiter entwickelt wurden. Schutz und Vorsorgemaßnahmen wurden in der vorindustriellen Entwicklungsphase der Städte in dem Maße beachtet, dass sich die Risiken aus den offensichtlichen oder vermeintlichen Gefahren beherrschen ließen [1] (vgl. Jonas 2006).

Die einsetzende und später immer stärker wirkende Industrialisierung überformte die Stadtstrukturen dort, wo Gewerbe- und Industriestandorte angelegt wurden und der Bedarf an verfügbaren Beschäftigten nicht nur personell sondern auch räumlich- strukturell gelöst werden musste. Der durch private und staatliche Interessen geförderte konsequente Auf- und Ausbau von Standorten wurde in bestehenden – im Gefahrenbezug- vorbelasteten Strukturen realisiert, so dass Belastungssituationen in quantitativer und qualitativer Hinsicht verschärft wurden. Zum Einen bedeutete dies eine Zusammenlegung und damit risikorelevante Nähe von Wohn- und Arbeitsorten. Zum Anderen wurde durch die Flächenverwendung selbst sowie durch den intensiven Technikeinsatz nicht nur die Rauminanspruchnahme erhöht und sondern zusätzlich durch den direkten Raumbezug eine Gefährdungssituation geschaffen bzw. verschärft, die sich in Risiken aus dem Bau bzw. dem Betrieb bestimmter technischer Anlagen und anderen Nutzungen ausdrückte.

Auf dieser Grundlage mündeten unterschiedliche sozial- und realutopische Vorstellungen in städtebauliche Konzepte von Saltaire oder Welwyn und versuchten, Missstände - zunehmend als Gefahren begriffene Zustände in betrieblicher, baulicher oder sozialer Hinsicht - zu bewältigen und eine Basis für ein geordnetes

Zusammenleben zu schaffen. Die Reduzierung und weitgehende Ausschaltung von Risiken aus dem räumlichen Zusammenspiel unterschiedlicher Nutzungen und damit verschiedner Werthaltungen wurde durch eine ebenso konsequente räumliche Trennung herbeigeführt, die die technischen Risiken nicht auflöste, sie jedoch aus dem direkten Risikoobjektbezug löste und somit Spannungen aus diesem Verhältnis nehmen konnte. Scheitelpunkt dieser Haltung und bestimmend für die weitere Entwicklung war der Einfluss der Charta von Athen, die 1933 auf der 4. Tagung des Congrès Internationaux d´Architecture Moderne (CIAM) formuliert wurde und auch dazu beitrug, die rigide Trennung der Funktionen in den Städten der Nachkriegszeit durchzusetzen [2] (vgl. Jonas 2006).

Inhaltlich sollten mit Aufstellung der Charta städtebauliche Missstände erkannt und beseitigt werden. Sachbezogen wurde durch die Funktionstrennung eine Einfassung technischer Gefahren im Sinne einer umfeldbezogenen Risikobeherrschung realisiert, da die städtischen Grundfunktionen Wohnen, Arbeiten, Erholung und Fortbewegung getrennt wurden. Die Bedeutung der hier formulierten Leitsätze wird einerseits durch die Gestaltung und Schwerpunktsetzung der stadtplanerischen Leitbilder der Nachkriegszeit und andererseits etwa durch die Einwirkung auf den Regelungscharakter und –umfang des bundesdeutschen Bauplanungsrechts deutlich. Dessen Grundsatz- und Zielhorizont entspricht der angestrebten Funktionstrennung ebenso wie dem allseitigen Schutz- und Vorsorgeprinzip, das jedem hoheitsstaatlichen Handeln zu Grunde gelegt werden muss. Die vorausschauende, planungsbezogene Beachtung und Bewältigung von vorliegenden oder erwarteten Konflikten wird somit in einem normierten Verfahren geregelt und zur Lösung gebracht.

4 RÄUMLICHE RISIKOVORSORGE IM RAHMEN NACHHALTIGER STADTENTWICKLUNG

Die Weiterentwicklung der Leitbilder in der Stadtplanung und die Überformung bestehender Strukturen und Konzepte durch wechselnde gesellschaftliche, politische oder wirtschaftliche Rahmenbedingungen führten in diesem Zusammenhang zu einer Abkehr von strikten Trennungsparadigmen und somit zu räumlichen Entitäten von Nutzungen. Die Beachtung des Nachhaltigkeitsgedankens in der Planung führt unweigerlich zu einer räumlichen Zusammenführung von Funktionen und Nutzungen und somit zu einer Zusammenlegung von Gefährdungs- bzw. Risikoobjekten. Aufgesetzte planerische Strategien und Konzepte, die Realisierung der Innen- vor Außenentwicklungen im Siedlungsbereich oder die Verkürzung von Wegstrecken entsprechen einerseits dem bewussten Umgang mit begrenzten natürlichen Ressourcen. Andererseits werden hierin auch potenzielle oder faktische Gefahrenpunkte neu geschaffen bzw. bestehende intensiviert.

Hierbei kann von planungsbezogenen Grundkonstellationen im Flächenbezug ausgegangen werden, die im Folgenden in einem Auszug dargestellt werden sollen (vgl. Abb. 1).

Im Wesentlichen werden dabei die Ausgangslagen durch bestehende, hinzutretende oder sich verändernde Nutzungen und die damit verbundenen Auswirkungen auf die Umgebung variiert. Vorgabe und Rahmensetzung ist dabei die Risikorelevanz einer Nutzung für die benachbarte und somit die Notwendigkeit zum vorsorgenden Umgang. Die vorgestellten Varianten entsprechen Grundformen von Nachbarschaften zwischen den Nutzungen, die Basisbetrachtungsmodelle liefern. Diese Beispiele sind in dieser eindeutig zu klassifizierenden Form selten und sind daher als Diskussionsbasis und Ausgangsplattform anzusehen. Nicht betrachtet werden in diesem Fall technische Lösungen zur Beherrschung von Unsicherheiten oder Risiken, da diese im vorliegenden Zusammenhang eine lediglich untergeordnete Rolle spielen und keine planungsbezogene Auswirkung aufzeigen. Es lassen sich grundsätzlich unterscheiden:

Ausweisung eines neuen Gewerbe- oder Industriegebiets in Abhängigkeit des erforderlichen Abstands zu einem schutzwürdigen Siedlungsbestand

- 1.Ausweisung eines neuen Wohngebiets oder einer sonstigen empfindlichen Nutzung in Abhängigkeit eines erforderlichen Abstands zu einem risikorelevanten Siedlungsbestand
- 2.Siedlungsentwicklungen auf Abstandsflächen zwischen schutzwürdigem und risikorelevantem Siedlungsbestand
- 3.Veränderungen durch
    - a.Erweiterung oder Verkleinerung der Fläche des Siedlungsbestands
    - b.Umstrukturierung und Neuorganisation innerhalb der bestehenden Nutzung

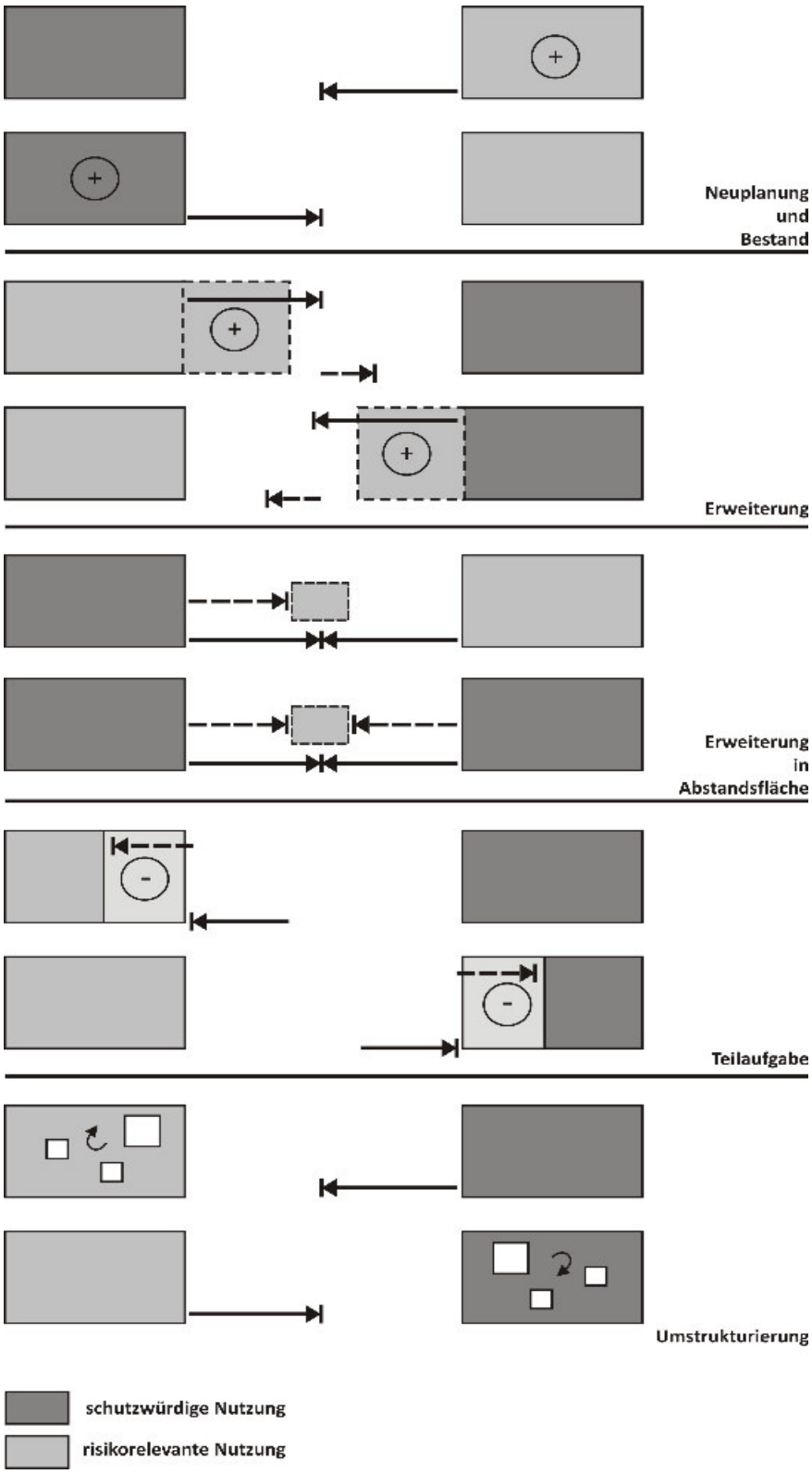

Abbildung 1: Grundkonstellationen

Die aufgelegten Beispiele dienen der Verdeutlichung der Ausgangslage und der individuellen Haltung der betroffenen Nutzungen bzw. deren Anforderungen im Sinne einer Neuausweisung oder Veränderung. Dabei sind die risikorelevanten Ansprüche an eine Beachtung und unbedingte Einhaltung eines Abstands in diesem Sinne als Mindestanforderung zur Sicherung bestehender und zukünftiger Nutzungen und somit auch als fortgeschriebene Entwicklungsmöglichkeit zu verstehen und einzusetzen. In dem Zusammenhang ist die räumliche Risikovorsorge zur Beherrschung der Risiken von Störfallen technischer Anlagen ein vorausschauender Ansatz, um frühzeitig Konfliktpotenziale zu erkennen zu beseitigen oder sie zu reduzieren bzw. zu verlagern.

5 DIE SEVESO-II-RICHTLINIE UND IHRE ROLLE IN DER RÄUMLICHEN RISIKOVORSORGE

Die im Dezember 1996 neu gefasste Richtlinie 96/82/EG (Seveso II-Richtlinie) dient der Beherrschung von Gefahren bei schweren Unfällen mit gefährlichen Stoffen. Diese mit der Störfallverordnung (12. BImSchV) vom April 2000 in deutsches Recht umgesetzte Richtlinie regelt insbesondere die Pflichten von Betreibern besonders gefahrenrelevanter Industrieanlagen.

Ziel der Richtlinie ist die Verhütung schwerer Unfälle mit gefährlichen Stoffen und die Begrenzung der Unfallfolgen für Mensch und Umwelt, um auf abgestimmte und wirksame Weise in der ganzen EU ein hohes Schutzniveau zu gewährleisten (Art. 1 der RL). Neben den auf den Anlagenbetrieb bezogenen fachrechtlichen Regelungen ist mit Art. 12 auch eine Regelung für die Raumplanung (in der Richtlinie sehr unglücklich mit „Politiken der Flächenausweisung und Flächennutzung“ übersetzt) enthalten. Diese Regelung richtet sich auf die Neuplanung und wesentliche Änderung relevanter Betriebe sowie auf die Siedlungs- und Infrastrukturentwicklung im Umfeld solcher Betriebe und hat das Ziel, in Planungssituationen eine Zunahme der Gefährdung der Bevölkerung durch Abstände und (bei Bestandsanlagen) auch durch technische Maßnahmen zu vermeiden.

Die Seveso II- Richtlinie beinhaltet somit auch die Anordnung von Nutzungen in der Nachbarschaft gefährlicher Industrieanlagen, so dass die Folgen eines schweren Unfalls keine zusätzlichen Risiken eröffnen. In erster Linie betrifft dies den Schutz des Menschen. Dabei ist die Richtlinie in Abschnitte unterteilt, die zunächst Eingriffsmöglichkeiten im Betriebsbereich und in den technischen Regelungsmöglichkeiten betreffen und sowohl für bestehende als auch neu zu errichtende Anlagen gelten

Art. 12 der Seveso-2-Richtlinie enthält neben einer allgemeinen, gestaltungsfähigen Berücksichtigungspflicht die konkrete Zielvorgabe, dafür zu sorgen, dass in der Raumplanung ein angemessener Abstand zwischen störfallrelevanten Betrieben und konkret benannten schutzwürdigen Gebieten und Raumnutzungen gewahrt bleibt, damit es nicht zu einer Zunahme der Gefährdung der Bevölkerung kommt (=Verbot der Risikoerhöhung).

Dieser konkret vorgegebenen Zielformulierung steht der Mangel an operablen quantitativen Zielfestlegungen gegenüber. Die Umsetzung des formulierten Ziels erfordert dem Grunde nach einerseits eine quantitative Festlegung oder zumindest terminologische Konkretisierung des Begriffs „angemessener Abstand“ (deterministischer Ansatz) und andererseits eine methodische Vorgabe zur quantitativen Bestimmung des raum- und Bevölkerungsbezogenen Störfallrisikos in den Dimensionen „Eintrittswahrscheinlichkeit“ und „Ausmaß der Betroffenheit“ (probabilistischer Ansatz).

In direktem planerischen Bezug stellen sich die Regelungen zu Art. 12 Seveso II- Richtlinie dar, da hier Vorgaben für die „Überwachung der Ansiedlung“ getroffen werden, so dass insbesondere die Folgen schwerer Unfälle gefährlicher Anlagen begrenzt werden. Es geht dabei in erster Linie um die Vereinbarkeit der Planung bestimmter Betriebe mit benachbarten Nutzungen. Diesem Ziel entsprechend sollen die Mitgliedsstaaten in ihren Politiken der Flächenausweisung oder Flächennutzung sowie in anderen einschlägigen Politiken Rechnung tragen und Methoden und Kriterien entwickeln, um zwischen den unter die Richtlinie fallenden

Betrieben einerseits und von Menschen genutzten Bereichen und schützendwerten Gebieten andererseits einen angemessenen Abstand zu wahren. [3] (vgl. Berkemann 2009).

Nach Art 12 Abs.1 Seveso II- Richtlinie fallen unter diese Regelung

- die Ansiedlung neuer Betriebe,
- die Änderung bestehender Betriebe sowie
- die Berücksichtigung neuer Entwicklungen in der Nachbarschaft.

Zu dieser Nachbarschaft werden

- Wohngebiete,
- öffentlich genutzte Gebäude und Gebiete,
- wichtige Verkehrswege,

- Freizeitgebiete und
- für den Naturschutz besonders wertvolle bzw. empfindliche Gebiete [4] (Art 12 Abs 1 Richtlinie 96/82/EG).

Dabei setzt sich die in der Richtlinie verwendete Bezeichnung „Land Use Planning“ über den instrumentellen Bedeutungsgehalt der Flächennutzungsplanung, deren Eigenschaften auf dem immanenten Verfahrensbezug und somit in einer Normsetzung resultieren, weiter fort. Die inhaltliche Komponente betrifft insbesondere den zukunftsbezogenen, integrierenden und vor Allem strategischen Ansatz einer Gesamtplanung, die unter den Bedingungen des Optimierungsgebots, des Trennungsgrundsatzes und der gegenseitigen Rücksichtnahme in diesem Sinne Standortplanung durch Flächenvorsorge betreibt.

Konkret bedeut dies, dass im Rahmen der Bauleitplanung, z. B. der Erstellung bzw. Änderung von Flächennutzungs- oder Bebauungsplänen eine Nachbarschaftssituation zu Störfallbetrieben und ggf. die Einhaltung eines angemessenen Abstands zu prüfen ist. Allerdings gilt das Gebot eines angemessenen Abstands nur für neue Vorhaben. Artikel 12 kann nicht rückwirkend angewandt werden und bestehende Nachbarschaften genießen Bestandsschutz. Hierbei fallen besonders gewachsene Gemengelagen ins Gewicht.

Die nationale Umsetzung des Artikels 12 der Seveso II-Richtlinie ist mit der Änderung des § 50 des Bundes-Immissionsschutzgesetzes im Oktober 1998 erfolgt. Als Beurteilungshilfe hat die Störfall-Kommission/ Technischer Ausschuss für Anlagensicherheit den Leitfaden SFK/ TAA- GS- 1 [5] herausgegeben. Der Leitfaden definiert Achtungsabstände, die Planungszonen darstellen. Die Achtungsgrenzen basieren auf Konventionen und berücksichtigen nicht transportbedingte Risiken, „Nicht-Störfallstoffe“, „Worst- Case-Störfälle“ für die Katastrophenschutzplanung und weiteren zukünftigen Entwicklungen. Die Achtungsabstände basieren auf den so. „Dennoch- Störfällen“ und entsprechen somit der probabilistischen Risikobewertung. Unterschieden werden im Leitfaden die Bauleitplanung mit Detailkenntnissen und die Bauleitplanung ohne Detailkenntnisse.

Dabei hat die Bauleitplanung im Sinne der räumlichen Risikovorsorge und in der Beherrschung technischer Störfälle als strategischer Bewältigungsansatz möglicher Gefahren aus Unfällen Handlungsmöglichkeiten, um vorlaufende Schutzregime zu installieren und zu pflegen. Diese basieren grundsätzlich auf der gestuften, zweiteiligen Strukturgebung gemeindlicher Bauleitplanung, deren Verbindungen zu übergemeindlichen Planungsvorgaben und der damit einher gehenden außer- und innerstrukturellen Subsidiarität und Abschichtung sowie zunehmende Konkretisierung.

Dies trifft insbesondere die Optionen in der konkreten Standortvorsorge auf Ebene des Flächennutzungsplans, das sich auf eine Standortsicherung und -entwicklung konzentrieren lässt. Gerade durch den dimensionsbedingten Charakter auf dieser Planungsebene, der eine zusammenfassende, das gesamte Gemeindegebiet umfassende Darstellung - und in diesem Sinne auch eine entsprechende Haltung – einnimmt. Hier können räumliche Zuordnungen von flächenbezogenen Nutzungen zueinander relativ und in individueller Weise absolut verortet und daraus Konfliktzonen- bzw. risikorelevante Bereiche eruiert werden. Diese inhaltliche Komponente wird durch die instrumentelle Anwendbarkeit der Flächennutzungsplanung in ihrem Rechtsbezug und dessen Auswirkungen auf die kommunale Planung unterstützt.

Die inhaltliche Ausdifferenzierung durch formelle Festsetzungen des Bebauungsplans entspricht in diesem Kontext der Risikobeherrschung. Die räumliche Risikovorsorge kann hier durch die Rechtsanwendung unzweifelhaft umgesetzt werden und erhält somit einen Gültigkeitsstatus, dessen Legitimation sich auf die langfristige Sicherung und Entwicklung bodenbezogene Nutzbarkeit für Siedlungszwecke auswirkt. Dabei werden durch die Optionen des Bebauungsplans zwei Gestaltungsrichtungen bestimmt: Zum Einen zielen diese insbesondere auf die Bestimmungen zu Art und Maß baulicher Nutzungen innerhalb der Betriebsgelände, zum Anderen auf die Festsetzungsmöglichkeiten in der Nachbarschaft von Betrieben ab. Die Steuerungsmöglichkeiten des §9 BauGB zur Bestimmung des Charakters der Baugebiete i.V.m. dem systembedingten Typenzwang und gerade auch den Gliederungsoptionen des §1 Abs 4 Nr. 1 und 2 BauNVO sowie die Anwendungen der Störgradsystematik gemäß §§5 ff. BauNVO sind in dieser Hinsicht weitreichend und durch eine vorlaufende Flächennutzungsplanung zwingend anwendbar und sinnvoll nutzbar.

Als Grundlage dient die Erstellung belastbarer Szenarien und Konzepte auf unternehmerischer und kommunaler Seite. Dazu zählt auf Ersterer die Bearbeitung der flächenrelevanten Fragestellung der mittel- und langfristigen Entwicklung der räumlichen und betrieblichen Struktur unter den jeweiligen Bedingungen realistischen Annahmen. Dies betrifft sowohl den Umfang und die Art der Entwicklung, den Zeithorizont und die faktisch bzw. potenziell dafür zur Verfügung stehenden Ressourcen. Konflikte oder Spannungspotenziale sind so aus Eigeninteresse bereits zu diesem Zeitpunkt vorab zu erkennen bzw. auszuschließen.

Auf kommunaler Seite steht in erster Linie die Beachtung der Gemeinwohlinteressen im Vordergrund. Daher erhält unter den vorhergehend beschriebenen gewachsenen Siedlungsstrukturen und den damit oftmals entstandenen Gemengelagen die Einhaltung von Achtungsabständen unter diesen Bedingungen eine besondere Bedeutung, da diese nicht nur hinsichtlich ihrer Wirksamkeit bestimmt werden müssen sondern im selben Maße auch eine Deckungsgleichheit zwischen Trennungsanspruch und faktischer Möglichkeit erzielt werden muss, was auf Grund vorausgegangener Entwicklungsprämissen teilweise schwer umsetzbar ist. Sind Konfliktbereiche abgegrenzt, müssen Strategien und Konzepte zu deren Lösung gefunden und maßnahmenbezogen umgesetzt werden. Diese konzeptionelle Umsetzung betrifft sowohl die zukünftige Siedlungstätigkeit unter der Einhaltung bestehender Achtungsabstände und der Umsetzung bestimmter Optimierungsziele als auch den Einbezug betrieblicher Entwicklungsvorstellungen im Rahmen eigenständiger Konzepte und Vorüberlegungen, die in beiderseitigem Interesse zu einem frühen Stadium mit in die risikobezogene Grundüberlegung weiterer Entwicklungen mit einbezogen werden sollten.

Darüber hinaus gehend sind diejenigen planerischen Konzepte und Strategien unter räumlicher Risikovorsorge mit in die Überlegungen aufzunehmen, die mittelbar auf die Beachtung und Umsetzung der räumlichen Trennung der schutzbedürftigen von risikorelevanten Siedlungsflächen und deren Nutzungen abzielen. Diese stehen in programmatischem Zusammenhang mit planerischen Ansätzen der Bewältigung inhaltlich bzw. sachbezogen anderer Fragestellungen und Herausforderungen. Dazu zählen Konzepte zur Bewältigung des wirtschaftlichen und sozialen Strukturwandels, dem Boden- und Umweltschutz oder dem Umgang mit dem räumlich stark heterogen ausgebildeten demographischen Wandel und den hierin transportierten Herausforderungen an die Stadtplanung. Das hier genannte Aufgabenspektrum kann aus seiner thematischen Fragestellung heraus die Bewältigung bzw. den Umgang mit räumlicher Risikovorsorge nicht leisten, jedoch als Beitrag langfristiger Entwicklungsvorstellungen unterstützen. Dies führt im Weiteren zu einer Etablierung risi-korelevanter Aspekte als Teil planerischer Überlegungen und darüber hinaus auch zu einer Qualifizierung und somit zu einem Ausbau raumbezogener Risikovorsorge bei technischen Gefahren.

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🏆 *reviewed paper*

Simulation and Visualization of the Behavior of Handicapped People in Virtually Reconstructed Public Buildings

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1 ABSTRACT

The planning of public transport infrastructures today must respect the needs of a wide variety of travelers. In particular the design of guiding systems needs to take the reduced reception capabilities of the elderly and handicapped people into account.
Therefore tools for the evaluation of guiding systems need to be developed. Such tools must be based on empirical knowledge on the perception capabilities of the various user groups as well as detailed microscopic pedestrian movement models in order to represent typical paths taken. We model the cognition of guiding systems to enable a realistic representation for the motion and orientation behavior of elderly and handicapped people having difficulties perceiving the guidance information and not being familiar with a building.

To demonstrate the feasibility of the approach we discuss a technique to virtually reconstruct public buildings in 3D and visualize the simulated crowd with detailed models for each individual. The lines of sight of selected, handicapped persons, who are moving amongst other persons, are also shown in order to evaluate the visibility of the guiding information in the infrastructure and to hint at possible improvements.

2 INTRODUCTION

Over the last few years, many advances have been made in the field of pedestrian simulation modelling. For a recent review see Bierlaire and Robin (2010). Many pedestrian simulation models have been developed and applied in a variety of disciplines like computer graphics for games and movies, robotics and evacuation dynamics (Thalmann and Musse, 2007). Most of these pedestrian models try to address evacuation scenarios of buildings or ships in case of emergency and look also at capacity issues at bottlenecks such as transport infrastructures.

The motivation to model pedestrians comes from the fact that scenarios at large infrastructures are too complex to be estimated dircetly using conventional methods. In such scenarios pedestrian simulations provide a tool to investigate the characteristics of an infrastructure with respect to bottlenecks reducing the safety and convenience of passengers. Based on the simulations possibilities for improvements can be obtained.

In addition, there is a shift towards providing greater pedestrian priority and safety at junctions, interchanges and town centres. Thus, simulation tools are not only used to evaluate designs for pedestrians in evacuation conditions but also in normal conditions. This leads to the demand to understand pedestrian psychology and model pedestrian behavior accurately at public transport infrastructures.

Currently, there are several commercial tools available that can simulate the flows of people on a microscopic level where every pedestrian is modeled explicitly (e.g. Exodus, Aseri. Legion, PedGo, Simwalk, the pedestrian module of VISSIM, to mention just a few). All these tools have in common that they represent the mobility needs of elderly and handicapped people inadequately. Usually these groups are simply represented only by lower maximum speed and larger space requirement in the simulation.

Especially in restricted areas like stairs, narrow passages, however, these groups can lead to significant traffic jams that strongly affect the overall efficiency of the various designs. Such problems can not be explained by lower average speed alone. Elderly and handicapped people also require different routes depending on their physical constitution and mobility impairment. For some people an elevator represents the only alternative to change levels. At the first visit of an infrastructure finding the elevator can become a challenging task. These problems are amplified for people having additionally reduced reception capabilities.

These individuals need much longer for their orientation, and potentially temporarily block passage for the others, if the design of the infrastructure does not support their needs sufficiently.

Consequently currently there is much research effort put into enhancing existing simulation models by including models for the motion and orientation behavior of mobility impaired passenger groups like individuals with prams, wheelchair users, individuals with sensory impediments and people being unfamiliar with the infrastructure.

The main challenge in this respect is the realistic adaption of existing models by adequatly representing and measuring group specific behavior. The main component here is the modelling of the cognition of guidance systems, as well as the interplay with the orientation- and navigation behavior. Such models necessarily contain two parts. First, the cognition of the visual guiding system (mainly signage) depends on the visibility of the signs which depends on the placement within the infrastructure as well as on the current situation as the line of sight might be blocked by other pedestrians. Secondly the reaction of the individuals to the guiding system need to be represented inside the model. This includes the mechanics involved in the dynamic building of a mental map for previously unknown infrastructures on the first walk-through. First approaches in this respect are discussed in Teknomo and Millonig (2007) Modelling needs to be supported by substantial amounts of real world data which are collected in controlled experiments and real scenarios.

By accurately calibrating the models via comprehensive real data, a valid forecast of passenger flows and hence an improved basis for decision-making in terms of planning and adapting traffic infrastructures will be achieved.

This paper discusses first steps of this research agenda while putting these results in the broader perspective outlined above. To this end we first review different approaches which are related to our concepts in the next section. In section 4 we discuss the virtual reconstruction of public buildings based on photogrammetric methods in combination with various maps of the considered infrastructure. Afterwards the models for group specific behavior of pedestrians is described. In section 5 the visualization of the crowd is described which provides as an output for each person the currently visible sections.

3 RELATED WORK

This work extends the work documented in Braendle et al. (2009). In that paper the focus was laid on the virtual reconstruction of an infrastructure while not much attention was paid to the guiding system. In particular the visibility maps derived there did not take occlusions due to the surrounding passengers into account. In particular for handicapped persons sitting in wheelchairs this clearly is inadequate in the context of this paper.

Somewhat surprisingly the topic of this paper has not attracted much research. To the best of our knowledge the only comparable study consists in Harikae (1999) where the visualization of a barrier free environment is discussed. One reason for this might be found in the fact that microscopic pedestrian movement models only recently have reached a sufficient state of maturity to allow the inclusion of 3D visibility information.

Recent advances in computational technologies have led to the development of applicaction-specific simulation models focusing on different aspects of the collective behavior, using different modeling techniques. It can be distinguished roughly between two broad areas of crowd simulations. The first area is high-quality visualization for movie productions or games, where usually the realism of the behavior model is not the priority (for a survey see Thalmann and Musse, 2007). These applications aim at a convincing visual result.

The second group focuses on realism of behavioral aspects with usually simple 2D visualization like evacuation or crowd dynnamic simulations. In this area, the behavior represented in the simulations is usually restricted to a narrow range with efforts to quantitatively validate the fit of results to real-world observations of particular situations (Thompson and Marchant, 1995). Visualization is used to help understanding simulation results, but it is not crucial and in most cases a schematic representation with colored dots is used. Some applications for building design purposes need large crowds to measure both the overall flow rate in different parts of the environment and percentage of people that can leave the environement in a given amount of time.

Techniques employed in both areas range from macroscopic models that do not distinguish individuals (such as the models implemented in Pedflow, Space Syntax methods, Pedroute), mesoscopic models using cellular automata (such as STEPS, PedGo) to microscopic models using agent based modelling (such as Legion, the pedestrian module of VISSIM and CAST). Agent based microscopic modelling is an approach for simulating pedestrians as single individuals by supplying a detailed representation of their behavior, including decisions on various levels (e.g. related to orientation and navigation) and interactions with other pedestrians in the crowd. The goal is to reproduce realistic autonomous behavior. A comprehensive survey of serveral systems and approaches that have been developed for animation and evacuation dynamic purposes can be found in Pelechano et al. (2008).

Most currently available simulation models are based on the assumption that all pedestrians know the infrastructure perfectly and consequently all pedestrians choose the shortest path to reach their goal. Another simplification is made by representing of the group specific behavior using only by varying maximum speed and space requirements according to the characteristics of the considered group. There are several phenomena and types of pedestrian behavior that have a major influence on the overall performance of an transport infrastructure but cannot be reproduced under these simplifications.

The probably predominant modelling approach for microscopic models is the so called social force paradigm. Compared to other models it has been found to describe pedestrian behavior more realistically (see e.g. Bauer, 2010). The most prominant social force model is Helbing's model (Helbing and Molnar, 1995). This model has been calibrated and accordingly adapted using real world data (see Johansson and Helbing, 2008). The social force model was also extended by Musse to include individualism (Braun et al., 2003). Pelechano et al. (2007) merged rule-based and social-force based models and incorporated psychological state into the pedetrian simulation model. Shao et al. (2007) used a complex cognitive and behavior model for planning, but did not attempt realistic small-scale motion behavior like the social force model.

Not every pedestrian is familiar with the infrastructure and for realistic simulation the wayfinding has to be represented in the model. Wayfinding abilities are influenced by a number of physical, psychological, and physiological factors that will influence the ability of people to detect and correctly interpret the information conveyed by the signs. Xie et al. (2007) has demonstrated theoretically and through experimental trials that the maximum viewing distance is dependent on the viewing angle and that as the viewing angle increases, the maximum viewing distance decreases in a nonlinear manner. These findings have been implemented in a comprehensive evacuation model. They have been shown to be sensitive to the complexity of the geometry and the scenario modelled. While the overall differences in the key evacuation indicators like average total evacuation time and average personal evacuation time resulting from the introduction of the new developments showed to be small, it is nevertheless essential to correctly represent these subtleties, if the model is to correctly represent reality.

In an evacuation scenario people in the crowd have the same goal of sharing their knowledge to find the fastest way out of the building. Contrary to that in a normal crowd scenario each person has its own goals, decisions and routes and typically does not share her information. This implies that autonomous wayfinding and in particular individual differences in wayfinding capabilities need to be carefully modelled. Wayfinding is supported by signage in the infrastructure. However, to use guidance information people must a) be able to physically see the signs and b) be able to interpret the information provided by the signs. In this paper we focus on the first point of visibility of the signs.

The next section describes the techniques used for obtaining a 3D-representation of the infrastructure which builds the basis for the visibility analysis. Subsequently data collection design is discussed and finally the derivation of the visibilitiy for a given position in the infrastructure is examined.

4 VIRTUAL RECONSTRUCTION

Every virtual 3D-representation of an infrastructure relies on sufficient and accurate data. Our approach uses photos made with a common SLR camera. In order to add more details to the representation additional data sources will be used. The main steps in the modelling process are described in the following. The developments will be demonstrated using the railway station "Praterstern" in Vienna as a test case. The station is a multi-functional building connecting rail, subway, tram and bus lines. It also provides access to

one of the major recreation areas in Vienna. Consequently it is a rather complex building posing challenges for wayfinding for the uninitiated first time user.

4.1 Point Cloud Creation

The first step to create the 3D model of a public railway station is the calculation of 3D point clouds. We use "city dense modeling" as described by Irschara et al. (2007). The first step is the acquisition of pictures of all parts of the building which are to be reconstructed. A certain amount of overlap is needed between the pictures to get useful results. The advantage of the algorithm lies in the low level of user interaction needed to obtain a representation. In particular no further aids or manual registrations are required to obtain reasonably accurate results.

The created images are rectified and the lens distortion is removed. This process is supported by the strategic placement of 96 markers prior to taking the photographs as described by Irschara et al. (2007). The markers can be spotted from different angles in various photos. Thus these markers provide valuable information with respect to the rectification of every single image as well as for the linkage of different photos where they act as reference points. Figure 1 shows the markers arranged on the floor where they can be photographed to get images for the calculations as described. In addition the focal length of the camera is used for removing the lens distortion. A SIFT based method is used to find pairs of points in different images. By establishing a unified real world coordinate system the camera position for every picture taken can be estimated and iteratively improved with additional images. Based on point pairs and camera position the position in the unified real world coordinate system of the feature points on the pictures can be calculated in the 3D space. Figure 2 shows a reconstructed part with the point cloud in 3D.

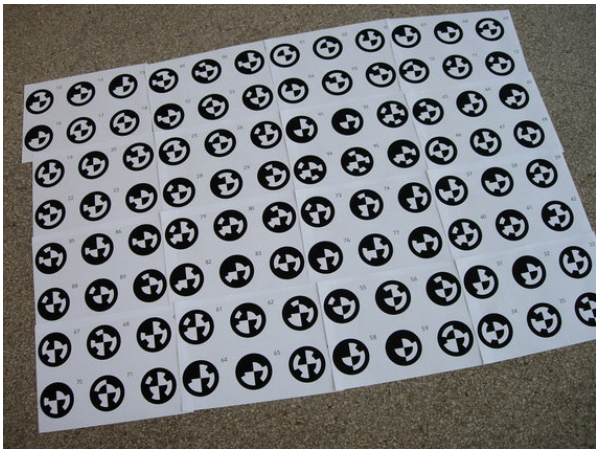


Fig. 1: 96 calibration markers arranged in a 4 by 4 layout on the floor (Irschara et al. 2007)

The algorithm of Irschara et al. (2007) is designed for the reconstruction of outdoor facades. In public buildings like railway stations the high amount of reflecting glass surfaces poses serious challenges such as distance errors of sections which are mirrored in a glass surface. To reduce these problems additional information is needed to create a more accurate model.

4.2 Use of additional data sources

Usually there exist several maps of public buildings which can be used to improve their reconstruction. The best basis for the models needed is a 3D CAD plan. To be able to use it, it has to be converted into the same coordinate system as the already used data and manual comparisons have to be made, to find the best representation of the reality. This is necessary since typically CAD plans represent the planning stage rather than the completion of the infrastructure. Details can be changed during the building process and thus usually the 3D CAD plans cannot be trusted to be totally correct in particular for the details.

Another source which is available in many cases are the drawn plans of a public building. These plans provide a 2D view of the infrastructure, typically providing information on the projection of the building onto the ground floor. Consequently the plans need to be mapped onto the ground of the 3D-model to use them as a reconstruction source. Afterwards walls and other details are visible in a top view and the interior can be placed like seen on the plan.

Both methods are not enough as a standalone solution and can only be used for the completion of the model. The problem with plans no matter if they are 2D or 3D, is often, that they are created in an early planning phase and therefore later changes are not found there in detail. Another problem of 2D plans is that they typically do not contain any height information. Consequently as described above other sources need to be added to create an accurate model. The combination of plans and reconstruction leads to improved results because the weaknesses of several sources can be eliminated.

Fig. 2: Point-cloud in a reconstructed 3D environment based on photos

5 PEDESTRIAN SIMULATION

For the research project MASIMO an agent based approach is used allowing the characteristics of individual pedestrians to be assigned and varied as required. The model development will be supported by empirical data collection providing data how people behave in real life. This empirical data collection will enhance the understanding of parameters and their influence to individuals' decisions to walk a certain route and which measures provide a basis for model calibration on a tactical level.

5.1 Operational and Tactical Level

In the multiagent simulation the agent behavior is described on an operational and a tactical level. On the operational level agents move in the infrastructure driven by a social force model and serveral parameters that will allow a wide variety of individuals like elderly and handicapped people and emergent behavior. A review of agents' speeds and densities according to several studies from Fruin, Predtechenskii and Milinskii, SPFE handbook, etc. can be found in Pelechano et al. (2008).

The tactical level decribes the knowledge and the wayfinding process which is defined as the process identifying, determining and following a path or route from an origin to the destination (Bovy and Stern, 1990; Golledge and Stimson, 1997). Wayfinding will be performed to navigate through the transport infrastructure allowing different types of behavior and navigation abilities and requires an interactive behavior between agents and their environments (Li, 2008). For the route selection the wayfinding algorithm calculates dynamically the global path based on the agents' knowledge of the infrastructure. Agents will have access to the information stored at the paths based on their perception abilities. The attributes of both people and their environments influence how and how well wayfinding is achieved (Allen, 1999). Individual attributes allow to represent individual levels of knowledge about the infrastructure and the individual gathering of new information through exploration, learning and communication with other agents (like asking for the way).

5.2 Perception

Each agent has a perception of the environment and a reaction to static and dynamic objects and agents. Perception approaches in the literature are based on casting a set of rays to calculate intersections. Here guidance information is determined against relevant influencing factors such as line of vision, occlusion due to other pedestrians and the distances in three-dimensional space. At each time step in the simulation the visibility of the guiding system inside the infrastructure is calculated for each agent representing a person unfamiliar with the environment.

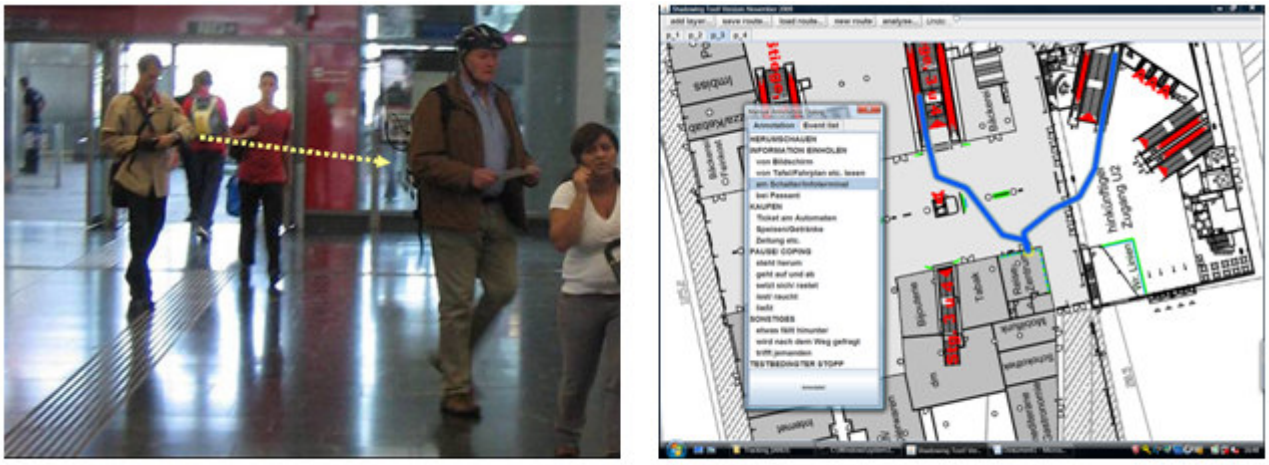
5.3 Empirical Data

Empirical data is collected in two different ways. First, nonobstrusive observations are obtained by videotaping critical elements inside the infrastructure in order to quantify effects on pedestrian flow through bottlenecks as a function of the percentage of persons with special abilities. One indicator in this respect is the number of persons per minute passing a staircase as a function of the percentage of person carrying a pram. A number of different scenes will be monitored.

Data collection in this respect is manual limiting the achievable sample size. Automatic analyses of video material currently do not support the level of detail required for our purposes. In particular the distinction of various user groups cannot be done reliably by currently available automatic methods.

Moreover automatic tracking applications only cover a limited area. Thus they are not capable of providing data needed for the analysis of wayfinding behavior.

To provide information on this aspect the second data source consists in an observation technique typically called “shadowing”, shown in Figure 3. For more details see e.g. Bauer et al. (2009). Hereby in Figure 3 (a) an observer (whose presence is known by the individual observed) follows the observed individual and records the major directional changes using a special application on a tablet PC. The graphical user interface and a recorded trajectory (blue polyline) is shown in Figure 3 (b).



(a) (b)

Fig. 3: Shadowing with a tablet PC (a) and the shadowing application (b)

Additionally the observed person carries a voice recorder which is used to document the wayfinding process. In this way it is possible to observe which guiding information is recognized at which positions inside the infrastructure.

The observation is followed up by face-to-face interviews to understand pedestrian’ psychological behavior and reasoning for their behavior are made. At this stage also the formation of a mental representation of the infrastructure can be tested.

5.4 Model Calibration

The models for the operational level of pedestrian behavior contain parameters determining the strength of reactions of pedestrians to other pedestrians coming close, the distance kept from walls as well as the behavior for collision avoidance. Therefore calibration on the operational level needs to use detailed information on the walking paths of pedestrians. Correspondingly the parameters are calibrated in order to

closely represent the collision avoidance manouvers as well as the relative spacing of pedestrians as good as possible.

A number of publications describe calibration of miscroscopic models (Johansson et al, 2007; Bauer and Kitazawa, 2008; Hoogendoorn and Daamen, 2010).

For the tactical level the data collected will be investigated in order to derive quantitative information such as the distance at which signage is recognized, positions in the infrastructure where decisions are taken. The user comments will be used in order to gain insights into the factors determining route choice.

6 VISUALIZATION

Visualization is a powerful tool aiding the interpretation of complex data sets. This allows the presentation of results in a manner understandable also for non-specialists. In the present context both the path a person takes as well as the visible field need to be visualized in a dynamic, interactive manner. These two components will be described next.

6.1 Person Paths

For the visualization of person paths we use the technique documented in Brunnhuber et al. (2009). The paths are indicated using lines drawn one meter above the floor of the infrastructure. The speed of the persons is visualized using alternating colors to indicate the movement between consecutive time steps of the simulation. Thus longer strips of one color correspond to high walking speed and short strips to slow walking. Moreover several lines are animated to get an idea of the walking direction of the simulated crowd.

6.2 Crowd Rendering

The simulation data describes the position of every person of the crowd per time step. For dense scenes including many persons crowd rendering is nontrivial from a computational perspective. However, detailed representation of every pedestrian is vital because the analysis of the guiding systems in railway stations also needs the 3D representation of the people to know if the environment is also visible in crowds.

For the rendering of large crowds we use instancing as described by Dudasch (2007) as a technique which refers to render a mesh multiple times in different locations with different parameters. A secondary vertex buffer that contains the parameterizations of every instance is bound. The primary vertex buffer loops over each instance and the secondary buffer is incremented to parameterize these loops over the mesh.

The presented approach has to use the DirectX 10 API because instancing takes place in the core of this version of the API. By using the instancing techniques it is possible to rendering large number of persons in real-time. Dudasch (2007) describes tests with about 10000 characters at an acceptable frame rate of 30 frames/sec on an usual personal computer.

6.3 Creation of Visibility Maps

One of our major goals is to find out how the guiding system of public buildings works for mobility impaired people. Therefore we want to find the visibility of signs and information boxes inside the railway station from the perspective of the individual. The basic technique of shadow maps is used similar for one timestep or if every timestep of the simulation has to be visualized at once. The only difference is that the shadowmaps of every timestep are combined in the visualization of the whole timespan. The basic thought for the creation of the described visibility is the fact, that if a spot lightsource is used on the position of the viewer, the shadows it creates are the positions which cannot be seen by the person who looks in the exactly same direction. In other words it is not possible to see any shadows caused by a lightsource which is exactly on the same position as the camera.

The basic technique, that the Z-buffer-based renderer could be used to generate shadows quickly on arbitrary objects, is described by Akenine-Möller et al. (2008). The Z-buffer algorithm is used to render the scene from the position of the light source without additional content like lighting, texturing or colors. The shadow rendering is usually used for directional- or spotlights. In our approach we use the technique of spot lights to be able to use shadows like parts of the image which are not seen by the tested individual. The view volume of the spotlight is created and the image in the stencil buffer is moved. The pixels outside the light's view are ignored this way.

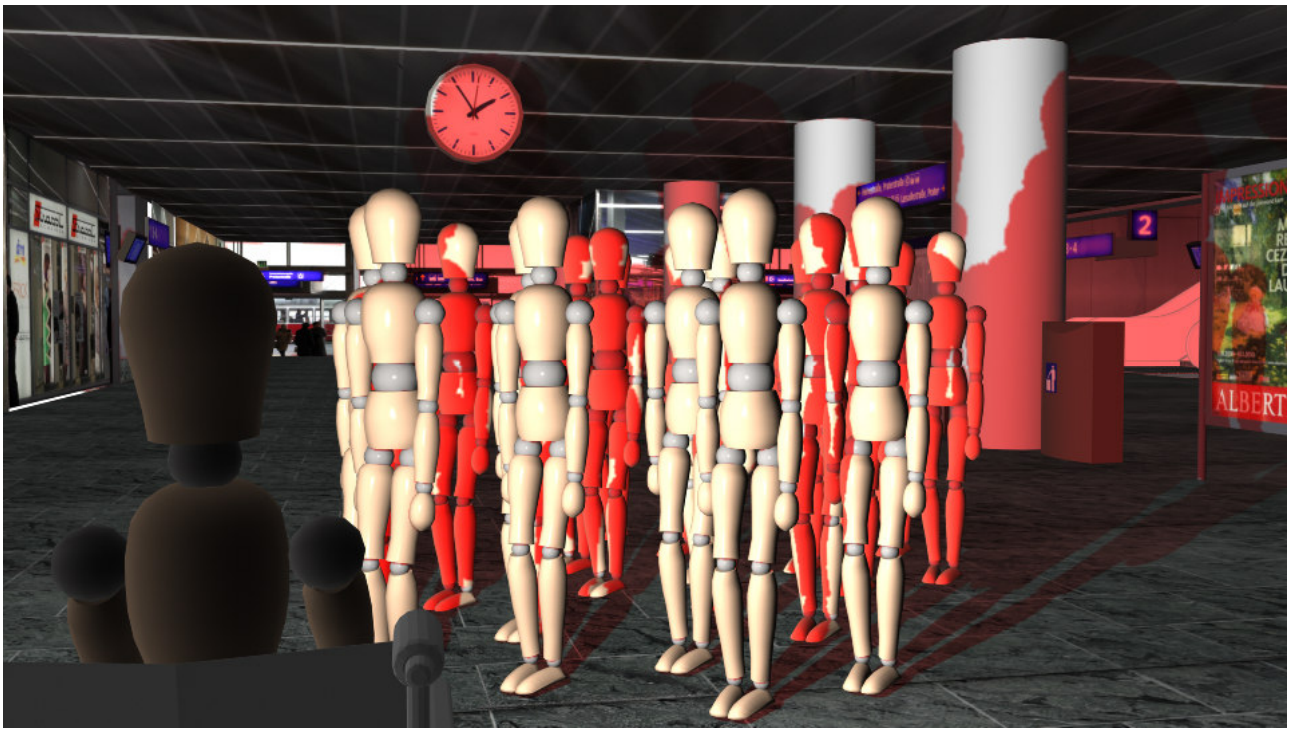


Fig. 4: Example for Visibility map concept

Akenine-Möller et al. (2008) also describe several techniques to use good resolutions for the shadow maps dependent on the viewpoint of the actual scene. The technique of cascaded shadow maps can be used to improve the visibility maps. There, a set of fixed shadow maps is generated to cover different areas of the scene. In the presented approach fixed empty maps are used first to cover the whole environment. The shadows for every light source in every time step, which represent a field of view of a handicapped person, are calculated and mapped on the created fixed maps. Instead of setting a shadow color we add a value (the visbility indicator) to the maps which depends on the total number of lightsources. Large values indicate dark regions while regions that are visible by many individuals correspond to small values. Correspondingly the maximum of the visibility indicator occurs at the sections which are never seen by the simulated, handicapped persons.

Fig. 5: Visibility Map detail on a sign of the guiding system

The cameras which are used as viewpoints in our case, are set to a width of almost 180 degree. The forward vector of the persons is their walking direction and the wide view angle is used to simulate the moving of the head when somebody looks around for guiding information to find his way through the railway station.

Finally a recoding of the color values on the several maps is performed to enhance readability of the resulting pictures. Sections which are perfectly visible are marked as white, while darker regions are not

visible for most agents most of the time. This way it is easy to identify the visible sections from an analysis of the corresponding artificially coloured 3D- representation.

Figure 4 shows an example of a person in a wheelchair, who looks into the room. A crowd is standing in front of him and blocking his field of view. Shadows are colored in red and highlight the invisible sections of the person this way. Figure 5 shows a sign of the guiding system in detail. Big parts of the sign are marked in red showing that they are invisible for the person in the wheelchair. Future developments will include a more detailed colour coding to represent different degrees of visibility.

6.4 Visibility maps in different time dimensions

The visualization of the visibility maps is time dependent. It is possible to analyze one timestep or the whole dataset in one image to gain the needed findings. The described way for the creation of visibility maps combines every timestep to show the visibility on the way of the simulated, handicapped persons. The behavior of the people in various timesteps has to be analyzed too and the combination of the whole timespan with one moment may lead to further findings inside the dataset.

Therefore the maps are created as described in a preprocessing step. Usually the visualization shows the visibility maps directly inside the 3D-model. The crowd at a particular time stamp is shown at the simulated positions and the sight of one individual is visible with a light frustrum (as shown in Figure 4). The current situation is possibly comparable with the whole testcase and the space which is marked as nearly or completely invisible can be explored in detail to see why the section is not seen (e.g. persons stand in front of it, the guiding system is not seen without further obstacles and similiar cases).

7 CONCLUSION AND FUTURE WORK

In order to be applicable as a planning tool, the pedestrian simulation model must be able to simulate realistic pedestrian behavior. The MASIMO project aims to develop a simulation tool capable of the simulation of realistic behavior of pedestrians in public infrastructures considering the individual knowledge of the infrastructure, route requirements, the orientation and the visual performance especially for the elderly and handicapped people. The pedestrian simulation model will be properly calibrated against quantitative and qualitative empirical data to provide a reliable tool for the planning of pedestrian facilities like transport infrastructures. To apply the simulation model to another infrastructure some considerations should be made about influencing factors that may play a role, for example the percentage of elderly and handicapped people, carrying of luggage, having a pram, use of mobile phones and the variety of activities that can be made in the infrastructure. Furthermore, the combined approach of simulation and visualization makes it possible to evaluate the visibility of the guidance system and to show the areas with leaks of guidance information for people unfamiliar with the infrastructure, especially for elderly and handicapped people with reduced reception capabilities.

A realistic environment is important to represent the approach properly. Our presented reconstruction of a railway station is a fast way to get data, which can be used for a visualization which meets our requirements. The visual representation of the crowd and the visible sections is important to analyze the guiding system of the public buildings. Our approach uses the resources of current technology to present everything in real-time and to be able to change the data interactively.

In the near future we will have to proof our concepts in a real-time application. The basic ideas will lead to a program which can be used to test if a public building is really barrier free or if there are some problems with the guiding systems or bottlenecks for the moving crowds. It might be important to improve the resolution of the shadow maps dependent on the distance to the view point. The distance between the viewer and the signs at the creation of visibility maps is not handled in our approach yet. A method has to be found to get realistic information if a sign is still readable in a defined distance.

Currently the pedestrian simulation models and the visibility analysis are not coupled. Future developments will integrate the movement models to represent every person in the simulation. This improvement will lead to an application for presenting our findings in a way which is easy to interpret for anyone who is interested in the quality of a barrier free environment in public buildings.

8 ACKNOWLEDGEMENTS

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reviewed paper

Size of the Patch

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1 ABSTRACT

The creation of liveable, healthy, and prosperous cities is, quite simply, a matter of proportion. Urban agglomerations are partitioned or nested into a quilt of functions and spaces, of which ecological patch structures are a vital aspect of human-environmental sustainability. This paper examines the how specific types of ecological patches exist and perform within urban agglomerations. Patches are describable by "landscape signatures" containing attributes such as origin, contrast, age, size, and shape and also have characteristic and measurable "environmental responses" such as biodiversity and –GHG. Following Alberti (2008) and others, a general approach to studying the existence and performance of patches is developed at the scale of the city or larger metropolitan region. The emphasis in this paper is to show how existing and/or alternative "emergent patch structures" contribute to the overall human-environmental quality of life, with particular attention paid to the size and shape of patches. Because context matters, both the overall approach and the proposed methodology are illustrated for the specific instance of Warsaw, Poland.

2 THE RECOGNITION OF HUMAN-ECOLOGICAL ECOSYSTEMS

The sustainability movement has placed an artificial wedge between human needs and environmental needs. Analytical models associated with the sustainability movement simplify either the human dimension to reach an ecological conclusion or simplify the ecological dimension to reach a human conclusion. For example, the classic economic models based on the Alonso bid-rent dynamics do not consider the environment at all; conversely, urban ecosystems models such as those developed by Odum and follows tend to simplify human needs, wants, and behaviors. To overcome these methodological dilemmas and to foster an understanding of the human-ecological interface as an integrated system, a series of research efforts are underway that emanate from the landscape ecology research community. Alberti (2008) and others have develop an integrated human-ecological model of urban ecosystems.

Urbanization changes land use from a formerly pristine ecological regime to another regime. In so doing, the process of urbanization fragments the earlier ecosystem. The resulting urban eocystems are "heterotrophic ecosystems" – dependent on large amounts of energy and materials and a vast capacity to absorb emissions and waste. But, detailed knowledge about this overall phenomenon is lacking, due in large part to methodological inconsistencies among studies. Alberti and others have asked the general question: is there a relationship between patterns of urbanization and environmental performance. For planners, the answer to this question must be YES! It defines their position in society. Yet, scientists, for a number of reasons, have yet to confirm this conclusion, due in large part to faulty thinking and the failure to recognize the scale implications of their work. The basic conclusion reached by Alberti (1999) and others is: we don't know. But this conclusion is argued within a context of the need for further, longer lasting, research.

This paper is organized as follows. In the next section, we review the major theoretical treatments of the human-ecological interface, focusing on both systems thinking and the conceptual and methodological advances within the landscape ecology research tradition. We then briefly describe the ecological and urban development patterns in Warsaw. The research problem is simply to explore the possibility of human-ecological patch type analysis in the situation of Warsaw. The methodology sections focuses on how "landscape signatures" are created for our situation. The results focus on three individual case studies: a comparative patch analysis, a gradient analysis, and a single-area dynamic analysis. Results are expressed in terms of similarities and differences. The final part is an overview of our results, an assessment of contribution to the literature, possible recommendations for the improvement of both planning and real dynamics in Warsaw, and suggestions for future research.

3 ADVANCES IN UNDERSTANDING THE HUMAN-ECOLOGICAL ECOSYSTEMS

The conceptual and methodological approaches to the study of human-ecological urban system are undergoing rapid change. There are two major threads: systems and complexity, and advances in the landscape ecology research traditions. The first focuses on how to more appropriately capture the joint

dynamics of both human and ecological needs. The second focuses on methodology. Both are briefly reviewed here.

3.1 Systems and Complexity [+ Ecological Performance]

Advances in human-ecological thinking seem to focus on the work of five research nodes: Marina Alberti's at the University of Washington, Nancy Grimm at Arizona State University (e.g., 2000), Stewart Pickett and colleagues at the Cary Institute of Ecosystem Studies in New York (e.g., 2001), Mark McDonnell at the Australian Research Center for Urban Ecology (e.g., 2000), and Herbert Sukopp in Germany (e.g., 1995). In this body of work, much emphasis is placed on the twin notions of cities as systems and complexity theory.

3.2 Cities as Systems

Perhaps the most fundamental idea is that cities and regions can be represented as systems. In a system, there are four major elements: drivers, patterns, processes, and effects/changes. The dynamic is basically from "inside-outside" but there are two important feedback loops: one internal between patterns and processes; and one external in which changed conditions lead to changes in the behavior of the drivers. Figure 1 is an adaptation of one such model, drawn from Alberti (2008, drawn from Alberti et al, 2003).

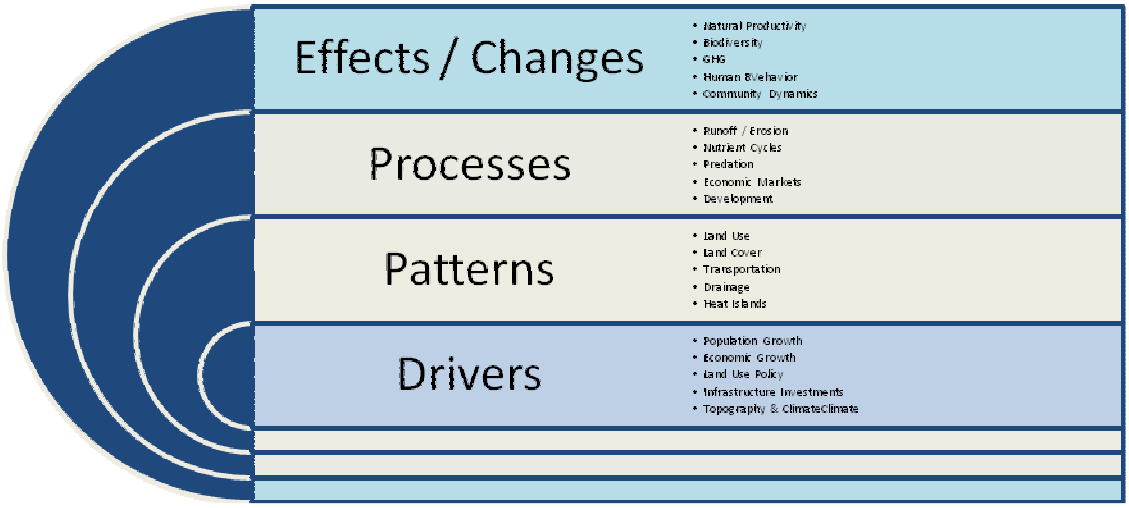

Figure 1: Systems Characterizations

Drivers are external events but are of three types: socio-economic forces, natural forces, and planned interventions. Patterns are mostly physical representations observable at a general scale. Processes are also physical but are generally observable at different scales.

Effects and changes are differences in the levels of some behavior. None of this matters of course if there were not certain emergent properties of interest. This is the area of environmental performance. How is it measured? What does it mean? The normal environmental performance variables include things such as clean air, clean water, and more recently, reduction of GHG and other carbon related things.

3.2.1 Complexity

Characterization of the human-ecological urban system is not enough to capture how such systems operate. Complexity theory, which underlies most system characterizations and whose rudiments can be found in Nicolis and Prigogine (1997), Portugali (2000), Batty (2005) among others, contains a number of important concepts including: emergent properties, feedback, self-organization, and resilience.

An emergent property is a characterization of what we see or observe at a certain time. It is in a sense a temporally defined "product" of processes at work. It is a static description. The current pattern is either, depending on one's point of view: (1) to be changed if one is a planner; or (2) to be made sustainable (or resilient). The choice between change and sustainability/resilience is of course the fundamental matter of ideological debate. Feedback is the general dynamic of growth/decline. Feedback can be positive (reinforcing) or negative (dampening) for the process under consideration. Note that positive feedback is not positive in an ideological sense; the continuing erosion of the polar ice cap is an example of positive feedback. Feedbacks are defined in terms of processes, not net results. Self-organization is an idea that

systems, by virtue of carrying out its process will result in a certain emergent state. More often than not, these are described in terms of agent-based models, where simple decision rules at the scale of the individual result in patterns at the scale of the aggregate. Finally, resilience is the ability of a system to stay in the same regime state (emergent property) while experiencing shocks. Moreover, resilience is defined for certain scales within a system.

3.3 Landscape Ecology

Landscape ecology is generally understood as the science of analyzing and improving the dynamics between urban land uses and ecological processes at a variety of scales. There are, of course, a few basic terms that need to be defined. The first is landscape. It is generally agreed that the word landscape refers to a spatially heterogeneous area characterized by diverse interacting patches or ecosystems, ranging from the relatively natural terrestrial and aquatic systems such as forests, grasslands and lakes to human-dominated environments including agricultural and urban settings. The second is ecology. It is generally agreed that the word ecology refers to the interdisciplinary study of the interactions between organisms and their environment, or more colloquially, ecosystems. Landscape ecology is the scientific study of the relationship among pattern, process, and scale, and more recently of the need to couple biophysical and socio-economic systems. Wu and Hobbs (2002) suggest that there are five topics of current interest: (1) ecological flows in landscape mosaics, (2) land use and land cover change, (3) scaling, (4) relating landscape pattern analysis with ecological processes, and (5) landscape conservation and sustainability.

More specifically, current landscape ecologists suggest that there are various “signatures”, indeed “urban” signatures in the current landscape. These signatures contain elements that can be described and measured. For example, Alberti (2008) suggests that these important variables include: (1) scale and heterogeneity (composition, structure, and function); (2) patch and mosaic; (3) boundary and edge; (4) ecotones, ecoclines, and ecotopes; and (5) disturbance and fragmentation.

3.3.1 Theory of the Patch

Patches are the basic units of the landscape. They simultaneously exist and change. The literature devoted to the categorization and measurement of patches is illustrated by the work of Mora and Iverson (2002), Watson (2002), Watling and Donnelly (2006) among others. A patch is normally defined as a discrete area of relatively homogeneous conditions. We distinguish between patch characteristics and patch dynamics. Patch characteristics can be defined by/as:

- Shapes and configuration and can be described compositionally by variables such as number of trees, number of tree species, height of trees, or other heterogeneity descriptors.
- Centers.
- Boundaries and/or edges. The zone composed of the edges of adjacent ecosystems is the boundary. Edge means the portion near its perimeter, where influences of the adjacent patches can cause an environmental difference between the interior of the patch and its edge. The edge effect includes a distinctive species composition or abundance. Adjacent patches have a boundary between them which can be either defined or fuzzy.
- Existence of colonization processes, disturbance regimes, and succession.
- Scale. Human and biophysical processes have defined scales of impact.
- Connectivity. Connectivity is the measure of how connected or spatially continuous a terrestrial place or corridor is. For example, a forested landscape (matrix) with fewer gaps in forest cover (open patches) will have higher connectivity. Particularly in urbanized landscapes, corridors have important functions as strips of a particular type of landscape differing from adjacent lands.
- Networks. A network is an interconnected system of corridors.

Patch dynamics, which are the processes and change and fluctuation, normally focus on the spatial structure, function, and changes in the above set of relatively discrete concepts or elements. The emphasis is on changes in values of any of the variables above. Clearly, if a human-ecological ecosystem is improving it will exhibit, among other things, a stronger center, better defined edges, resilience, connectivity to larger ecosystems, etc. The key idea is to capture processes occurring over time.

3.3.2 Ecosystem Services

The concepet of ecosystem services is focused on dynamics. Alberti (2008, p. 261) suggests five themes for observation and/or research endeavors. First, urban ecosystems are dynamic, hierarchically structured, patch mosaics resulting from the interactions of humans and ecology. Second, urban ecosystems are drive between multiple states in regard to the amount of urbanization. Third, interactions between socio-economic and biophysical patterns and processes lead to emergent properties, such as sprawl. Fourth, the effects are non-linear and are found in various levels of disturbance and resilience. And, finally, ecosystem functions are moving targets with multiple and unpredictable futures. The implications for planning are immense. As Alberti argues (p. 261), policies that aim to achieve fixed goals cause a loss of resilience and are destined to fail.

3.3.3 Urban Landscape Signatures / Typical Measaurement Schemes

Three basic concepts create the language of measurement: patch, class, and landscape. As before, there are two issues: what to measure and in what methodological framework.

What to Measure

Alberti (2008) suggests that these signatures are composed of two major properties: composition and configuration; and, four elements: form, density, heterogeneity, and connectivity. With enough data, it is possible to develop eight sets of measurements. However, as Alberti herself points out, many of the measures are joint composition/configuration concepts. Figure 2, drawn from Alberti, show some of these measures.

Form	Density	Heterogeneity	Connectivity
Land Use (% land in certain categories)	Clustererd v. Dispersed	Number of Elements	Connected or Dispersed
Land Cover (% urbanized)	Overall Patch Density (number of patches per square unit of land)	Diversity v. Evenness	Interspersion (distance between patches)
Fragmententation (mean patch size)		Number of Patches of Specific Land Use	Evidence of Colonization, Other Disturbances, and/or Succession
Shape (circular, rectangular)		Number of microclimates	

Figure 2: Concepts and Measurements

Methodological Frameworks

Four major frameworks to analyze “urban landscape signatures” are in common use. Taken together, they represent a way to observe variations among different landscapes. These methods are: gradients, single-area analysis, networks, and hierarchies. A truly universal methodology would use all four methods.

- The gradient method focuses on the human impacts on ecosystems at different distances from the city center. Gradient methods are similar to the new urbanism transect concept – an attempt to look at certain variables at different distances from a center. Typically, the categories are things like: urban, suburban, and rural. Variables typically studied could include things such as microclimates, nutrient loads, plant distributions, stream health, and richness.
- Single patch analysis is normally used to study situations in which urbanization creates discontinuous patches, which are further modified with further human interaction. The outcome variables are typically: landscape heterogeneity and connectivity. So this is an overall measure of the place.
- Network analysis focuses on the interactions between and among ecosystem components. These interactions can be proximate, direct, or some other functional form. Moreover, the study of interactions implies that many ecological systems are far from random; displaying organizing principles that are evident at certain scales of resolution.

- Hierarchical analysis focuses on complexity theory constructs applied to urban ecosystems. These would include concepts such as nested phenomena, thresholds, and differential process rates and spatial extents.

3.3.4 The Size of the Patch … Matters

The key idea is that urbanization creates discontinuous and smaller patches, which are further modified with further human interaction. Patch performance, defined in terms of typical variables such as biodiversity, etc. are related to patch size. The general conclusion is that larger patches perform better in terms of most environmental variables than smaller ones. The fragmentation of formerly large patches into a series of smaller patches created by the urbanization process, limits the ability to the ecosystem to perform at high levels.

4 CONTEXT: BASIC DESCRIPTIONS OF WARSAW

The Warsaw Metropolitan Region contains approximately 2.8M people and covers an area of 6.1K square km (approx 2,355 square miles). The City of Warsaw contains 1.7M people and covers an area of 517 square km (approx 200 square miles). It is the 16th largest metropolitan area and the 9th largest city in terms of population in Europe. Warsaw is the main employment node for the surrounding region and over 20% of employment consists of commuters. Sixty percent of the population lives on less than 10% of the land area. The average population density is about 3,270 person per square km (varies from 380 to 9600). The most densely population portions are in and near the old, central districts, see Figure 3.

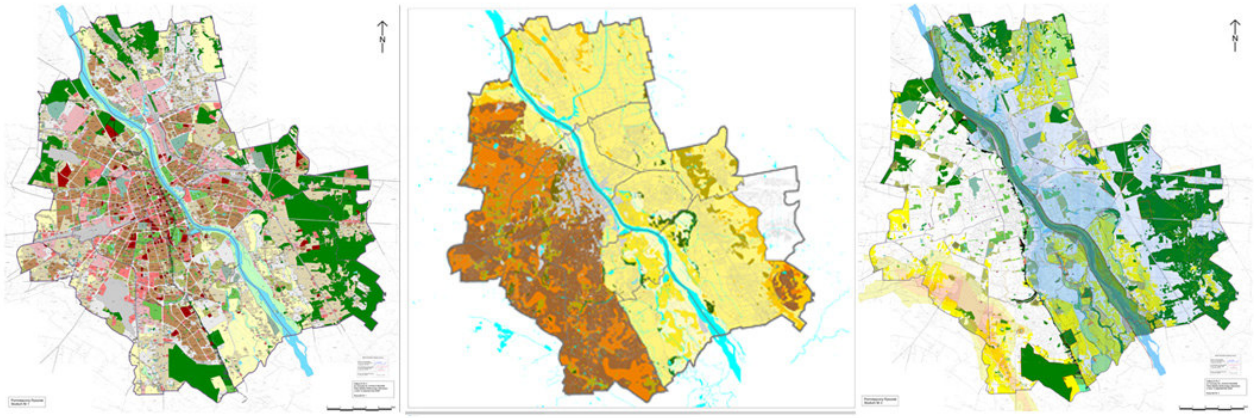

Fig. 3: Warsaw: Land Use, Geological, and Environmental Conditions

4.1.1 Basic Ecological Conditions

Warsaw is located on the border of two geographical units: Warsaw's Plain and the central part of Vistula Valley, in the center of geological unit called Mazovia Syncline. The steep edge of Warsaw's Plain is a main landscape feature of the city. The height of the Warsaw Escarpment ranges from 6m in the northern part, up to 25m in the city center, and slopes slightly towards south. The geomorphology of the area was shaped by two processes: glacial accumulation and river erosion. The ecological core of the city is the Vistula Valley; which although is relatively uninfluenced by anthropogenic changes, the water is very much polluted. The whole valley within the levees is a protected Natura 2000 area. Complicating the matter is that water resources are minimal, about 3 times smaller than the average in Europe. Another important ecological feature is the forests, which make 14% of the city area. The forests remain in either protected areas (several nature reserves) or are linked to them (Kampinoski National Park, Mazowiecki Landscape Park, and Chojnowski Landscape Park surrounding the city). Together, natural and semi natural greenery covers around 23% of the city area.

The basic issue, however, is not the total amounts of any of these features, but how they function as ecosystems. Green spaces in the eastern and southeastern part of the city are quite compact and continuous while they are fractured and isolated by urban development pattern in the western parts.

Ecological problems in the city are: heat island covering 30% of the area (central districts), air pollution caused by transportation and usage of fossil fuels, noise (65% of population lives in areas where noise level is over quota), and, fragmented area and linear green spaces, and water pollution.

4.1.2 Basic Urbanization Contexts

Warsaw exhibits a variety of development patterns, some "in conflict" with each other. It contains remnants of the historical urban fabric, elements of social realism planning, and some garden type settlements. As the economy transitions from an industrial base to a service base, older industrial sites have been abandoned, brownfields emerge, the primacy of the capital emerges, and attention is given to creating a global business district and a global brand. Conflicts arise between ecologists and investors – between environmental needs and human needs, especially regarding developments located adjacent to valuable natural areas.

The basic land use pattern does not create a clear structure. The major concentration is on the western border of the Vistula River, on the escarpment. The city center has almost a grid pattern, but it is fragmented and filled by free standing blocks. The city center is surrounded by newer districts built in 60s, 70s and 80s. The fastest growing districts from 1990 are suburban districts to the north-west, north-east and south. Suburban employment centers emerge (e.g., Piaseczno to the south), as do planned ring roads and planned airports.

5 RESEARCH PROBLEM

The purpose of this paper is to begin to apply the concepts and measures of the human-ecological approach outlined above in the context of Warsaw. Our intent is to frame and begin to analyze selected ecological issues and areas within the city. Our building block is the notion of "landscape signature", describable as a set of statements about both ecological attributes and ecological performance. We frame and conduct three types of studies: (1) the comparison of "landscape signatures" for two land segments; (2) the comparison of "landscape signatures" in a gradient-type analysis on five sections along the Vistula River; and (3) a discussion of the changing "landscape signature" for Wilanow, the site of a major ongoing development.

Ecological Variable	Measurement
Number of Patches	Number of Patches in each Study Area
Form	
Land Use	% of Land Residential, % of Land Other Urban, % of Land Natural
Land Cover	% of Land Developed
Fragmentation	Mean Patch Size
Density	
Clustered v. Dispersed	Clustered or Dispersed
Overall Patch Density	Number of Patches / Area of study areas
Heterogeneity	
Number of Tree Types	Count
Number of Species	Count
Diverse v. Evenness	Diverse or Even
Microclimates	Yes or No, Describe
Connectivity	
Aggregation	Grouping: Yes or No
Shape	Describe: circular, rectangular, linear
Distance Between Patches	Distance
Connected	Yes or No (to another patch)

Table 1: Synthesis of Human-Ecological Concepts and Measures

6 METHODOLOGY

6.1 Definitions and Terms

The "heart" of this paper is the development of definitions and terms for attributes and/or elements, that, taken together, are capable of describing the "landscape signature" of any geographically-defined area. Some of these measures are indicators of individual patches; some are measures of a geographically defined area, see Table 1. So, it is possible, even likely, that any geographically defined area will have multiple patches (or ecosystems within it).

6.2 Approaches and Definition of Study Areas

Three case studies are developed to begin to use the human-ecological "landscape signature" approach. The first is a comparative analysis of landscape signatures in what are a priori, completely different sections of the overall city spatial structure. The first, named Bielany (because it is in the political district of the same name), is located north/northwest of the urban center, has a geological topology of glacial heritage, and has witnessed urban growth and decline. The second, named Wawer is located in the southeast portion of the study area and is mostly pristine, has a geological topology of river valley with glacial accumulation and is on the fringe of urban development. The expectation is that these areas will have significantly different landscape signatures.

The second case study is a traditional gradient analysis, but instead of areas at different distances from the urban center, we focus on the Vistula River, which runs in a roughly north-south direction through the urbanized area. Although much of the riverbank is protected as part of the Natura 2000 plan, we also expect that landscape signatures will be different as distance from the center increases. We examine both "upstream" and "downstream" impacts by focusing on gradients in both directions.

The third case study is an example of a "single area" analysis, with a focus on dynamics. The case study is conducted for Wilanow, the current site of a major urban transformation from rural to urban. From a city-wide perspective, this development is absolutely appropriate since it is adjacent to existing urbanized areas and reflects an "organic" model of city growth. Nevertheless, the prior ecosystem is being changed. The focus of this study is to explore some of these dynamics. The study areas are shown in Figure 4.

Figure 4: Definitions of Study Areas

6.3 Gathering Data for the Warsaw

To present both data and results, a topographical map of the city at the scale of 1:25000 is used. The environmental, and where possible ecological, data are drawn from two studies produced by the municipality: (1) Study of the conditions and the directions of the spatial development for the city of Warsaw and, (2) Ecophysiographical study for the city of Warsaw. It is important to note that much of this data is "environmental" and not "ecological".

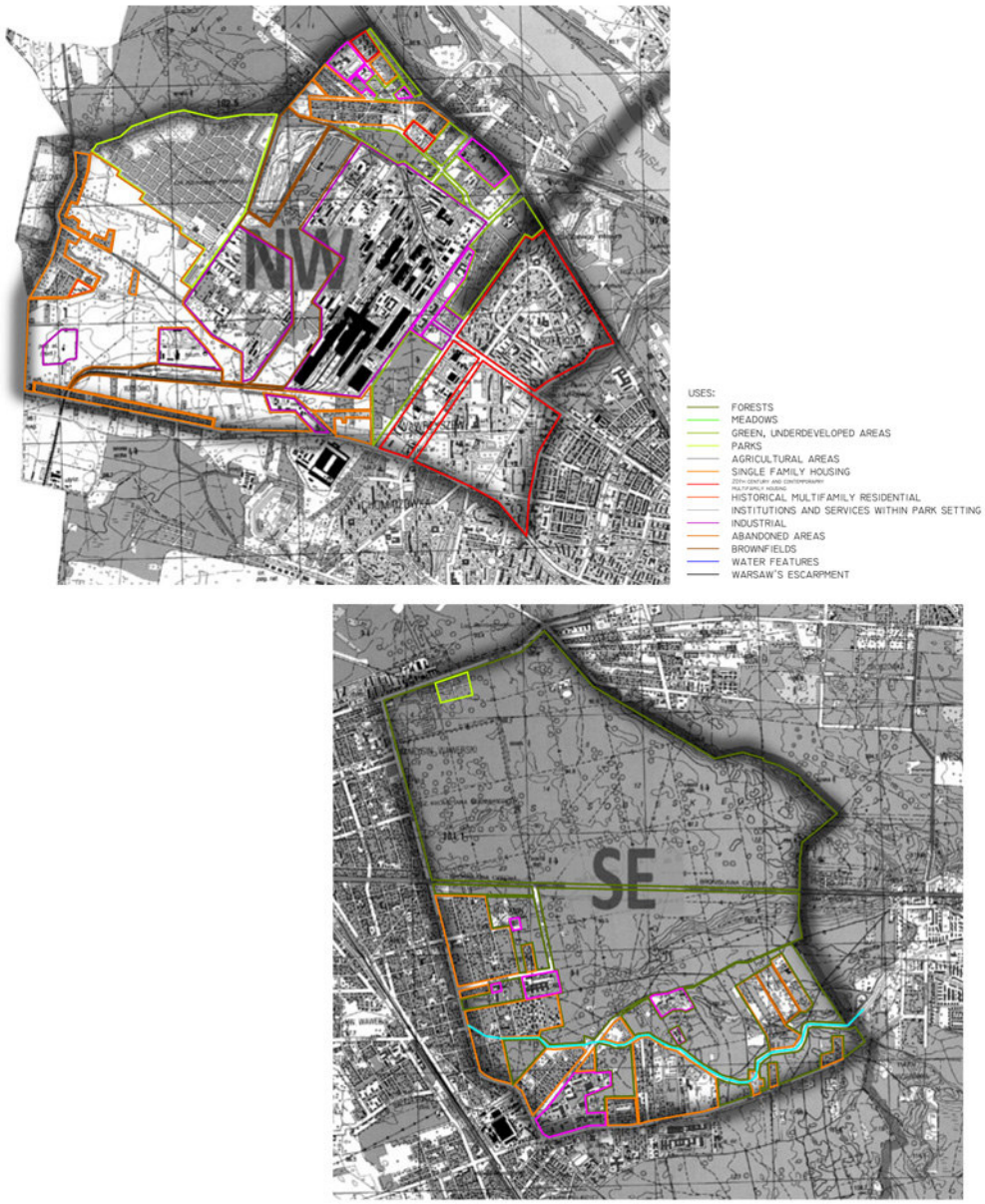

Figure 5: Comparative Analysis: Bielany and Wawer.

7 RESULTS

Results are presented in the order identified above.

7.1 Urbanized Versus Rural Landsapes

To show the difference between an urbanized landscape and a more pristine suburban landscape, we mapped the number of patches in each of two areas, see Figure 5. This comparative analysis between the Bielany and Wawer regions generally shows what would be expected. The Bielany area contains many more fragmented patches, patches which are not functionally related to each other, but indeed adjacent to one another. Thus, for example, there are commercial patches next to industrial patches. There is no set of connected green or natural ecosystems (there is a low level of connectedness, there is no apparent network, sizes and shapes vary wildly, etc.). On the other hand, the Wawer region contains a strong single ecosystem. There is a strong core

to the patch and boundaries are relatively easy to identify. Patches adjacent to the main central patch are more appropriate to the center core.

While this comparison is, to some degree, extreme by choice, the comparative analysis does show how important "landscape signature" elements vary between the two areas. Similar types of studies could be developed for other comparative areas throughout the city.

7.2 Gradient Analysis along the Vistula River

Here, we partitioned the landscapes along the Vistula River into five sections (or study areas) starting in the center, and doing a gradient analysis "away" from the center. The basic hypothesis is that ecological characteristics would vary among these sections. Even though the Vistula is a "wild river", we expect to see different ecological dynamics and processes in these three different sampled sections.

Patches are identified for each section along the river, see Figure 6. As can be seen, ecological patches in areas three and four are dominated by urbanized uses. Only area five starts to show more pristine ecological areas. The sizes of the individual patches tend to increase with distance from the city center, a finding anticipated from the literature, which is confirmed by our analysis. The green areas along the Vistula are narrower in sections 1, 2, and 3 showing the historic pressure for development close to water-based transportation. Only in section 5 do we find ecological patches consistent with the expectation of riparian ecosystems.

While the mapping of patches along five different segments of the Vistula provides evidence of urbanization effects on the natural water-based ecosystem, further hydrological models are needed to determine the true biodiversity and other characteristics of water-based issues in these ecosystems.

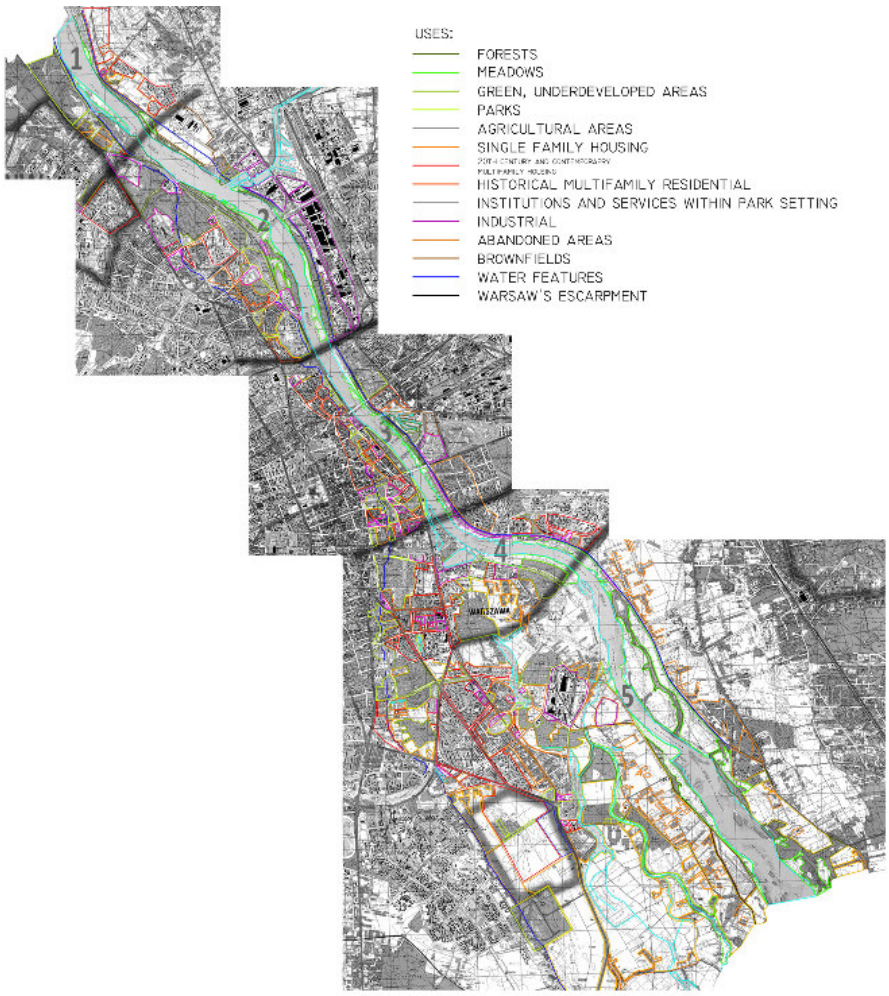

Figure 6: Gradient Analysis along the Vistula River

7.3 Wilanow Project Area

The third case study is an example of a single district, in this case one that is currently under development. Wilanow possesses both a precious cultural and natural heritage as well as huge development potential. The Wilanow West project is a 420 ha site of post-agricultural land that is being developed in accordance with the overall master plan (see location on Figure 4). The surrounding landscape is highly natural with majority of open space, the lowest development density in Warsaw, and several areas of nature protection.

Under the current development, the status of Wilanow West has been changing from an undeveloped area of fields and meadows, abandoned and growing with a birch wood, to a highly urbanized area with the development density factor exceeding 1 or even 1.5 which is typical for a city center. Such a change involves several effects, especially in the environmental performance of the area. For sure the micro-climate will begin to exhibit urban heat island, the flow of storm water will grow, and noise and pollution will increase. Furthermore, biodiversity and GHG absorption will dramatically fall with the elimination of more natural habitats. Although the master plan provides around 40% of biologically active area on the building lots, which has mitigating meaning, it will be still an anthropogenic landscape, designed and built, and it will need time to achieve full performance.

Finally, it is fair to say that this project, which will eventually provide housing for 40-50K people, that the impacts on the surrounding areas (that is, the rest of the metropolitan region) have not been fully assessed in

8 CONCLUSIONS / EXTENSIONS

Our summary comments are presented here in outlined form, due to space limitations. The final part is an overview of our results, an assessment of contribution to the literature, possible recommendations for the improvement of both planning and real dynamics in Warsaw, and suggestions for future research.

We have shown how the mapping of human-ecological patches leads to different landscape signatures for different types of geographical areas. Both in the terrestrial comparison and in the riparian gradient, significant differences were found and illustrated. The human-ecological approach seems to offer a better way to consider human impacts on the environment and environmental impacts on urbanization that either does from a singular perspective.

We have attempted to develop an empirical approach based on the theoretical and conceptual literature. To some degree, our attempt was limited by the lack of true ecological data. The important point is that environmental features are not ecological data. Ecology is the science of interactions and transactions, not merely counts.

So, it follows that the major recommendation is the pursuit of more sophisticated ecological data sets and models that capture the human-ecological interactions. We have barely touched the surface in this paper; a full analysis of the human-ecological model for Warsaw would take years of concerted effort. This is a call to begin that effort.

Finally, with regard to future research, we see the obvious need for a more sophisticated model based on the approaches outlined here. The model would overlay identified patches with their environmental conditions, in order to examine their interactions and functioning.We would have liked to have been able to say, for example, “there is a need for a network structure for green areas in or near Wilanow”. But, the data and the existing models do not yet permit such statements. In our opinion a complex patch model of the city would help to solve the conflict between human and environmental needs, and let the city develop in a more sustainable way.

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reviewed paper

Social and Aesthetic Camouflage: Case Study of New Belgrade

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1 ABSTRACT

The general level of this research represents the study of New Belgrade, which deals with the interpretation of the relevant aesthetic and social models of shaping the city, namely the theory of functional city as an aesthetic paradigm and Henri Lefebvre's "unitary theory" of social space. The validity of the presented aspects is given by the statement that New Belgrade emerged from the conflict between "the two dominant... ideologies of the postwar period: the modernist, or CIAM's dogma of functional city and political, Marxist – socialist dogma, in the context of the ruling system."[1] On the specific level, the study deals with the problem of the individuals, which are, in the case of both dominant ideologies, neglected and marginalized. The phenomenon of camouflage represents the aesthetic "mechanism for inscribing an individual within a given cultural setting" and as such can serve as a unique tool for deconstructing and analysing of predominant aesthetic and social paradigms in shaping of the city.[2]

2 INTRODUCTION

The general level of this research represents the study of New Belgrade, which deals with the interpretation of the relevant aesthetic and social models of forming. According to her book "New Belgrade: Modernism questioned" the author Ljiljana Blagojevic states that New Belgrade has emerged from the conflict between "the two dominant... ideologies of the postwar period: the modernist, or CIAM's dogma of functional city and political, Marxist – socialist dogma, in the context of the ruling system." [3] Thus, on the one hand, as a method of analysis this research introduces the theory of functional city as an adequate aesthetic paradigm and Henri Lefebvre's "unitary theory" of social space, on the other hand.

On the specific level, the study deals with the problem of the individuals, which are, in the case of both dominant ideologies, neglected and marginalized. The aesthetics of the functional city does it, authoritatively, through the separation of the parts of the city, which leads to loneliness and isolation of individuals, families, groups, etc., while the ruling political ideology of socialism creates the illusion of homogeneity and happiness through the mask of collectivity.

As Ljiljana Blagojevic directly indicates, the importance of Henri Lefebvre in the case of New Belgrade is exceptional. In the accompanying text for the international competition for the improvement of urban structure of New Belgrade in 1986, Henri Lefebvre and the team of architects Serge Renaudie and Pierre Guilbaud demonstrated the requirement for the transformation of the society, which is based on civil rights - the rights of the individual.[4]

Interpretation of the human need to identify with an environment and methods for establishing connections with the culture as a whole "with which one wants to feel connected" gives Neil Leach in his book, Camouflage[5]. The phenomenon of camouflage is an aesthetic "mechanism for inscribing an individual within a given cultural setting" and as such can serve as a unique tool for deconstructing and analysing of predominant aesthetic and social paradigms in the shaping of the city, iluminating the individual experience of space[6].

The research aims to put the emphasises on the existence or lack of awareness of the position of individuals in modern spatial concepts and to arise practical methods by which individual succeeds to build his own identity and ensure its own survival, in conditions that are already set in the environment.

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[1] Ljiljana Blagojevic, Novi Beograd: Osporeni modernizam (Beograd: Zavod za udzbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zastitu spomenika culture grada Beograda, 2007), 244.
[2] Neil Leach, Camouflage (Cambridge: Mass., London: The MIT Press, 2006), 240.
[3] Ibid., 240.
[4] Ibid., 208.
[5] Neil Leach, Camouflage (Cambridge: Mass., London: The MIT Press, 2006)
[6] Ibid., 240.

Already mentioned ideologies of functional city and politics of socialism in some way represent the general terminology, but spatio-temporal context of New Belgrade and the phenomenon of camouflage imply further clarification.

2.1 Spatio-temporal context – New Belgrade

New Belgrade is a modern city, which was built in the second half of the twentieth century, on the marshy plain surrounded by rivers Sava and Danube, stretching between the historic cities of Belgrade and Zemun.[7] Construction of New Belgrade, started after Second World War, in 1948th, in the changed socio-political conditions, in order to represents the new capital of the new Federal People's Republic of Yugoslavia. "Its modern urban ethos is derived from the ideas of modern movements, which are formulated and then transformed through the process of great historical and spatial changes of the twentieth century"[8]. The basic structural elements have been taken from modernist concepts of Le Corbusier's Radiant city and project of Lucio Costa for Brasil[9]. However, as Blagojevic had shown in her analysis of the ideology of New Belgrade, the impossibility of modernist / urban, or political ideology "to become homogeneous and hegemonic" new city proved to be a "unique example of which is substantially different" from both paradigms[10].

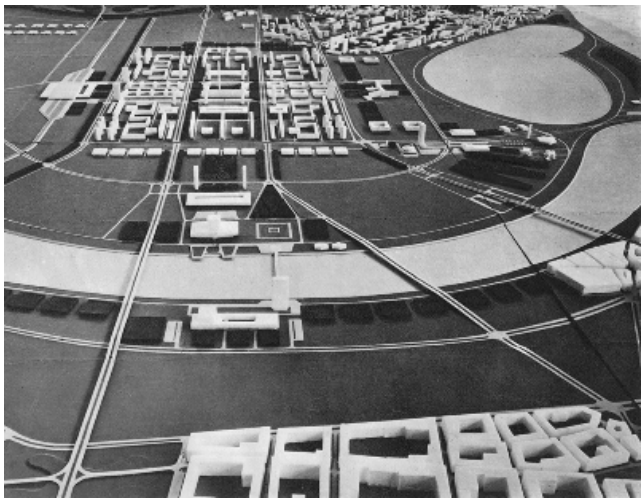

Fig. 1 Scale model of the regulation plan of New Belgrade, 1962[11].

2.2 The phenomenon of camouflage

Starting point of the research of phenomenon camouflage is determined by transition in etymology of the term camouflage, which is manifesting as a gradual change of meaning. The term derives originally from the French camouflet which signify an explosive device designed to ward off enemy miners by making their tunnels collapse. Widespread use of camouflage started from the First World War by the formation of "camouglaged units" with uniforms that are designed to be blended in the immediate surroundings of trenches. Today, the primary meaning of the word camouflage (fr. camouflage) implies disguise, colouring of warlike material so that it is not different from the environment, also baffling[12].

Methodology of camouflage explained Roy R. Behrens claiming that its method is "... not exclusively to make an object blend into the background (blending) or to make it to look like something else (mimicry), but to break up its contours into unrelated components" which can not or hardly can be related with each other[13]. In other words, the phenomenon of camouflage is based on two different tactics – the first is camouflage of primarily physical characteristics in environment and second is camouflage of behavior in the behavior of

[7] The Municipality of New Belgrade, established in 1952, today covers the area of some 4.000ha with population of 236.898 inhabitants. See: www.novibeograd.org.rs
[8] Ljiljana Blagojevic, Novi Beograd: Osporeni modernizam (Beograd: Zavod za udzbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zastitu spomenika culture grada Beograda, 2007), 13.
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[11] Ibid., 183.
[12] According to Serbian official Dictionary of foreign words and expressions, Milan Vujaklija, Leksikon stranih reci i izraza,
[13] Roy R. Behrens. False Colors - Art, Design and Modern Camouflage (Dysart, IA: Bobolink Books, 2002)

another organism or group. At this point, too, we are coming to the threshold of separation of starting point of this research - aesthetic and social camouflage.

Also in this research, the camouflage presents the specific form of representation and identification, beyond the narrow domain of disguise, by which it consistutes the form of symbolization. It operates through the medium of establishing of relations with each other.

3 AESTHETIC ASPECT OF THE CITY

3.1 Functionalism

The basic paradigm of reconstruction or construction of new cities, in the period after the Second World War, was CIAM's concept of functional city that is next to Corbusier's concept of Radiant city - the city of sun, space and green - compiled in Athens Charter (1943). The essence of the concept is the strict segregation of the four main activities - housing, work, recreation and transportation, where housing is almost completely removed from the city center.

Criticism of the functional city, suggested by Henri Lefebvre, indicates adverse circumstances which cause negative implications against individuals as well as collective, namely all users of space. According to Lefebvre's critique there are "towers and straps ominous dimensions, lost in a desolated space", whose disarticulation and isolation means" to kill the city, as it would kill any other living organism". Dissolution of usually connected activities in the urban tissue causes the inability of every single element, and thus city as a whole, and as a consequence loneliness arises:

"Loneliness of individuals, families loneliness, within the family, groups, neighborhoods, apartment buildings, offices ... loneliness causes inertia, and when it becomes collective, it ballasts the social life of communities and collective's movements; it prevents solidarity and sociability and endangers the development of individuals and collectives"[14].

During the 1950s, awareness of the emotional and material needs of people was also inherent to CIAM's advocates, who reinterpreted their goals and strived to work on the formation of an adequate physical environment, in this sense. A particular shift from the severe functional settings was made by Alison and Peter Smithson who put the emphasis in their work on the issues of belonging and identity, and individual's need to be identified with the physical structure of the city - house, neighborhood, street...[15]

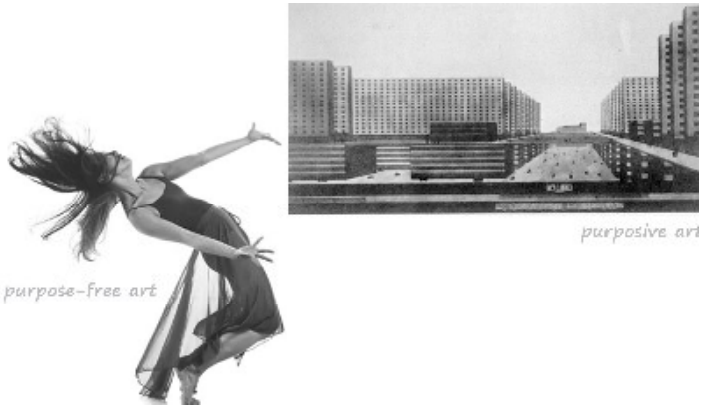

Fig. 2 Purposive and purpose-free arts

3.2 Aesthetic camouflage – identification with the space

Free from ambition to enter the territory of functionalism in modern architecture, we will make use of Adorno's criticism of functionalism, in order to show what functionalist's space actually offers to individuals. Adorno made difference between the functionality itself and an aesthetic of functionality, and argued that what seems to be functional might not prove to be the functional, and vice versa. Also he stated

[14] Henri Lefebvre in Ljiljana Blagojevic, Novi Beograd: Osporeni modernizam (Beograd: Zavod za udzbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zastitu spomenika culture grada Beograda, 2007), 43.
[15] „Urban Re-Identification Document" in Ljiljana Blagojevic, Novi Beograd: Osporeni modernizam (Beograd: Zavod za udzbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zastitu spomenika culture grada Beograda, 2007).

that purposive and the purpose-free arts can never really be separated owing to their dialectical relationship[16]. Finally, Neil Leach establishes unexpected conclusion: "Is the function, then, despite what Adorno said, a little more than an aesthetic category?"[17]

Hence by using the conclusions which Adorno and Leach problematized, functional modern city can be understood as an aesthetic category which is itself able to produce symbols. By assimilating those simbols man becomes able to identify with his environment. In other words, even a functionalism of modernism and paradigm of machine have symbolic importance and allow a man to be identified with them.

4 SOCIAL ASPECT OF THE CITY

4.1 Lefebvre "unitary theory" of social space

Exploration of relationships between the individuals and the city begins by studying Lefebvre's "unitary theory" of social space. According to Lefebvre, conceptual triad is consistuted of: 1 social practices which take place in the space of everyday life, 2 representational space - forms of knowledge and practices which organize and represent space, such as architecture and urban planning, social engineering, etc., and 3 representative space or the space of simbols whose focus is based on the process of creating symbols and meanings of place. By thesis that "(social) space is a (social) product" Lefebvre precisely signifies on different social practices, which establish and represent space[18]. Consequently, in modern societies, the hegemony of the state's institutions and authorities is highly prominenced, by using the knowledge and technical expertise, as well as space, as the means of emboding their power. Lefebvre also indicates the dominance of the state's institutions in the space:

"As a product of violence and war, it is political, instituted by a state, it is institutional. On first inspectiont it appears homogeneous; and indeed it serves those forces which make a tabula rasa of whatever stands in their way, of whatever threatens them - in short, of differences. The notion of the instrumental homogeneity of space, however, is illusory – though empirical descriptions of space reinforced the illusion – because it uncritically takes the instrumental as a given."[19]

From the previous, we are arriving to the final margins of the modern process of the production of space, namely the place of the individuals, users of space, or the city, which is completely neglected. Illusion of happiness of the individual in modern society is consequence of the apparent homogeneity and happiness through collective way of life. Is it possible, through collective way of life, to build identity and to establish identification with the social environment, is the key issue of this aspect of the research?

4.2 Social camouflage – identification with the society

"The urge to identify with our psychical environment is merely a manifestation of a larger desire to establish some connection with culture as a whole, and to overcome the threat of alienation"[20] The question of identification, as it meticulously explains and decomposes Neil Leach, can be simultaneously or independently observed in two planes - the physical and mental. The process of mental assimilation is set as the crucial issue of barrier between man and space (collective) which surrounds him. The identification process is made difficult by the very nature of human psychology and is manifested as a defensive mechanism. In the primary identification the "subject has yet to distinguish its identity from that of other object," while in "secondary identification the subject is able to identify with another object as a separate entity."[21] There is two-fold deterritorialization in overcoming the limits of a single body (human) - the loss of internal boundaries, which allows both the influence of external events on the body and expansion of the inside outward[22]. To summarize this part of research - destabilization of the man's mental level is only temporary, and the new plane of stabilization individual establishes by the overall identification with the social collective, while in this process the collective receives new quality.

[16] Adorno in Neil Leach, eds. Rethinking Architecture: A reader in cultural theory (London: Routledge, 1997), 5.
[17] Neil Leach, Camouflage (Cambridge: Mass., London: The MIT Press, 2006), 48.
[18] Henri Lefebvre. The Production of Space (1974). Translated by Donald Nicholson-Smith (Oxford: Blackwell, 1991), 26.
[19] Henri Lefebvre. The Production of Space (1974). Translated by Donald Nicholson-Smith (Oxford: Blackwell, 1991), 285.
[20] Neil Leach, Camouflage (Cambridge: Mass., London: The MIT Press, 2006), 9.
[21] Ibid., 137.
[22] Greg Lynn. Multiplicious and inorganic bodies. Assemblage 19. December 1992, 47.

5 CASE STUDY OF NEW BELGRADE

5.1 Aesthetic aspect

As the survey of Ljiljana Blagojevic has shown, planning and design of an urban structure of New Belgrade, was not the result of a single modernist concept, but of many interpretations of the modern idea of functional city.[23] The success of an urban structure and thus the city as a living organism with its social, political, cultural and other conditions of individual's life represents the basis of contemporary debates about the New Belgrade. What we can emphasize with certainty, however, is that occasionally through the modernist strategies and concepts awareness of the individual has been crystallized. Contribution to this gives the fact that the ideas and priniples of CIAM has been familiar to Yugoslav architects[24], which practically shows the competition for the New Belgrade in the year of 1947[25]. Indirectly, we can conclude that the progressive manner of the 1950s which has brought the reform to CIAM and Alison and Peter Smithson's "urban reidentification" of an individual, reached Yugoslav architects. An example is given by Yugoslav architect, Milorad Pantovic, an associate of Le Corbusier, who was opposed his theory agains the concept of sterile isolation of Gaden city and of uniform collectivism of socialism in early 1937th: "The modern town has to go for protecting the individual of diminishing of intellectual, moral and psychological value... It should develop all his creative activities, give him health, return to him the unity, on the one hand, and on the other hand, to revive his strong personality."[26]

Question of whether aesthetics and representation of space itself can "overcome" threat from alienation of the individual, also invites the question whether the transformation of object's design - and the reconstruction of subjectivity through design - also call for greater structural, economic and political transformations? Contrary to famous Corbusier's state that by architecture revolution can be avoided, in the postwar Yugoslavia, namely the period of construction of New Belgrade, prevailed the attitude that architectural paradigms, namely modern and functional city, can be applied only by changing sociopolitical relations.

5.2 Social aspect

On the other hand, starting from the hypothesis of Henri Lefebvre that "every society - and thus every mode of production…- produces space, its own space" the New Belgrade could be observed as a specific space, once settled by Yugoslav people, which has been produced by public institutions and knowledge mainly represented by Yugoslav architect.[27] Individuals, even though apparently neglected participated in the creation of space, camouflaged under the mask of the collective. This form of spatial belonging is manifested through the concept of nationalism and national identity. Furthermore, Lach's statement indicates that for National Socialism it is "common that man wants to feel himself as a part of the larger community. We are often capable to almost completely erase our own individuality, while subscribing ourselves to the cultures of conformity..."[28] The question that arises is whether the loss of individuality is negative or, on the contrary, supplemented collective identity is quality?

Lacan psychoanalytic theory even claims that national identity is based on more than just symbolic identification. Lacan believes that national identity denotes a special form of enjoyment through the fantasy of "lifestyle" that threatens to be available to only one particular group, thus an individual, in order to avoid the threat of alienation, is identifying with the group. Furthermore, national identity, as a specific form of social camouflage, is expressed through specific rituals and practices which hold the community.[29]

[23] Ljiljana Blagojevic, Novi Beograd: Osporeni modernizam (Beograd: Zavod za udzbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zastitu spomenika culture grada Beograda, 2007)
[24] Declaration of CIAM from 1928th was completely translated in serbo-croatian language and published in 1932.
[25] Ibid., 31.
[26] Milorad Pantović in Ljiljana Blagojevic, Novi Beograd: Osporeni modernizam (Beograd: Zavod za udzbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zastitu spomenika culture grada Beograda, 2007), 39.
[27] Henri Lefebvre. The Production of Space (1974). Translated by Donald Nicholson-Smith (Oxford: Blackwell, 1991), 31.
[28] Neil Leach, Camouflage (Cambridge: Mass., London: The MIT Press, 2006), 1-2.
[29] Jacques Lacan in Neil Leach, Camouflage (Cambridge: Mass., London: The MIT Press, 2006), 145.

5.3 Conclusion

To summarize, in the case of New Belgrade the question of the individual has been araised as a problem during construction of the city as well as the question of political and social conditions of that construction. National identity, as a specific form of identity and possibility of overcoming the threat of alienating, is formed in this case under the term of Yugoslav identity. In this sense, overall relation between aesthetics and society, namely discourse of architecture and discourse of nation, in the case of New Belgrade gives us an excerpt from concluding considerations from the book Jugoslovenism in Architecture, wrote by Aleksanar Ignjatovic:

"The structure of knowledge underlying the Yugoslav identity does not exist outside of his presentation ... Therefore the architecture can not be simply a reflection of a knowledge of the Yugoslav, but she - as a discourse and as interpretabilna reality - participate in its construction. It therefore can not be passive representation of certain ideological doctrine, there can be phenomenology in which only reflects the political and ideological knowledge, but the discourse of their construction ... „[30]

6 CONCLUDING CONSIDERATIONS

The determinated spatial system is formed by symbols which move through different social networks. In this sense symbols are constructing the social space and become available to every individual who is free to estimate them. From there, the potential for the production of space is being created. The process of decomposition and re-synthesis is what characterizes cubistic techniques and theories which use their strategies, that is - the modern theory and the theory of camouflage.[31]

New Belgrade is the space of representation, or symbols, which resulted from the specific discourse of time, which is determined by modernist practice and political ideology. As addition to this goes Leach's statement that "throug its ornamentation, art responds to the outlook of a particular epoch. It provides that epoch with a set of symbols."[32] However, New Belgrade has been produced as symbol by performing its social function. In other words, architecture of New Belgrade represent discourse in which the Yugoslav national community had been constructed, and hence every particular individual through the mode of camouflage and under the mask of collectivity. Intentions of prevaling ideologies may be failed, but in self-production New Belgrade managed to give rise to the problems of the new urbanity by questioning the position of the individual.[33]

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[30] Aleksandar Ignjatovic. Jugoslovenstvo u arhitekturi (Beograd: Gradjevinska knjiga, 2007), 453.
[31] Urbanists of modernistic avanguarde decompose city on fundamental elements in the same way that cubistic panter do with their motifs, and after thay assembling it, forming very new whole. Vladimir Perovic, Iskustva proslosti (drugo izdanje) (Beograd: Plato), 2000, 31. Gertruda Stein declared that when Picaso had seen camouflaged military vehicles he stated: "We originated that. It's Cubism".
[32] Neil Leach, Camouflage (Cambridge: Mass., London: The MIT Press, 2006), 44.
[33] Ljiljana Blagojevic, Novi Beograd: Osporeni modernizam (Beograd: Zavod za udzbenike, Arhitektonski fakultet Univerziteta u Beogradu, Zavod za zastitu spomenika culture grada Beograda, 2007)

🏆 *reviewed paper*

Stadt - Land - Peripherie - Die Zukunft der Stadt liegt (auch) in der Region!? Eine Erkundung des Zukünftigen zwischen Visionen und Realitäten

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1 ABSTRACT

Stadt - Land - Peripherie - Die Zukunft der Städte liegt (auch) in der Region!? Im Zusammenhang mit diesem Titel, der zugleich eine Arbeitshypothese und Frage darstellt, befasst sich der vorliegende Aufsatz sowohl mit dem Versuch der Beantwortung der Frage nach der Relevanz der Region für die Stadtentwicklung, als auch mit dem Ausfüllen der Hypothese mit konzeptionellem und strategsichem Inhalt. Die räumliche Bezugsebene stellt dabei das Territorium der Bundesrepublik Deutschland in dem Bewußtsein dar, dass die zunehmende Bedeutung der Region als Handlungs- und Entscheidungsebene ein Europa umspannendes Phänomen darstellt. Die Betrachtungen sind sich durchaus bewusst über den Umstand, dass es sich lediglich um, die Thematik anreißende, beispielhafte Blickwinkel handeln kann. Dies ist sowohl dem begrenzten Umfang geschuldet, der für diesen Beitrag zur Verfügung steht, als auch der unheimlichen Komplexität der Regionen-Thematik. Vor diesem Hintergrund sieht sich der folgenden Beitrag als einer von vielen Impulsen für den nach wie vor laufende wissenschaftlichen, politischen und auch gesellschaftlichen Raumentwicklungs- und Regionendiskurs an.

2 STÄDTE IM NATIONALEN UND GLOBALEN WETTBEWERB - EIN KURZER ABRISS

Die Raumstruktur der Bundesrepublik Deutschland sieht sich seit nunmehr bereits etlichen Dekaden einem tief greifenden und sich zunehemend in seinen Problemlagen kumulierenden strukturellen Wandel unterworfen. Dieser Wandel begründet sich in zahlreichen elementaren Entwicklungen, namentlich beispielsweise in der zunehmenden Globalsierung von Arbeit und Gesellschaft und in dem fortschreitenden demographischen Wandel. Diese Gesichtspunkte haben sich deutlich neben weiteren Aspekten zum Teil gravierend in der Raumstruktur niedergeschlagen. Einen Abriss dieser Tendenzen liefert sehr eindrücklich die Betrachtung der letzten Raumordnungsberichte aus den Jahren 2000 und 2005 in ihrer Analogie (BBR 2000, BBR 2005). Man darf in diesem Zusammenhang gespannt auf den kommenden Raumordnungsbericht und seinen Aussagen zu den drängenen Entwicklungspfaden sein.

Für Städte und Gemeinden ergeben sich innerhalb dieser Entwicklungen sehr differenzierte Herausforderungen die unter anderem in einem ressourcenintensiven "Bürgermeisterwettbewerb" um Arbeitsplätze und Wohnbevölkerung, also im Prinzip um Steuergelder, münden, der als Konsequenz die Herausbildung von "Gewinnern" und "Verlierern" mit sich bringt. Analog zur Größe der Städte hat sich hier ein für einige Teilräume nahezu ruinöser Wettbewerb um Ressourcen auf den unterschiedlichen Maßstabsebenen herausgebildet. Dominiert wird diese Diskussion jedoch nach wie vor eindeutig von dem weiterhin vorherrschenden "Metropolenfieber" (Leber/Kunzmann 2006, S.58).

Neben dem "Metropolenfieber" muss zudem noch ein sehr wichtiger Aspekt ergänzend in der Entwicklung einer räumlichen Kategorie die Aring "Regiopolen" nennt und die Wachstumsräume außerhalb der Metropolräume beschreiben gesehen werden (Aring/Reuther 2008). Die elf deutschen europäischen Metropolregionen, die ja neben den Kernstädten selbst auch jeweils weite Teile ihrer Umlandregionen umfassen, beheimateten im Jahr 2007 mit etwas mehr als 50 Millionen Einwohnern gute 61 % der Gesamtbevölkerung der Bundesrepublik. Insgesamt lebten zudem im Jahre 2005 cirka 85% der Bevölkerung in Städten, was bezogen auf den internationalen Vergleich einem Spitzenplatz gleich kommt. Die Entwicklung der Metropolräume mit ihren herausragend wichtigen Gateway-Funktionen als Motoren der Regionalentwicklung ist zweifelsohne, alleine schon aus demographischen und gesamtvolkswirtschaftlichen Gründen, eine unabdingbare und unbestreitbare Zukunftsaufgabe. Diese räumliche Akzentuierung führt jedoch zum Teil sehr deutlich dazu, dass neben den schon durch spezifische, mitunter aus bereits aufgezählten Entwicklungstrends resultierende, real schon zu beobachtende Abhängen einiger Raumtypen, vornehmlich ländlicher und peripherer Räume, nun auch ein Abhängen auf der strategischen Ebene tritt. Desweiteren, auch dies begründet sich überwiegend in der vorherrschenden ökonomischen Kultur, überwiegt deutlich ein Wachstumsparadigma, welches einen Aspekt immens überblendet der vielen benachteiligten Städten und Regionen sehr viel näher liegt als das Motiv des Wachstums: die Stabilität. Es geht in vielen

Bereichen eben nicht mehr nur ausschliesslich darum Wachstum zu produzieren, zu organsieren und dann letztlich zu verteilen, sondern vielmehr das Nebeneindander von Wachstum und Schrumpfung zu gestalten und für einen sinnvollen Ausgleich zwischen begünstigten und benachteiligten Teilräumen, seien es nun Städte oder Regionen, zu sorgen. In diesem Kontext wird sich künftig immer deutlicher die Frage danach stellen, was strategisch gewollt wird und ob unter anderem ein Festhalten an dem Anspruch der gleichwertigen Lebensbedinungen in allen Teilräumen der Bundesrepublik unter den gegebenen Rahmenbedinungen als sinnvoll und vor allem als überhaupt möglich und leistbar zu bewerten ist (vgl. u.a. Weith 2009). Darüber hinaus bedarf es der genauen Prüfung, ob es nicht gänzlich neuer strategischer Ansätze und einem neu abgestimmten räumlichen Zielkanon und ebenso neuer Verteilungs- und Ausgleichmechanismen bedarf. Vor diesem Hintergrund werden unter anderem raumstrukturelle Ansätze und räumliche Modelle wie jenem der großräumigen Verantwortungsgemeinschaften, der sich ohne Zweifel als äußerst diskussionsbedürftig herausgestellt hat, zum Bestandteil des gesellschaftlichen und wissenschaftlichen Diskurses (Hahne/Glatthar 2006). Daneben spielen auch Aspekte der Gemeindefinanzierung, also im Wesentlichen Aspekte aus dem Zusammenhang des kommunalen Finanzausgleichs eine zunehmend wichtiger werdende geradezu herausragende Rolle. Die Städte befinden sich generell und wachsend in einem nach innen (national) und nach außen (international) gerichteten kumulierenden wachstumsorientierten Wettbewerb um knappe und zudem auch knapper werdende Ressourcen, der sich unter anderem auch durch oder in den nachfolgend grob beschriebenen Spannungsfeldern niederschlägt. Es wird bei der nachfolgenden Beschreibung nicht der Anspruch der Vollständigkeit erhoben. Vielmehr konzentriert sich die Darstellung auf einige ausgewählte und signifikant wichtige Themenfelder.

2.1 Zwischen Globalisierung, Regionalisierung und Kommunalisierung

Weder Globalisierung oder Regionalisierung, noch Kommunalisierung sind gänzlich neue Themenfelder. Vielmehr blicken alle drei Aspekte auf eine durchaus längere Geschichte zurück, die zum Teil von sehr großen und kontroversen Diskursen begleitet wurde und gegenwärtig noch wird. Ohne einen differenzierteren Abriss der Entwicklung dieser drei Termini im Detail geben zu wollen, denn dies würde schlichtweg einen eigenen Beitrag rechtfertigen, lässt sich die Position der Kommunen - und hier sind wirklich jegliche Kommunen unabhängig von ihrer Größe und ihrer raumstrukturellen Lage gemeint-im Geflecht von Globalisierung, Regionalisierung und Kommunalisierung durchaus prägnant auf den bildlichen Begriff des Spagates verengen. Städte und Regionen sind mittlerweile zum größten Teil funktional vernetzt und agieren als Knoten in globalen Netzen unterschiedlicher Ausprägung und dies überwiegend vor dem Hintergrund knapper und sich weiter verknappender vor allem finanzieller Ressourcen. Die arbeitsteilige Organisiation der Weltwirtschaft führt ebenfalls zu globalen Netzstrukturen in denen Städte und Regionen spezifische Aufgaben und Funktionen übernehmen.

Neben den Vorteilen einer solchen Organsisation führt ein Impuls innerhalb dieser hochgradig vernetzten Strukturen logischerweise auch zur entsprechenden Resonanz im gesamten Netz, wie es unlängst an dem Beispiel der globalen Finanzkrise sehr eindringlich zu beaobachten war. Es gilt dabei für die Städte und Gemeinden die Auswirkungen der Globalisierung zu bewältigen, ihre Chancen zu nutzen, eine Balance im funktionalen Verflechtungsbereich der Region zu finden und dies kommunal umzusetzen. In der Tat bildet dies einen weitestgehend sehr verinfacht und grob dargestellen Zusammenhang ab, der jedoch sehr gut erahnen lässt, welche Tragweite bereits der vereinfacht dargestellte Zusammenhang entfaltet und welchen Aufgaben sich die Städte und Gemeinden in diesem Rahmen entgegengestellt sehen. Es geht künftig darum, den bislang sehr häufig ausschließlich auf nationalstaatlicher Ebene verwendeten Begriff der Globalisierung, der mittlerweile zweifelsohne auch auf der kommunalen Ebene angelangt ist (Heinz 2008, S. 39), mehr in den Kontext der Region und der Kommune einzubetten und neben der Bewältigung der fraglos mit der Globalisierung verbundenen negativen Auswirkungen auch die Chancen dieser Entwicklung zu identifizieren und regional bzw. kommunal nutzbar zu machen. Eine Stigmatisierung der Globalisierung scheint, gerade auch in Anbetracht der unter den gegebenen Rahmenbedinungen zu beobachtenden Unabwendbarkeit dieser Entwicklung, eine aussichtslose und vor allem auch wenig produktive Herangehensweise zu sein. Hier sind unter anderem auch neue Raumverständnisse, wie sie vor allem auch von Castells unter dem Schlagwort „Raum der Ströme" entwickelt wurden (Castells 2004), und die aus ihnen erwachsenen Konsequenzen in das regionale und kommunale Handeln zu integrieren. An dieser Stelle ist eine gravierende Kluft zwischen der

Enträumlichung der Welt, wie sie sich in Castells "Raum der Ströme" abbildet und der für die Administration von Entwicklungen notwendigen Verräumlichung zu konstatieren. Dies muss jedoch auch vor dem Hintergrund gesehen werden, dass die Reaktions- und Gestaltungspotentiale der Kommunen bezogen auf die globalisierungsbedingten Herausforderungen derzeit nur sehr gering sind, insofern also eine grundlegende Überprüfung und Verbessereung elementarer Aspekte, angefangen mit der Ausgestaltung der räumlich administrativen Ebenen über die Kompetenzverteilung bis hin zur finanziellen Flankierung dringend von Nöten wäre. Eines wird bei der Betrachtung sehr schnell offenkundig und das ist das Faktum, dass sich in Bezug auf die Globalisierung das Rad mit Sicherheit nicht mehr wird zurückdrehen lassen. Vielmehr geht es künftig darum der Globalisierung ein menschenwürdiges Antlitz zu geben und die negativen Störgeräusche der Globalisierung, denn nicht alle Kommunen werden es schaffen eine positive Reaktion auf die Globalisierung zu initiieren, zu kontrollieren und vor allem auch im Sinne einer nachhaltigen globalen Entwicklung zu minimieren (Heinz 2008, S.322). In diesem Kontext siedelt sich unter anderem die Dikussion über die Art und Weise der Steuerung und des Regierens an, die sich im Gegensatzpaar von Governance und Government widerspiegelt. In Bezug zu den konstatierten allgemeinen gesellschaftlichen, räumlichen, ökonomischen und auch ökologischen Entwicklungslinien hat sich die Region als Handlungs- und Entscheidungsebene, gerade auch in Bezug auf die europäische Entwicklung und den Aspekt der Kohäsion, durchaus als besonders relevant, wenigstens aber als besonders untersuchenswert herausgestellt (vgl. u.a. Bloetevogel 2000, S.491 ff.). Alleine die instrumentelle und adminsitrative Steuerung dieser räumlichen Ebene stellt sich vielmals noch, bei allen positiven Aspekten, bezogen auf die gängigen und gegenwärtig implemnetierten adminsitrativen Ebenen und deren Instrumente, als zum Teil sehr inkompatibel und schwierig dar (Adamaschek/Pröhl 2003). Die Diskrepanzen zwischen den globalen, regionalen und den kommunalen Erfordernissen scheint derzeit noch mitunter zu groß zu sein, als das von reellen spezifischen und vor allem auch relevanten Steuerungsoptionen auszugehen ist. Dies soll jedoch nicht als desillusionierte Einschätzung verstanden werden, sondern vielmehr als Appell daran, Strukturen zu schaffen mit denen diese Zukunftsaufgaben potentiell zu bewältigen sind und die die Städte damit aus ihrer mitunter sehr machtlosen Lage befreien und sie in eine komforablere Poistion, die ein nachhaltiges und problemadäquates Handeln ermöglicht, zu versetzen. Diese Strukturen müssten sich durch eine sinnvolle und ausgewogene Balance von harten Instrumenten und konsensualen weichen Kooperationsstrukturen charakterisieren Hierzu finden sich in Kapitel 5 einige diskussionswürdige Thesen und Ansätze.

2.2 Zwischen Wachstum und Schrumpfung

Auch im Begriffspaar Wachstum und Schrumpfung spiegelt sich bei genauerer Betrachtung die im Laufe der Jahre und Jahrzehnte entstandene räumliche Heterogenität wider, so lässt sich zwar noch (!) ein relativ deutliches Gefälle von West nach Ost, sowie von Nord nach Süd erkennen, jedoch verdeckt dieser großmaßstäbliche Trend die kleinen regionalen und sehr differenzierten Begebenheiten, die sich unter anderem häufig in einem räumlich unmittelbaren Nebeneinander von Wachstum und Schrumpfung ausdrücken (vgl. u.a Die Bundesregierung 2008, S.20 f.).

Ebenfalls schwer erscheint die Verknüpfung von Wachstum per se mit Ballungsräumen und Schrumpfung generell mit kleineren räumlichen Einheiten. Auch diesbezüglich schlägt die Heterogenität sich deutlich nieder. Die mittlerweile auch außerhalb der Metropolräume liegenden Wachstumskerne zeigen dies z.B. sehr eindrucksvoll (Aring/Reuther 2008). Allgemein lässt sich feststellen, dass sich die Bereiche des Wachstums jedoch dessen ungeachtet überwiegend auf die Bereiche großer, wirtschaftlich starker Ballungsräume und deren Umland konzentrieren, München und sein Umland kann diesbezüglich als absolutes Paradebeispiel angeführt werden, während sich analog dazu überwiegend in den periphersten Räumen, wie etwa in großen Teilen Mecklenburg-Vorpommerns, deutliche Entleerungstendenzen erkennen lassen. Aber auch hier lässt sich, wie bereits erläutert keine stringente und in sich homogene Aussage formulieren. Demographische Prognosen weisen jedoch darauf hin, dass Schrumpfung durchaus einige Ausnahmen ausgeklammert- München wurde ja bereits genannt- zu einem gesamträumlichen Problem werden könnte bzw. in nicht allzu weiter Zukunft wird (BBSR 2009). Wobei auch hier davon auszugehen sein wird, dass die räumlichen Muster dieser Entwicklung sich sehr divers und vor allem auch dispers darstellen werden.

Angeführt werden muss zudem, dass Bevölkerungsschrumpfung nicht direkt mit wirtschaftlichem Schrumpfen gleichzusetzten ist, denn auch hier zeigen sich sehr heterogene Muster. So kämpfen einige Metropolräume durchaus mit stark ausgeprägten Suburbanisierungstendzen also Bevölkerungsrückgängen,

wachsen jedoch wirtschafltich zum Teil deutlich. Insofern sehen sich gegenwärtig bereits einzelne Städte und Regionen sehr unterschiedlichen und inhomogenen Anforderungen entgegen, die auch sehr deutlich auf der Seite der Strategien zur Daseinsvorsorge aufgegriffen werden müssen. Gilt es doch auch hier, den Spagat zwischen Unter- und Überversorgung und damit den schmalen Grad der wirtschaftlichen Tragfähigkeit auszuloten und in planerische und strategische Prozesse zu integrieren. Das kostenintensive Vorhalten der Daseinsvorsorge weidt einen deutlichen Zusammenhang mit der notwendigen Aufrechterhaltung der kommunalen Handlungsspielräume.

Die Aspekte der Daseinsvorsorge stellen hier jedoch nur einen von vielen wichtigen Aspekten im Zusammenhang von Wachstum und Schrumpfung dar. Daneben spielen auch Bereiche wie der Wohnungsmarkt, Mobilität oder auch energetische Aspekte eine herausragende Rolle. Gerade auch die Reaktion auf und die Anpassung an die klimatischen Veränderungen werden in diesem Kontext in Zukunft weiter an Bedeutung hinzugewinnen. Die sehr ausgeprägten funktionalen Verflechtungen zwischen den einzelnen Raumtypen untermauern die These, dass eine Auflösung von defizitären Zusammenhängen nur auf einem größeren räumlichen Maßstab wie etwa der Region oder Stadtregion und im Rahmen neuer konzeptioneller und modellhafter Strukturen zu lösen sein werden.

2.3 Zwischen Prosperität und Niedergang

Auch der Blick auf die wirtschaftliche Entwicklung der Städte und Regionen untermauert die Erkenntnis eines Höchstmaßes an Inhomogenität. Dies resultiert zunächst einmal originär aus der generellen wirtschaftlichen Ausstattung und elementarer lagebedingter Faktoren einzelner Städte und Regionen die sich als Produkt von ökonomischen und gesellschaftlichen Entwicklungen im Laufe der Zeit zu dem herausgebildet haben was heute beim Blick auf die wirtschaftlichen Strukturen der Bundesrepublik zu konstatieren ist. Bereits diese Feststellung verdeutlicht wiederum, dass Städte und Regionen mit ihren sehr unterschiedlich gearteten Rahmenbedingungen über sehr ungleiche Potentiale und Hemmnisse in Bezug auf eine wirtschaftliche Entwicklung verfügen. Auch hier zeichnet sich diese Entwicklung wiederum durch eine räumliche Nähe von Prosperität und Niedergang aus. In diesem Fall lässt sich die Maßstabsebene bis auf die Ebene der Stadtteile herunterbrechen.

Unter anderem in den alten Industrierevieren wie etwa dem Ruhrgebiet lassen sich sehr signifikant kleinräumige Diskrepanzen zwischen Wachstum und Prosperität auf der einen Seite und Schrumpfung und Niedergang auf der anderen Seite beobachten. Neuere städtebauliche Projekte, wie etwa der Duisburger Innenhafen, forcieren bei allen positiven Aspekten die sich mit dergestaltigen Projekten ohne Zweifel verknüpfen lassen, städtische Disparitäten. Wobei hier einschränkend, wie bereits weiter oben geschehen, anzuführen ist, dass Wachstum im Sinne von Bevölkerungswachstum nicht unbedingt auch mit einem wirtschaftlichen Wachstum gleichgesetzt werden kann. Um diese Erkenntnis zu fundieren muss man nicht unbedingt in die Entwicklungsländer schauen, vielmehr lassen sich auch hierfür Beispiele überwiegend benachteiligter Stadtteile in deutschen Städten finden, die zwar ein Bevölkerungswachstum aufweisen, jedoch von der wirtschaftlichen und sozialen Entwicklung nahezu abgeschnitten sind. In diesem Kontext sind Daten über die Beschäftigtenentwicklung gleichsam Indikator für die Symptome, als auch für die spezifischen Wirkungen. In neuester Zeit hat sich im Rahmen des wirtschaftlichen Strukturwandels ein offenkundiger Bedeutungswandel vollzogen, der sich vor allem in seiner genrellen Tendenz in einer Bedeutungszunahme des Produktionsfaktors Wissen niederschlägt und der unter dem Schlagwort „von der Insdustrie- zur Wissensgesellschaft“ firmiert. Diesbezüglich hat die Bedeutung der so genannten kreativen Klassen extrem zugenommen (Florida 2003). In dieser Bedeutungszunahme drückt sich auch ein zunehmender Wettbewerb um Wissen und kreative Köpfe aus, der Städte in die Lage versetzt für entsprechende Angebote in der Form harter und vor allem auch weicher Standortfaktoren zu sorgen bzw. diese schaffen zu müssen. Der Gesichtspunkt der sozailräumlichen Polarisierung der sich damit verbindet bleibt in der wissenschaftlichen und kommunalen Debatte bedauerlicherweise weitestgehend ausgeblendet. Das Beispiel des Duisburger Innenhafens wurde bereits angeführt. Diese Entwicklung führt dazu, dass sich für viele Städte und Gemeinden die Spirale nach unten weiter fortsetzt, da schlichtweg die finanziellen Mittel fehlen oder die räumliche Lage eine Teilnahme an diesem Wettbewerb schlichtweg ausschliesst. Auch in diesem Rahmen entstehen Teilräume, seien es nun ganze Regionen oder Städte oder aber Stadtteile, die von wirtschaftlichen Entwicklungen fast gänzlich abgekoppelt sind bzw. sich auf dem Weg in die Abkopplung und damit in einer Abwärtsspirale befinden. Diese teilräumlichenPolarisationsprozesse führen wiederum im

Gesamtgefüge zu erheblichen Disparitäten und Schieflagen für deren Überwindung es derzeit weder eine geeignete räumlich-adminstrative Ebene, noch Umverteilungs- und Ausgleichsinstrumente gibt. Auch hier könnte die Ebene der Region zu einer wirksamen strategischen Ebene werden.

2.4 Zwischen Erhalt, Erneuerung und Umbau

Bedingt durch das Zusammenspiel sehr unterschiedlicher Faktoren, die zum Teil in diesem Aufsatz schon angeklungen sind, sehen sich Städte und Gemeinden vor der dringlichen Aufgabe ihre Strukturen mitunter tief greifend zu verändern und sich damit den neuen sehr dynamischen Begebenheiten und Anforderungen anzupassen um im Wettbewerb der Städte und Regionen bestehen zu können. Dabei sind die Möglichkeiten und Erfordernisse dieser strukturellen Veränderungen sehr groß und siedeln sich zwischen den Optionen Erhalt, Erneuerung und Umbau an. In diesen Fällen wird eine nachhaltige und gehaltvolle planerische Entwicklung jedoch nurmehr sehr schwer realisierbar, weil die Komplexität und Heterogenität dessen was Gegenstand der Planung ist, sich als enorm umfassend und vielschichtig darstellt.

Zudem führen Erneuerungs- und Umbauprozesse in den Städten, soviel hat die nähere Vergangenheit der Stadterneuerung und des Stadtumbaus sehr deutlich gezeigt, bei aller Notwendigkeit nicht immer zu den gewünschten Ergebnissen. Die Prozesse sind immer auch von systemrelevanten Resonanzen und Polarisationstendenzen im Stadt- und daraus resultierend oftmals auch im Regionalgefüge begleitet. Diese Resonanzen führen beispielsweise über den Bodenmarkt zu deutlichen Verdrängungsmechanismen und damit zum Teil zu erheblichen und sehr weit reichenden Seggregations- und Gentrificationsprozessen. Im Gefüge von Erhalt, Erneuerung und Umbau spielt neben der absoluten Mikroebene, sprich der Ebene des Quartiers, auch die regionale Ebene eine sehr wichtige Rolle, da hier Verflechtungen als Leitermedium für die beschriebenen Resonanzen fungieren. Sehr prägnante Beispiele in diesem Zusammenhang bieten der bereits angesprochene Bodenmarkt und die regionalen Wohnungsmärkte. Städtische Gefüge zeichnen sich in diesem Fokus eher als wenig reaktiv und in der strategischen Lenkungswirkung als sehr begrenzt aus.

3 VON STADT UND REGION ZUR STADTREGION

Die Städte befinden sich schon immer in fortwährenden Wandlungsprozessen die sich in Spannungs- und Konfliktfeldern ausdrücken wie sie in den vorhergehenden Kapiteln grob beschrieben wurden. Die Dynamik dieser Prozesse hat indessen deutlich zugenommen und teilweise zu einer Krise der Städte, bzw. einer Krise des Städtischen und damit verbunden zu einer Krise der Planung geführt. Auch heute kämpfen Städte mit defizitären Zusammenhängen, angefangen bei der finanziellen Ausstattung, über die Probleme, die mit dem demographischen Wandel einhergehen, bis zu daraus resultierenden sich auf unterschiedlichen räumlichen und inhaltlichen Maßstabsebenen abspielenden satdtstrukturellen Problemen.

Der Typus Stadt blickt dabei auf eine sehr lange Entwicklungsgeschichte zurück, die sich aktuell weiter fortschreibt. Seit etwa mehr als 7000 Jahren gibt es nunmehr Städte. In dieser Zeit haben sich viele Strukturen und Elemente verschiedenster Epochen in den Stadtbildern niedergeschlagen und prägend auf die Gestalt der Städte eingewirkt. Strukturen waren dabei immer bzw. überwiegend als eine Reaktion auf sich veränderende gesellschaftliche, ökonomische und demographische sowie ökologische Entwicklungen und Ansprüche zu verstehen. Während sich die Beziehungen der Städte zu ihrem Umland in der weiter zurückliegenden Vergangenheit sehr einfach auf den Aspekt der Bereitstellung von Nahrung und Ressourcen verkürzen ließ und sich eine Abgrenzung von Stadt und Land oftmals alleine schon durch vorhandene Stadtmauern klar und deutlich manifestierte, sehen wir uns seit geraumer Zeit in einem Prozess hochgradiger Vernetzung, auf allen Ebenenen sehr komplexen Verflechtungen und einer zunehmenden räumlichen Entgrenzung gegenüber.

Die angeführten Verflechtungen sind die Produkte einer Jahrhunderte währenden Entwicklung die nach und nach zum Aufbrechen des Stadt-Land-Gegensatzes und zu einem „Überschwappen“ der Städte über ihre Mauern hinweg und weit in ihr Umland hinein geführt haben. Im Jahr 2005 lebten ca. 85% der Einwohner der Bundesrepublik Deutschland in Städten bzw. verstädterten Gebieten. Es gibt wenige Kenngrößen, die ein größeres Plädoyer für die Stadt als die wichtigste räumliche und gesellschaftliche Einheit abgeben könnte, als dieser statistische Wert. Die Stadt, in welcher Form auch immer, als Kleinstadt, Mittelstadt oder Metropole, als europäische Stadt oder postindustrielle Stadt, ist nach wie vor die wichtigste räumliche, gesellschaftliche und ökonomische Einheit. Jener horrende Wert sollte jedoch nicht falsch aufgefasst werden und zu einer überzogenen Dominanz städtischer Belange in Raumordnung sowie Landes- und

Regionalplanung führen. Dies wäre unter anderem aus raumordnungspolitischer Sicht keinesfalls so gewollt. Dessen ungeachtet ist trotz des immensen Stellenwertes der Städte doch auch eine Relativierung ihrer Position zu konstatieren, die vor allem auch aus der Tendenz zur Enträumlichung zahlreicher Prozesse resultiert. Diese Ambivalenz fusst zudem auf den zunehmenden Verflechtungen mit anderen Städten und Regionen im Rahmen der Globalsierung. Städte als solitäre Gebilde gehören in der Regel-Ausnahmen lassen sich aber mit Sicherheit auch hierfür finden, der Vergangenheit an. Städte sind vielmehr zu Teilen von Regionsgebilden geworden die untereinander sehr deutlich und umfangreich funktional verflochten sind. Stadtregionen setzen sich dieser Logik folgend demnach aus vielen Städten unterschiedlicher Ebenen zusammen. In diesem Zusammenhang ist ein wesentliches Konstruktionsmerkmal von Regionen zu suchen. Die Region als ein so aufgefasstes funktionales Konstrukt scheint diesbezüglich ein untersuchenswertes räumliches Gebilde mit Hemmnissen aber auch deutlichen Potentialen darzustellen. Die Region könnte vor diesem Hintergrund als ein „Raum-Container“ dienen, der das Potential aufweist die offensichtliche Sprengung kommunaler Grenzen funktional wieder zu einer politischen Handlungsebene und einer räumlich-administrativen Einheit zusammenzuführen (Göschel 2004, S.167). Dies setzt jedoch zahlreiche enorme inhaltliche, instrumentelle und strukturelle Umwälzungen voraus.

3.1 Die Region als Handlungs- und Entscheidungsebene für lebenswerte Städte

Alle Betrachtungen haben die sehr heterogenen Zusammenhänge aufgezeigt, und weisen auf die Notwendigkeit der Aufwertung der Ebene der Region als Planungs- und Handlungsebene hin. Diese Erkenntnis manifestiert sich seit längerer Zeit auch in der Fachliteratur und in dem in ihr geführten Diskurs (vgl. u.a. Bloetevogel 2000, Benz/Fürst 2003). Die Umsetzung einer verbesserten administrativen und instrumentellen Ausgestaltung der Regionalebene verharrt jedoch derzeit weitestgehend auf dem Stand des Status-quo, der sich vor allem durch fehlende und/oder defizitäre administrative und instrumentelle Aspekte hervortut. Zwar lassen sich vereinzelte auch sehr erfolgreiche Initiativen ausmachen, wie etwa die Kooperation in der Region Bonn/Rhein-Sieg/Ahrweiler oder die sehr erfolgreichen aber auch hoch formalisierten Regionen Hannover und Stuttgart, um nur einige zu nennen, jedoch sind diese Konstrukte hinsichtlich Inhalt und Struktur überwiegend aus sehr unterschiedlichen Aspekten sehr limitiert, so dass festzuhalten bleibt, dass an dieser Stelle ein hohes Maß notwendiger Ergänzungen und Modifikationen gesehen werden muss. Es offenbart sich in dergestaltigen Konstrukten immer auch die latent vorhandene Legitimationskrise. Teilweise ist jedoch davon auszugehen, dass aufgrund der vorherrschenden administrativen und strukturellen Ausprägungen zahlreiche durchaus sinnvolle Modifikationen Gefahr laufen, sich aufzureiben und insofern zu verebben. Die jahrelang schwälende nordrhein-westfälische Diskussion über die räumliche Ausgestaltung der Regionalplanung hat dies unter anderem sehr deutlich zu Tage treten lassen.

Gleichermaßen scheint eine weitere Ursache im Planungsverständnis und in der vorherrschenden Planungsphilosophie zu liegen, so lässt sich sowohl auf der Seite der Fachwissenschaften als auch auf der Seite der Praktiker ein sehr tief greifender Diskurs unter der Überschrift Governance vs. Government ausmachen. Es geht demnach um die Ausgestaltung und die Strukturen des Regierens zwischen dem vom Volke legitimierten Government und den konsensual und überwiegend informell angelegten und in der Regel über Verträge abgesicherten Governance-Strukturen. Der Begriff der Region hat in diesem Kontext sehr offenkundig an Bedeutung gewonnen, so spricht Bloetevogel zum Beispiel davon, dass Regionen nicht nur ein passiver Resonanzboden des Globalen sind (Bloetevogel 2000, S. 493) und misst ihnen damit durchaus die Fähigkeiten zu, mehr zu sein, als sie dies derzeit sind und von den Rahmenbedingungen her sein können. Regionen können dabei sehr unterschiedlich gefasst werden, so ist auch der Ansatz der großräumigen Verantwortungsgemeinschaften, der im Jahre 2006 Einzug in das raumordnerische Leitbild der Bundesrepublik gehalten hat (BMVBS 2006) ein zwar großmaßstäblicherer, aber dennoch regionaler Ansatz, der genau den Aspekt der Umverteilung auf der Basis der räumlichen Verantwortung thematisiert ohne dabei jedoch hinreichend konkret zu werden. Der Aspekt der Umverteilung stellt neben den adminsitrativen Aspekten offenkundig den zentralen Aspekt einer Regionalisierungsdiskussion dar. Eine wie auch immer geartete Regionalisierungsdiskussion muss künftig oder sollte nachdrücklich zu einer inhaltlichen und räumlichen Konkretisierung der bislang weitestgehend inhaltslosen raumordnerischen Formel der großräumigen Verantwortungsgemeinschaften und damit zu neuen planungsrechtlichen und auch planungsphilosophischen (Regions-)Modellen führen.

4 VISIONEN FÜR LEBENSWERTE, GESUNDE UND PROSPERIERENDE STADTREGIONEN

Die strategische Ebene der Raumordnung und Raumentwicklung im Allgemeinen und Visionen im Speziellen haben in den zurückliegenden Jahrzehnten in einer sich sehr stark deregulierenden und auf Einzelprojekte fokussierten Welt zunehmend an Bedeutung verloren. Während die Ebene der Stadtentwicklung weiterhin sehr viele zum Teil beeindruckende Leitbilder für ihre städtebaulichen Großprojekte produziert, hat sich die Ebene der Raumordnung und Raumentwicklung bedauerlicherweise nach und nach aus diesem Aufgabengebiet verabschiedet. Die Leitbilder und Handlungsstrategien für die Raumentwicklung in Deutschland (BMVBS 2006) sind zwar auf eine ordentliche Resonanz gestossen –die Diskussion über Raumentwicklung wurde dadurch erfreulichererweise temporär ein Stück weit wieder angekurbelt– jedoch lässt sich zum jetzigen Zeitpunkt im Frühjahr 2010 konstatieren, dass die Diskussion wieder abgeebbt und die wichtige strategische Ebene der Raumordnung und Raumentwicklung demzufolge wieder in eine Art „Dornröschenschlaf" verfallen ist. Städte und Regionen brauchen jedoch nichts dringender als starke und stringente, in sich homogene und integrierte sowie integrierende strategische Leitbilder, die gleichzeitig jedoch auch flexibel sind, um geordnet auf die vorhandenen und die sich ankündigenden kumulierenden Herausforderungen adäqaut reagieren zu können.

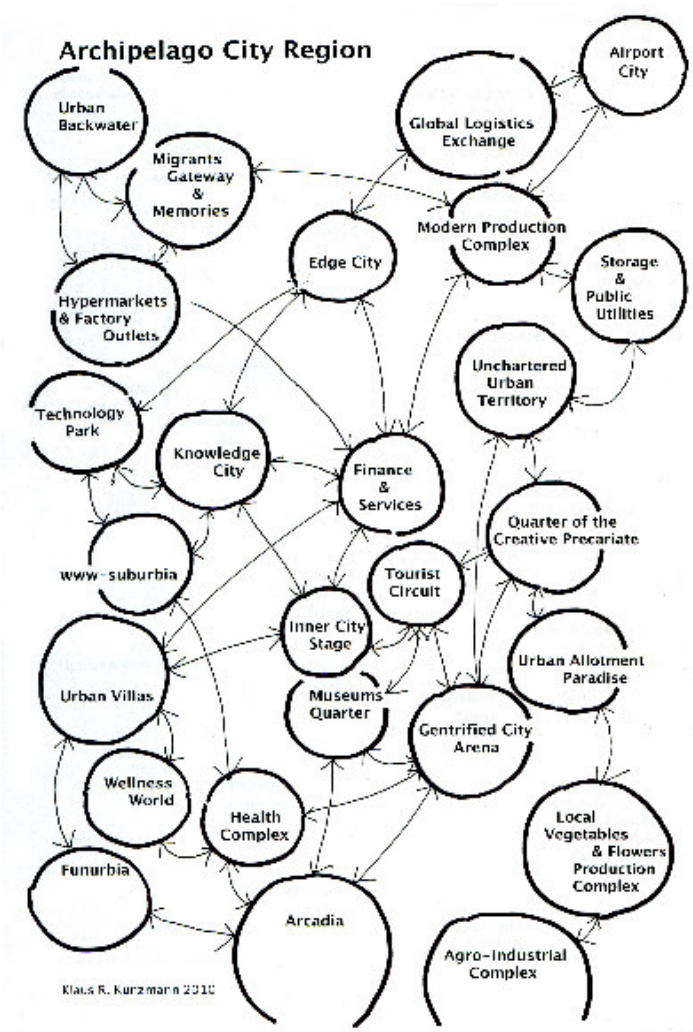

Abb. 1: Der funktionale Archipel der europäischen Stadtregion (Zeichnung: Kunzmann 2010)

Einen ersten elementaren Leitsatz liefert Kunzmann wenn er sagt, dass die Vielfalt der Städte das wichtigste territoriale Kapital Europas darstellt (Kunzmann 2009, S.221). Vielfalt und individuelle Stärken lassen sich in einer Stadtregion, in der viele Stärken und auch viele Schwächen aufeinander treffen, zu einer im positiven Sinne ausgelegten kritischen Masse zusammenführen, wie es sich etwa in dem konzeptionellen Modell des funktionalen Archipels der europäischen Stadtregionen sehr greifbar ausdrückt (vgl. Abb. 1).

Kunzmann vertritt die Ansicht man müsse die Stadtregionen jeweils in ihrer Gesamtheit betrachten. Vor diesem Hintergrund geht er von der Bildung von acht spezialisierten „Inseln" aus, die in Abbildung 1 in einem dunkleren Grau dargestellt sind (vgl. Abb. 1 und Kunzmann 2001). Auch hier bietet möglicherweise

das Modell der großräumigen Verantwortungsgemeinschaften, welches in den Leitbildern und Handlungsempfehlungen zu finden ist (BMVBS 2006) und sehr kontrovers diskutiert wurde einen wichtigen konzeptionellen und strategischen Ansatzpunkt. Das Motiv der räumlichen Verantwortung von „begabten" und weniger „begabten" Städten zueinander und untereinander stellt den zentralen Ansatzpunkt einer räumlichen Vison für Städte als Bestandteil von Stadtregionen dar. Verantwortung von prosperierenden Teilräumen für benachteiligte Teilräume verlangt dabei neue Mechanismen des Ausgleichs und der Verteilung, neue Institutionen auf „neuen" administrativen Ebenen mit neuen Regelungskompetenzen. Diese Ansprüche sind tief greifend und erfordern einen sehr intensiven Eingriff in die implementierten adminstrativen Systeme. Auch das fiskalische System der Gemeindefinanzierung würde demnach beispielsweise nicht ohne weitere Modifikationen von sehr einschneidender Natur auskommen.

Ein wichtiger Aspekt einer Vision bzw. eines strategischen Leitbildes ist die Realisierung eines verträglichen und perspektivischen Spagates zwischen dem notwendigen aber verträglichen und nachhaltigen Wachstum und dem essentiellen Bedürfnis einiger Teilräume nach Stabilität. Des Weiteren muss der gedankliche Unterschied von Stadt und Land der in vielen Köpfen und auch noch in vielen Programmen und Plänen vorherrscht und sich abbildet aufgebrochen werden, ganz der Überschrift einer Publikation von Hans-Peter Gatzweiler folgend „Raumentwicklung ist Stadtentwicklung ist Raumentwicklung. Zur Unteilbarkeit eines inneren Zusammenhangs". Dies ist mitunter auch gemeint, wenn Vertreter der Ministerien im Zusammenhang mit der raumordnerischen „Leitformel" der großräumigen Verantwortungsgemeinschaften von einem Agieren auf Augenhöhe reden. Solches setzt natürlich auch ein völlig geändertes Raumverständnis und eine veränderte administrative und instrumentelle Ausgestaltung der Raumordnung und der Landes- und Regionalplanung voraus.

Raumentwicklung, Landes- und Regionalentwicklung und Planung im Ganzen braucht starke aber auch flexible und damit auf den jeweiligen spezifischen Problemzusammenhang anwendbare Strategien und Visionen. Hier gilt es, den notwendigen Spagat zwischen einem dringend erforderlichen synoptischen Überbau und einem ebenso dringend notwendigen und dem jeweils individuellen Zusammenhang Rechnung tragenden Inkrementalismus zu finden. Entwicklung, dies steht außer Frage, braucht Visionen, die sich ihrerseits aus dem Zusammenspiel des Bewußtseins vergangener Entwicklungen, den Erkenntnissen bezüglich gegenwärtiger Verhältnisse und dem unabdingbaren Gespür für künftig notwendige Entwicklungen und Maßnahmen zusammensetzen müssen. Dies scheint ein durchaus gangbarer Weg zu lebenswerten, gesunden und prosperierenden Städten als Knotenpunkte innerhalb von stabilen Stadtregionen zu sein.

5 LIEGT DIE ZUKUNFT DER STÄDTE AUCH IN DER REGION? 5 THESEN ZUM SCHLUSS

Die in der Überschrift dieser Abhandlung gestellte Frage und Hypothese lässt sich letztlich eindeutig mit ja beantworten. Die Region scheint das Potential zu haben als praktikable räumliche und strukturelle Handlungs- und Entscheidungsebene zu agieren. Diese Antwort muss jedoch mit einem großen „Aber" versehen werden, denn unter den gegenwärtigen Rahmenbedingungen können die Regionen nur sehr schwer diesem Anspruch gerecht werden. Das heisst im Klartext, dass es sehr unterscheidlicher Modifikationen und Veränderungen bedarf, um die Ebene der Regionen und Stadtregionen mit dem notwendigen Rüstzeug auszustatten, um dem gestellten Anspruch gerecht zu werden.

Die folgenden 5 Thesen/Bausteine fassen zum Teil Aspekte aus der laufenden Diskussion zusammen, die von Seiten des Autors als besonders relevant erachtet werden.

5.1 Neue Raum- und Aufgabenverständnisse

Stadt und Land sind im Laufe der Zeit funktional und räumlich zu Stadtregionen zusammengewachsen. Stadtpolitik ist dieser elemntaren inneren Logik folgend immer auch Raumentwicklungspolitik und Regionalentwicklungspolitik (vgl. Gatzweiler 2008). Diese Logik spiegelt sich jedoch bislang noch nicht in allen politischen und planerischen Dokumenten und Instrumenten sowie in den diversen Modellen wieder, so dass hier ein erheblicher Erneuerungs- und Modifikationsbedarf besteht. Ebenso verhält es sich in den Planungs- und Steuerungsphilosophien, wobei hier die Governance-Government-Diskussion bereits zu einer erheblichen Resonanz geführt hat. Auch die Renaissance des "Strategischen" stellt einen wichtigen Baustein dar (Altrock 2004). Jedoch ist auch dieser Diskurs bislang noch nicht in dem Stadium angelangt, das zu

einem Umdenken und zu einer analog dazu notwendigen Um- und Neuausgestaltung des Instrumentariums und der administrativen Ebenen geführt hat.

5.2 Die Vielfalt der Städte ist das wichtigste territoriale Kapital Europas

Dies lässt Kunzmann in eine These in seinem Beitrag zu den Herausforderungen der nationalen Stadtentwicklungspolitik in Europa einfliessen. Dabei zielt die These auf die Geschichte und Geschichten, die kulturellen Traditionen, ihre engagierten Bürger, die zivilen Gesellschaften und die lokalen Ökonomien (Kunzmann 2009). Diese Vielfalt stellt auch die Basis und die krtische Masse für stabile Stadtregionen dar, die es mit alten und neuen administrativen Ebenen und alten und neuen Instrumenten zu schützen und zu entwickeln gilt.

5.3 Wir leben Regional – Es ist Zeit für eine gut funktionierende Regionalentwicklung

„Wir leben Regional – Es ist Zeit für eine funktionierende Regionalentwicklung“ so lautete bereits im Jahre 2007 der Titel eines Positionspapiers der Akademie für Raumordnung und Landesplanung in Hannover (ARL 2007). Dieses Positionspapier stellt vier zentrale Entwicklungen für eine strategische Regionalplanung in das Zentrum der Betrachtungen

verstärkte Koordination und Strategiefähigkeit, das heisst je stärker sektorale Strukturen im Verwaltungssystem sind umso größer ist der Bedarf nach Koordination und Strategiefähigkeit auf regionaler Ebene

„Planungssystemkritik“; das umschreibt den Ansatz der Reduktion der Planvielfalt, sprich z.T die Zusammenfassung von Plänen und Programmen und die klarere Strukturierung von Planung

Neue Steuerungsinstrumente; umschreibt das Feld der Neubestimmung der Steuerung im Verhältnis Staat-Komunen/Staat-Regionen und Regionen-Komunen

Ökonomisierung der Regionalplanung; verstärkte Einbindung der Regionalplanung in ökonomische Steuerungs- und Argumentationszwänge

5.4 Die Balance von Regional Governance und Regional Government

Seit nunmehr geraumer Zeit findet der Diskurs über das Spannunsfeld von Governance und Government statt. Es geht um die Art des Regierens und Steuerns auf allen Ebenen. Hier stoßen Positionen aufeinander die sich zwischen den Extremen des Regierens mit harter Hand und der Deregulierung ansiedeln. Für die Ebene der Region ist dieser Diskurs von enormer Bedeutung, da das Ergebnis dieses Diskurses im optimalen Fall ein System hervorbringen sollte, welches die Region in die Lage versetzt, sowohl auf informeller Ebene im Rahmen von flexiblen Governance-Strukturen aber ebenso auch auf der fomalen und institutionalisierten Government-Strukturen handlungsfäig zu werden. Eines wird bei der Betrachtung dieses Bezugsrahmens sehr rasch offenkundig und dies ist die Tatsache, dass Governance-Strukturen alleine nicht zu einer stabilen Region führen werden. Es wird hier auf die instrumentelle und institutionelle Kraft ankommen die man bereit ist der Region zu verleihen um Inhalte rechtlich-planerisch abzusichern und zu transportieren.

5.5 Von der großräumigen zur regionalen Verantwortungsgemeinschaft

Der Begriff der großräumigen Verantwortungsgemeinschaft wurde 2006 in die Leitbilder und Handlungsempfehlungen für die Raumentwicklung in Deutschland eingeführt. Ein Begriff der aufgrund der fehlenden inhaltlichen Ausgestaltung- hier erprobt ein MORO-Projekt gerade was dies in der Praxis bedeuten kann- zurecht mit erheblicher Kritik bedacht wurde, der jedoch ebenso denkenswürdig ist, da räumliche Verantwortung ein möglicher konzeptioneller Schlüssel für den inner- und den intraregionalen Ausgleich verkörpern könnte. Zudem ließe sich aus diesem Konstrukt eine Art klare aber dennoch flexible Bauanleitung für die Schaffung von, auf den Begabungen der regionalen Teilräume (Städte und Gemeinden) basierenden, kritischen Massen ableiten. Das Motiv der regionalen Verantwortung nach innen, also innerregional aber auch nach außen (intragegional) spielt künftig eine Schlüsselrolle bei der Erreichung der räumlichen Ziele und der Bewältigung der räumlichen Herausforderungen. Eines sollen dergestaltige Raumkonstrukte jedoch nicht erreichen und das ist die Gleichmachung von Räumen. Vielmehr bedeutet Verantwortungsgemeinschaft nichts anderes, als dass sich die Teilräume im Rahmen ihrer Möglichkeiten und Begabungen einbringen und dies dann in der Summe zu einem Ausgleich führt. Es ist klar, dass das Prinzip der regionalen Verantwortungsgemeinschaft der Beteiligung aller Akteure, vom Bürger, über die

Wirtschaft bis hin zur Politik und zur Planung bedarf. Anders ließe sich ein derartiges Projekt nicht realisieren. Dabei darf den regionalen Verantwortungsgemeinschaften jedoch nicht der berühmte Blick über den Tellerrand und der Blick für möglicherweise weiterhin abgehängte Regionen verlorengehen, denn zum einen heisst es von den anderen Regionen zu lernen und zum anderen gilt es auch hier Vernetzungen im Sinne eines horizontal interpretierten Gegenstromprinzips zu schaffen und das Motiv der räumlichen Verantwortung zu stärken.

Der Beitrag hat verdeutlicht, dass zwischen Vison und Wirklichkeit durchaus noch eine mitunter sehr große Kluft liegt. Vieles liegt noch im Argen, seien es nun Aspekte der Instrumentalisierung oder der Institutionalisierung oder aber strategisch-konzeptionelle Aspekte. Die Wissenschaft und auch weite Teile der Politik haben die Ebene der Region als die künftige Handlungs- und Entscheidungsebene identifiziert, ohne jedoch bislang für die notwendigen Umwälzungen und Modifikationen gesorgt zu haben. An dieser Stelle wird noch ein weiterer konkretisierender wissenschaftlicher, politischer und vor allem auch gesellschaftlicher Diskurs gleichsam über Ziele als auch über Maßnahmen und Instrumente vonnöten sein.

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Strategies for Sustainable Cities: Climate Change as a Generator of Development Planning Policies - Belgrade Example

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1 ABSTRACT

This paper considers the impact of climate change on sustainable development of cities and compares the links between the developed countries strategies and the strategy in Serbia. The results of this comparison may be used as guidelines of the future planning process in Serbia.

The paper briefly presents sustainable development concepts in Sweden, the Netherlands and Germany and show that climate change is crucial for sustainable development strategies and new planning policy of these European countries. Then, the paper considers the current sustainable development in Serbia and, particularly, Belgrade city expansion to suburban areas. Finally, the paper explores possibilities of foreign experience application to Serbia planning policies improvements.

2 INTRODUCTION: CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT

The model of sustainable development links the needs of today's generations with the life prospects of future generations and demands that long-term development is designed in a manner which is fair to both. It promotes a dynamic economy, social and territorial cohesion and environmental protection in a peaceful and secure world.

Climate change is one of the greatest challenges facing the world. This issue requires global cooperation, participation of many segments of society and of both producers and consumers. Efforts to slow down and mitigate the effects of climate change will cause enormous costs. But the price of not taking any action is likely to be much higher. In recent years this issue has become a central concern for both, the general public as well as decision makers, owing to frequently occurring extreme weather events and their consequences on the environment, society and regional and local economy (European Communities, 2004; RMNO, 2007).

Adapting spatial planning to climate change has a great potential. It will enhance the quality of land use and make it sustainable. Spatial planning mediates between competing demands on the way land is managed and used. With climate change underway and future change unavoidable, all professional advice and political decisions must now take climate change into account. We need to start today adapting to these changing conditions, to ensure our social, economic and environmental prosperity (ESPACE project, 2008).

3 DEVELOPED COUNTRIES: SUSTAINABLE DEVELOPMENT STRATEGY

The sustainable development concepts of the developed countries are analyzed in the following. The sustainable development strategies of Sweden, the Netherlands and Germany are discussed (European Communities, 2004). A long environmental policy tradition exists in these countries. However, due to the meaning of sustainable development in local context, each country's definition differs according to its culture and society. The analysis aim is to present the focus of these European countries while formulating their own strategies. In this way one can reveal the importance of climate change impact on new planning policy. The mentioned countries have formed general principles of sustainable development on the World summit on sustainable development held in Johannesburg 2002, the EU strategy for sustainable development and the Lisbon strategy (SME, 2004; RMNO, 2007; FGG, 2002).

3.1 Sweden

The main issues of sustainable development in Sweden are analyzed on the basis of the National strategy for sustainable development (2002) and the revised version of this document named A Swedish strategy for sustainable development - economic, social and environmental (2004), both prepared by the Ministry of Environment. The priority of these strategies is the integration of social, economic and environmental dimensions of the sustainable development. It also defines the long term vision, as well as instruments, mechanisms and processes that are necessary to implement the changes. The advantage of the strategy is

reflected in the precisely defined objectives and measures for the achievement of sustainable development (SME, 2002, 2004).

The most important topics of sustainable development are presented in eight core areas: (1) the future environment, (2) limitation of climate change, (3) population and public health, (4) social cohesion, welfare and security, (5) employment and learning in a knowledge society, (6) sustainable economic growth and competitiveness, (7) regional development and regional conditions, (8) development of sustainable community planning (SME, 2004, p.3).

Concerning climate change, the previous strategies main objective refers to achieving balance of greenhouse gas concentration in atmosphere. Particularly, greenhouse gas emissions in the period 2008-2012 have to be at least 4% lower than the values of these gases in 1990. This objective can be achieved by the following measures (SME 2002, p.22):

- istribution of information in order to raise public awareness of climate change
- tax changing in terms of increasing taxes for activities that lead to high emissions of greenhouse gas
- promotion of alternative fuels in the transport sector
- promotion of renewable sources electricity use.

Attention is drawn to the active participation of all community members who have an interest in reducing the climate-changing gases. Thus, the landlords of state-owned real estate are instructed about reducing fossil fuels use. Also, the Government has set up a car industry cooperation program with the aim of developing environmentally reliable technology for the cars of the future. A significant contribution to reducing the impact on the climate change is reflected in the change of production technology, as well as the use of final products (SME, 2002, p.22).

Particularly, the strategy highlights the importance of planning as an instrument for the implementation of the sustainable development priorities. In this sense, integrated approach adoption is important and not focusing to physical environment only. Different interests regarding installation, infrastructure and superstructure must be balanced, which is achieved by planning a healthy environment for future generations (SME, 2002, p.11). Efforts to improve the indoor environment and promote higher quality building design, construction and maintenance standards are to continue. Also, town and country planning must be further developed and brought into line with sustainable development policy goals (SME, 2004, p.19).

3.2 The Netherlands

Analysis of the sustainable development of the Netherlands is presented in the document entitled A New sustainable development strategy: An opportunity not to be missed, which is a report of the peer review of the National sustainable development strategy (RMNO, 2007). The national strategy was written as an Action programme for sustainable development in 2003, named Sustainable action and published by the Ministry of housing, spatial planning and the environment (RMNO, 2007, p. 53).

The main sustainability topics, according to Sustainable action, were: water, energy, health, agriculture and biodiversity - known as the WEHAB themes (Ministry VROM, 2003, p.10). The focus of the mentioned programme is dominantly environmental, but the social dimension and economic sustainability are missing. So, it can be said: “It is not a sustainable development strategy“ (RMNO, 2007, p.14). A New sustainable development strategy (NSDS) repairs the disadvantages of the action plan suggesting the Government to take the opportunity, in partnership with society and all relevant stakeholders, to develop such a NSDS, which should not be just an internal Government’s action plan (RMNO, 2007, p.15). The main topics, beside the WEHAB themes, are: demographic developments, mobility, sustainable production and consumption, and knowledge-based economy (RMNO, 2007, p.46).

As can be seen in the previous paragraph, climate change as a separate topic is not discussed in any document on sustainable development of the Netherlands. However, within the national sustainable development strategy, the mentioned issue is analyzed through the themes of energy and mobility. The fundamental goal includes the need to ensure supply in the long term and the need to reduce drastically emissions of greenhouse gasses. Specifically, the Netherlands should reduce greenhouse gas emissions for

6% during the first Kyoto budget period (2008-2012) as compared to the base year (1990). To achieve this goal, the sustainable development strategy lists the following measures (RMNO, 2007, pp.62-67):

- greenhouse gas emission reduction has to be achieved through technology leaps
- TV and radio commercials are used to influence public opinion on saving energy and climate change
- discussion on climate-neutral nuclear energy is revived
- reduction of gas emissions by one-third in 2050 by using multi-fuel cars and hydrogen buses.

A special segment of the sustainable development strategy is dedicated to the introduction of new planning policies for sustainable neighborhood and city development. There are several successful examples of ecologically sustainable cities, i.e. cities that have adapted their planning policy to the climate change-reducing requirements. Typical elements of these plans include environmental quality of public spaces, e.g. cleaning-up waste, curbing air quality hot spots, developing green areas, abating noise of traffic (road and rail) and similar measures (RMNO, 2007, p.85). It is also concluded that expanding beyond city perimeters led to increased pressure on scarce open space, as well to competition with other functional claims (like ecological network, infrastructure, recreational facilities, water retaining as a part of river basin flood management) (RMNO, 2007, p.84). This is the reason why the concept of 'compact city' is popular again. Sustainable construction became an issue within the environmental community as well. The mandatory energy performance standard allowed the government to set a quantitative requirement, beneficial to local climate change policy as well as the energy bill of new house-owners (RMNO, 2007, p.83).

3.3 Germany

Germany is an international frontrunner in environmental policy. This is the reason why there are many documents considering the mentioned topic. The relevant paper that considers the national sustainable development strategy is Perspectives for Germany: Our strategy for a sustainable development edited in 2002, by the Federal Government of Germany.

German strategy sets out the following broad priority areas: (1) efficient use of energy - effect protection of climate, (2) safeguarding mobility - taking care of the environment, (3) healthy (food) production - healthy eating, (4) structuring demographic change, (5) changing old structures - developing new ideas, (6) innovative businesses - successful economy, (7) reducing the demands on land, (8) assuming a global responsibility (FGG, 2002).

The Federal Government has developed in detail general concept, goals and measures to be taken for the first three of the priority areas for action. The main goal is reducing the greenhouse gases specified in the Kyoto Protocol (CO2, CH4, N2O, PFCs, CFCs, SF6) by 21% (for levels during the period 2008 to 2012 as against levels in 1990). By 2000 a reduction of over 18% had already been achieved (FGG, 2002, p.141). The programme contains many measures, such as (FGG, 2002, p.162):

- ecological taxation reform
- climate protection agreement with industry
- agreement on the maintenance, modernization and development of heat-power cogeneration
- proposal of renewable energies
- market introduction programme for renewable forms of energy
- 100,000-roof programme for photovoltaics
- energy saving regulation
- programme to promote CO2-reducing measures in housing stock
- tax for lorries using autobahns, based on mileage and emissions, starting from 2003
- setting up German energy agency.

The last segment of the strategy is dedicated to the land as the complex structure of ecological, economic and social requirements. A sustainable form of developing the urban structure is quantitatively and qualitatively controlled. The quantitative approach relates to land recycling, to more extensive mixed use and to traffic-

saving residential designs with residential development concentrated at nodal transport points and along transport axes. In the qualitative way, the living environment and the recreational value of open space in inner cities must be improved (FGG, 2002, pp.287-291). There are several measures to achieve this (FGG, 2002, p. 162):

- conserving open space
- controlling residential development at the interface between town and country
- intensifying the development within town and city areas.

Those instruments are postulates in many regional planning concepts under the title 'development inside before development outside'. It means finding new space for housing and commercial uses in the first instance in the existing town and city areas, and not giving a further boost to the process of suburbanisation by comprehensive new build measures on a greenfield site (FGG, 2002, p.296). Also, the particular attention is focused on the 'ecological footprint', which measures human use of the environment in terms of space requirement per inhabitant (FGG, 2002, p.299).

4 SERBIA: SUSTAINABLE DEVELOPMENT STRATEGY

4.1 Serbia

The National sustainable development strategy is adopted in 2008 by the Government of the Republic of Serbia. The document is based on EU documents: the EU sustainable development strategy (adopted in 2001 and reviewed in 2006), and the Lisbon strategy (adopted by the Council of Europe in March 2000). Serbian strategy is harmonized with the UN millennium development goals and the National millennium development goals for Serbia as adopted by the government of the Republic of Serbia in 2006. The prospects for the achievement of sustainable development in Serbia lie in the introduction, adjustment and implementation of the previously mentioned EU documents' principles (Government of the Republic of Serbia, 2008).

The key national priorities which will contribute most to achieving the vision for 2017 are the following: (1) EU membership, (2) development of a competitive market economy and balanced economic growth, (3) development of human resources, increased employment and social inclusion, (4) development of infrastructure and balanced regional development, (5) protection and promotion of the environment and achievement of rational use of natural resources (GRS, 2008, pp.14-16).

However, the climate change topic is not considered explicitly. The possibilities for the mitigation of climate change are taken into account within the last national priority. The main objective is protection and promotion of the environment, preservation and enhancement of environmental protection system and use of natural resources to ensuring their availability for the future generations, which requires (GRS, 2008, p. 16):

- establishing a system of protection and sustainable use of natural values or resources (air, water, mineral resources, forests, fish, wild flora and fauna)
- strengthening the inter-relations and achieving the significant effects between environmental protection and economic growth, integrating environmental policy in other sector development policies
- investing in reduced pollution of the environment and development of cleaner technologies
- reducing the high energy intensiveness of the Serbian economy and providing for a more efficient use of fossil fuels
- promoting the use of renewable energy sources
- planning sustainable production and consumption and reducing waste generation by unit of product
- protection and preservation of biodiversity.

It is interesting to discuss how the above recommendations can be achieved. The present situation of climate change in Serbia is described in the following.

Serbia is not considered as a significant emitter of carbon dioxide. In the territory of Serbia, this gas is primarily generated through the combustion of fossil fuels in power plants and heating plants, in transport

and partly by households which are heated in this manner. The identified problems include lack of a national inventory of greenhouse gasses and lack of strategic documents on climate change (a strategy for implementation of clean development and national strategy for climate protection). It is important to stress that legislation on emissions is not harmonized with that of the EU, as well the existing institutions are not adjust to the needs of active implementation of climate protection policy and obligations resulting from the international agreements (UNFCCC, Kyoto Protocol) (GRS, 2008, pp.89-90).

To solve those problems means to establish more institutions regarding the problem of climate change. Existing institutions are not sufficient. As it is said in the strategy, beside the Environmental protection agency, which is linked with European environment agency (EEA) and European environment information and observation network (EIONET), there is a need for new institutional structure. One of them is the Agency for sustainable development, which can become operational through establishing and strengthening the new institution, such as the National centre for climate change (GRS, 2008, p. 113).

The issue of spatial planning is not particularly considered within the Serbian sustainable development strategy. This is the main difference between Serbia and the developed countries. The result of inadequate planning policies can be seen on the example of Belgrade.

4.2 Belgrade

Belgrade, as a city in transition, is undoubtedly interesting due to its investments and building in suburban zones. Greenfield investments in the area of Belgrade are popular because of the following (Gligorijevic, 2007, p. 86):

- lack of appropriate legal and financial framework of business and investment (unknown origin of capital, unfavorable credit conditions, typically relying on transitional benefits through corruption in all sectors, etc.)
- cheap suburban unsettled land that is planned for construction
- favorable privatization of state-owned enterprises in urban locations and
- large inflow of capital of different origin.

In terms of socio-economic transition towards market economy system, the problem of brownfield sites is unjustifiably neglected. In addition to this, the concept of brownfield sites is not yet officially defined. In the Master plan of Belgrade for 2021, which was published in 2003, there is no request for revitalisation of existing brownfield sites. The city government creates the possibility of greenfield investment by attracting investors in accordance with their requirements and needs of the assigned use of undeveloped land. Also, the term ‘brownfield regeneration’ is not even mentioned explicitly in the new Law on planning and construction (2009), while the concept of urban renewal occurs only in the glossary. Benefits of brownfield regeneration have been recognized by the experts, but their implementation in new planning documents is expected in the future.

The research results on the effects of brownfield regeneration in Belgrade, conducted by a group of experts are published in the proceedings titled “The brownfield revitalisation in Serbia” (Gligorijevic, 2007, p. 86). The first advantage of brownfield regeneration is significant improvement of the air quality in the city, due to the reduction in number of vehicles. Another advantage is that a compact city, which arises through the development of brownfield sites, requires less energy for heating and cooling. According to statistics, residential buildings with five units use half the energy of individual residential villas (Gligorijevic et al., 2007, p.132).

Another advantage of the brownfield regeneration refers to the fact that densely built parts of the cities do not have too many open areas, as well as the large swimming pools, which are an integral part of individual family houses on the outskirts of the city. This contributes to water and tanks use reduction and therefore reduced possibility of contamination.

As the following argument, which goes in favor of rebuilding within the existing urban area, the authors (Gligorijevic et al, 2007, p.134) notify rational use of land, which is reflected in the preservation of existing ecosystems and open space. Also, if there is no need for green space within the existing urban structure, brownfield site can be used as an open space.

In the end, experts say that the brownfield regeneration means clearing potentially contaminated land, which is useful for public health (Gligorijevic et al, 2007, p.133). Investment in brownfield is investment in better living and working environment. In this way, the health risks created by the presence of solid waste, pollution of groundwater and soil are eliminated.

From the previously presented arguments can be concluded that there is a need for integration of the environmental policies into other sector policies, especially in the sector of spatial and urban planning. Firstly, it is necessary to build capacities to implement the strategic environmental assessment of policies, plans and programs, according to the law. Also, the adoption of the Strategy of spatial development of the Republic of Serbia is one of the priorities (GRS, 2008, pp. 73-74). Secondly, in the existing national sustainable development strategy, the land is treated only as agriculture land and not as a resource of the global importance (GRS, 2008, pp.79-80). Other problems in implementing environment protection measures in the area of spatial and urban planning and housing refer to: unsatisfactory inter-departmental and inter-sector cooperation; insufficient training of local government divisions and their weak financial capacity for implementing the duties stemming from legislation and planning (Karadzic and Mijovic, 2007, p.12).

We can understand the relation between spatial planning and climate change from the previous paragraphs. Sustainable development strategy is seen as an instrument for notifying environmental problems and defining solutions to minimize negative environmental impacts. The potential of strategy is presented in considering alternatives and the expected changes within law regulation and the strategy will contribute to more environmentally sound plans (Crncevic and Therivel, 2009, pp.102-103).

5 CONCLUSIONS: TOWARDS PLANNING SUSTAINABILITY

The Kyoto Protocol specifies that all developed countries are obliged to reduce greenhouse gases emissions between 2008 and 2012 by an average of over 5% as compared to 1990 levels. Therefore, the developed European countries' goal is greenhouse gas emissions reduction. Developing countries are not subject to such obligation under the Kyoto Protocol, but they have to consider the climate change issue as well.

The climate change has impact on spatial planning in the developed European countries. Economical use of land, compatible with nature and society, is essential element of sustainability. Within the EU framework of spatial and urban planning legislation, many instruments of sustainable development already exist and are used. Profitable land use supports sustainable development. For example, profitable is the reuse of land which has fallen into disuse, or the release of land which have not been used for a long time.

Developed European countries (Sweden, the Netherlands, Germany) and Serbia strategies comparison shows that climate change is equally important to all of these countries and that they have common idea on environmental protection and sustainable development.

Regarding Serbian experiences presented previously in this paper, it should be noted that environmental issues are quite well presented in the strategy. However, strategy implementation is not yet seen as a process, so there is a need to integrate strategy with plan making process. The lack of both relevant institutions and planning documents measures is obvious. Plan implementations are not sufficient. Spatial monitoring and reporting are deficient as well.

To achieve sustainability, Serbia planning policy should perform the following activities:

- make climate change adaptation a core objective of spatial planning
- combine change and risk management approaches to integrate climate change adaptation into planning
- harmonize current legal framework with strategy and planning process
- strengthen public involvement
- fund appropriate research on climate risks during early stage of spatial planning process
- develop long-term solutions to address the challenges that climate change poses to existing land uses.

These activities can be achieved by adopting and implementing the National Environmental Strategy of Serbia. That strategy implementation requires capacities improvement of institutions relevant to

environmental protection, such as the Environmental protection agency, the Environmental protection fund, the Agency for sustainable development and others.

The knowledge on climate change is developing rapidly. Spatial plans should protect communities against climate change risks and take advantage of eventual opportunities that climate change may bring. Long term spatial plans and measures must be revised regularly in order to be effective. It is important that spatial plans are reviewed according to the latest climate change data.

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reviewed paper

SUPPORT – A Strategic Planning and Decision Support Instrument for Environmental Urban Planning in Berlin

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1 ABSTRACT

The city of Berlin aims at intensifying the consideration of environmental aspects of urban developments at an early stage of the legal planning processes. Therefore a strategic planning and decision support instrument is being developed. Environmental impacts of planning alternatives and scenarios concerning the whole city as well as for future use concepts at large scale urban subspaces shall be indicated.

The integration of a strategic planning instrument into decision-making processes makes a standardized, continuable data processing, based on assessment of areas necessary. Different geospatial planning and environmental data, which have been administerd separatly in different departments of the Berlin Senate, need to be interdepartmentally collected and processed. The implementation and sustainable functionality of an interdisciplinary tool involves specific demands regarding the availability, quality, and actuality of the processing data.

A great challenge is the appraisal of less predictable environmental effects caused by the imprecise character of information at strategic planning levels. An approach for the assessment of environmental effects of large scale planning alternatives and scenarios will be presented and discussed.

2 INTRODUCTION

Starting point for the development of a strategic environmental scenario tool was the implementation of the European Commission's Directive on Strategic Environmental Assessment (SEA Directive) (EC 2001). This European 'law' requires an environmental assessment of the effects of formal plans and programmes which set a framework for subsequent planning levels. For (informal) planning concepts this instrument is not implemented systematically, until now.

In Germany, the Strategic Environmental Assessment regulations have been transposed in the German federal building code (2004) and the Environmental Impact Law (2005). The SEA shall ensure that the likely significant environmental impacts of plans and programs are taken into account. Contrary to the project based Environmental Impact Assessment (EIA) the Strategic Environmental Assessment proactively informs decision-making by providing for suggestions on what alternatives to consider. It should help to identify best practicable options or alternatives for minimizing negative environmental impacts within the decision process in accordance with sustainability principles (FISCHER 2007; DALAY-CLAYTON & SADLER 2005; THERIVEL 2004).

In Berlin, Strategic Environmental Assessments are required for the city-wide Land Use Plan (Scale 1:50.000) as well as for the Landscape Programme (Scale 1:50.000) and other technical plans and programs. To provide a tool for a more operationalized environmental reporting on this superordinate level and to simplify the complexity of environmental statements for planning in Berlin a strategic planning and decision support instrument is being developed. Its main objective is to intensify the consideration of environmental aspects in urban planning processes at an early stage not only for formal but also for informal plans and decisions (FERRETTI et al. 2009).

The tool follows and facilitates the obligatory steps of the preparation of an Environmental Report:

- 1. describing the relevant legal reglementations
- 2. taking stock of the current state of the environment

- 3. Prediction of the likely significant environmental effects
- 4. Assessing Alternatives.

2.1 Preliminary work – Methodical Framework for the SEA

The Technical University of Berlin, Department of Environmental Planning and Policy (Prof. Köppel) and Department of Geoinformation Processing for Landscape and Environmental Planning (Prof. Kleinschmit) developed a methodical framework for the environmental evaluation of the preparatory land use and landscape planning process in the Strategic Environmental Assessment on behalf of the Senate Department for Urban Development (KÖPPEL et al. 2009).

A survey analysis has to be conducted for following assets: population, human health, animal and plants, biological diversity, soil, water, air, climate, landscape, culture, interrelationships (see § 2 (1) Nr. 1-4 German Environmental Impact Law). The Strategic Environmental Assessment does not develop any new environmental goals, but rather compiles existing environmental goals to determine relevant indicators for the survey analysis. A five-stage master scale indicating the weighing resistence in the planning process was developed, which allows different situations to be brought into a comparable formal frame (see Fig. 1). It signifies either the quality potential or the risk potential for a specific asset. This scale was transferred to 17 different environmental aspects. The Restriction area indicates areas with legally binding criteria which cause an unacceptable risk (e. g. exceeding of a respective threshold for noise pollution) or damage (e. g. land use in a water conservation zone I). The four Precaution areas indicate the quality potential of areas or the degree of an existing damage; precaution area I distinguishes areas with a very high technical or scientific relevance (quality potential) or with the highest need of preventing risks or hazards (risk potential) in Berlin (see Fig. 1).

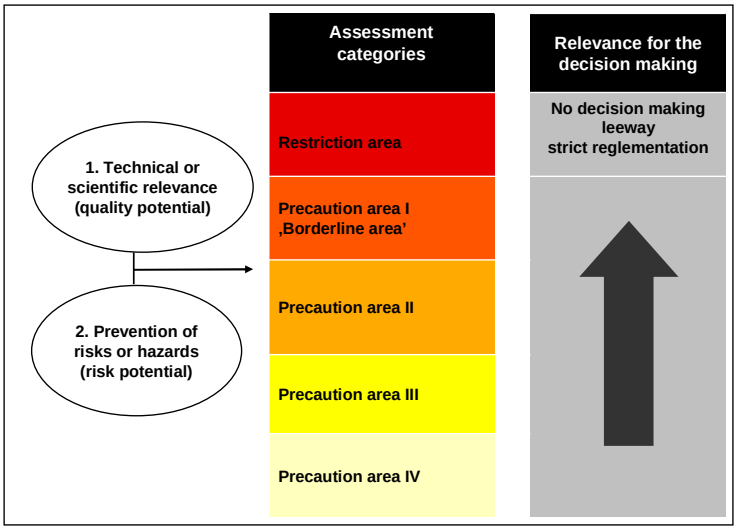

Fig. 1: Methodical framework for environmental evaluation (HERBERG et al. 2007, 79)

Many different existing assessments and data where taken into account and got involved according to the five assessment stages of the methodical framework (vgl. HERBERG et al.2007; KÖPPEL 2007).

An important requirement was the availability and accessabilty of environmental geodata. Necessary spatial data and scientific assessments were especially obtained from the Berlin Digital Envionmental Atlas, which represents an information system with basic urban and environmental data. It provides information on about 80 topics represented in approximately 400 maps including technical data (Senate Department for Urban Development 2010, online; WELSCH 2009).

2.2 Strategic Planning and Decision Support Instrument (SUPPORT)

Intensified foresighted operating on superordinate strategic planning levels shall increase environmental focus in Berlin's city area. The project SUPPORT is contributing to this aim by setting up an exemplary multiscale and –temporal concept (information system) within the project 'Strategic Planning and Decision Support Instrument' funded by the Deutsche Bundesstiftung Umwelt (DBU). The project is a cooperation between the Department Environmental Planning and Policy and the Department of Geoinformation

Processing for Landscape and Environmental Planning at the Berlin University of Technology and the Senate Department for Urban Development Berlin. It will amplify the way impact assessments on strategic and informal level are carried out by automatised appraisal. Moreover, the project aims at systematically integrating environmental considerations in the urban planning through a top-down approach. Therefore, the purpose is to create an interoperabilty in the heterogeneous geospatial planning and environmental data used for this instrument.

Environmental impacts of planning alternatives and scenarios concerning the whole city as well as future use concepts for large scale urban subspaces shall be indicated. Strategic actions, like the updating of the land use plan for a metropolitan area like Berlin, by their nature have wider ranging and less predictable outcomes than individual developments, for instance a legally binding master plan for a small spatial expansion. Therefore the assessment of the possible effects of strategic initiatives will be characterized by a high level of uncertainty. Methodological constraints for the assessment of environmental impacts of strategic plans or decisions are a wide geographical scale, extended time horizons and oftentimes a broad range of alternatives. Therefore methods and techniques should aim at simplifying the frequently complex issues under consideration at strategic decision-making levels. On the level of plans and programms argumentative assessment predominates (FISCHER 2007). In SUPPORT it is aspired to develop a spatial explicit method.

An important key aspect known for the formal Strategic Environmental Assessment is tiering. Tiering is to avoid duplication of issues in assessments of policies, plans, programs and projects. Therefore, once an issue has been assessed at a higher level it is not required to be considered at a lower level, other than perhaps to provide essential detail not provided in the prior assessment (JONES et al. 2005; JILBERTO in CARATTI 2004; FISCHER 2007; THERIVEL 2004; GONZALES DEL CAMPO 2008).

Below an introduction to the interoperability of spatial data as key requirement for the development of a spatial explicit planning instrument is described in chapter 2.2.1. and choosen scenario case studies of the SUPPORT-project are presented in chapter 2.2.2.

2.2.1 Interoperability

The implementation and sustainable functionality of an interdisciplinary tool requires a standardized, continuable data processing assessment of areas. This involves specific requirements regarding the availability, quality and actuality of the processing data. Different geospatial planning and environmental data, which have been administerd separatly in different departments of the Berlin Senate, are required to be interdepartmentally collected and processed. The city of Berlin offers a very good database for this purpose. Most data are provided by the environmental information sytem Berlin Digital Envionmental Atlas but also planning data (e. g. Landscape Programme) and other scientific data (e. g. species mapping) should be integrated (see HERBERG et al. 2007).

Therefore structural, semantic, and geometric heterogeneities in the data sets are an obstacle for the wide and integrative utilization of spatial information (see KIELER et al. 2007; VANDERHAEGEN & MURO 2004).

In general for establishing more homogeneous data-structures the INSPIRE (INfrastructure for Spatial InfoRmation) - Directive 2007/2/EG aspires to establish an infrastructure for spatial information in the european community for the purposes of community environmental policies and policies or activities which may have an impact on the environment (see Art. 1 Directive 2007/2/EG). It aims to allow users to identify and access spatial or geographical information from a wide range of sources in an interoperable way for a variety of uses (VANDERHAEGEN & MURO 2004). This advantageously affects the integration of environmental data for the development of such a strategic planning instrument, but has not yet been implemented in Berlin. The process of homogenization of environmental data initiated by the INSPIRE-Directive will last at least until 2019 in Germany (GDI-DE 2010, online). Not till then all relevant data will be provided homogeneously in Berlin. In addition different departments of the Berlin Senate are responsible for the accomplishment of environmental tasks and the associated data in Berlin, what is exacerbating this process.

Therefore first approaches to overcome the heterogeneties above mentioned are analyzed within the project. This includes for example a method for the necessary aggregation of incompatible spatial data with different spatial granularities or a first approach for the overcoming of semantic heterogenities for two different land use data (KÖPPEN et al. 2008; FÖRSTER et al. 2009).

2.2.2 Scenario-Case studies

To test the practical relevance of the tool scenario-case studies of current urban development processes were chosen. They had to be of relevance for the entire metropolitan area and at the same time suitable to demonstrate the field of application of the tool. The scenariocase studies were determined in cooperation with the concerned units in the Senate Department for Urban Development. It was decided for two kinds of scenarios: environmentally and constructional caused impacts in the urban surroundings. The first case study defines climate change as the impacting factor. Against this background a scenario integrating future demographic developments accompanied by changed land uses and respective alteration in bioclimatic conditions is described and assessed as well as a 'climate optimized' biotope network. Another strand analyzes climate relevant spaces within the building inventory in combination with green house gas emissions to show areas with prior need for climate protection and adaption measures.

The second scenario is an appraisal of the further development of the airport hub Berlin-Brandenburg International and the parallel process of putting out of operation of Berlin's two inner city airports. For these unique conversion processes the changed air and noise pollution as a consequence of modified traffic flows especially along the main routes leading to or from the airport surroundings are considered. Two approaches will be tested: The first one working with the more standard overlay method. The second scenario is more complex and will build on a tool for traffic modeling, whose results will be used to show potential impacts on the environmental assessets. In the following section the case study "airports Berlin" will be discussed.

3 CASE STUDY "AIRPORTS BERLIN"

In cooperation with the Senate Department for Urban Development it was determined to develop an "airport scenario", taking up and combining the assessment of the conversion of Berlin's two inner city airports and the expansion of the international airport in the metropolitan region Berlin-Brandenburg. The closing down of the inner city airports Tempelhof (380 ha) (2008) and Tegel (460 ha) (2011) were preconditions for the expansion of the airport Berlin-Brandenburg International (BBI) (existing airport Schönefeld).

The further development of the airport Berlin-Brandenburg International entails enormous opportunities for the designation of residential land and commercial or industrial land in the surrounding area. The former airport Schönefeld will be expanded to a 1.470 ha large area. The surrounding area offers more than 900 ha legally binded land for commercial or industrial use and 450 hectares land for residential use. Beyond that, further 1.330 ha of potential commercial and 780 ha of potential residential land are identified (see MIR / SENSTADT 2007).

The expansion of the airport Berlin-Brandenburg International and associated infrastructure not only causes environmental impacts directly in the project area. It also coincides with large-scale changes of land uses, work places, and traffic flows impacting on the urban environment of the whole city. The formal environmental impact assessment (EIA) (completed in 2004) focused on analyzing the environmental impacts directly in the airport region. A superordinate analysis of city-wide impacts for example through changed traffic flows was not legally required. The SUPPORT project aims at conducting an assessment of those city-wide impacts using the example of changed air and noise pollution due to a change in traffic volumes. A first approach will be presented in chapter 3.1 and further developments will be shown in chapter 3.2.

3.1 First Approach for the Appraisal of Air Pollution

3.1.1 Method

Aim of the approach presented below is to assess the changed air pollution due to an increase in traffic volumes especially along the main routes leading to or from the BBI surroundings and a decrease in traffic flows around the closed inner two city airports. For the support of strategic decisions it is important to simplify applied methods and techniques to avoid seeming accuracy and to handle a high level of uncertainty in an adequate manner (see FISCHER 2007). This approach is based on the existing air pollution assessment of the developed SEA assessment framework for Berlin (see chapter 2.1). The assessment classifies the pollution of nitrogene dioxide (NO2) and particulate matter (PM10), the two most problematic traffic caused pollutants in Berlin (Senate Department for Urban Development 2008a, online, 4). Criterion is the degree of exhaustion of existing tresholds for both pollutants, for instance formulated in the 22. Federal Immission

Control Ordinance (22nd BImSchV) (KÖPPEL et al. 2009, 32ff.). These values are not legally binding for land use planning and can be considered as technical thresholds, which is an important measure for practical planning purposes and restrictions. The mean emission limit value for one year for both pollutants is 40µg/m3. This value is taken into account for the classification in the assessment matrix (see Fig. 2).

Main database is the map Traffic-Related Air Pollution – NO2 and PM10 of the digital environmental atlas from 2008 (Senate Department for Urban Development 2008b).

Fig. 3 illustrates the assessment of the NO2 and PM10 pollution along the main streets according to the scale in Fig. 2.

Assessment categories	**Classification criteria (not all criteria have to apply)**
Restriction area	**Not existent (no legally binding treshholds for land use planning)**
Precaution area I ‚Borderline area'	**Exceeding or reaching 90 – 100 % of technical tresholds of NO_2 and PM10 pollution**
Precaution area II	**reaching 75 – 90 % of technical tresholds for NO_2 and PM10 pollution**
Precaution area III	**reaching 60 – 75 % of technical tresholds for NO_2 and PM10 pollution**
Precaution area IV	**reaching 25 – 60 % of technical tresholds for NO_2 and PM10 pollution**

Fig. 2: Assessment Matrix for NO2 and PM10 pollution along the main streets of Berlin

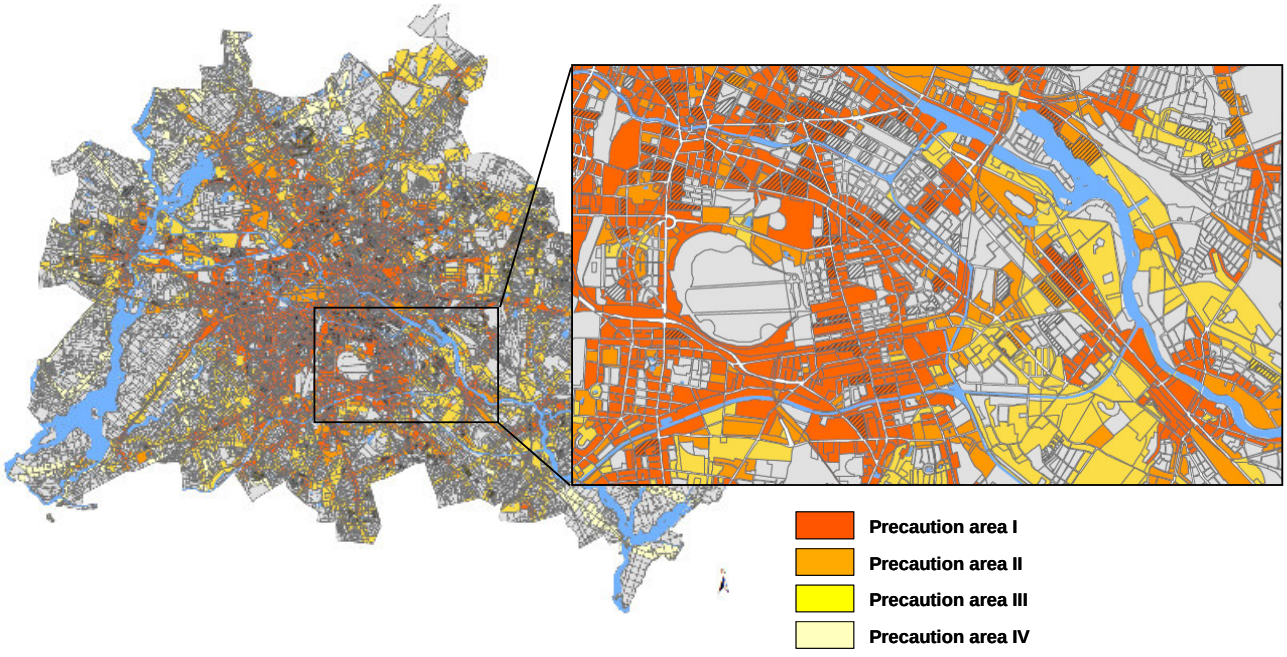

Fig. 3: Assessment map – air pollution

Based on that it is assumed that within a corridor (in this example 500 m) along the main routes leading to or from the BBI the traffic caused air pollution will considerably increase. Another assumption is, that the increase of traffic flow will extenuate with increasing distance to the airport BBI. Three different impact areas are determined. In a 5.000 m distance to the airport BBI a high, in 10.000 m a moderate and in 15.000 m a low increase of traffic flow is assumend. By overlay with the assessment categories of the current air pollution the increasing contamination degree was determined with an ordinal assessment scale. Fig. 4 illustrates the matrix for the comparison of assumed traffic flow increase (vertical) and current air pollution (horizontal) and the appraised contamination degree.

In contrast to the increase of traffic volumes around BBI airport a decrease of traffic flow is assumed within the same distances around the two closing down inner city airports Tempelhof und Tegel. In 5.000 m distance to the airports Temeplhof and Tegel a high, in 10.000 m a moderate and in 15.000 m a low decrease of traffic volume is assumend.The matrix in Fig. 5 illustrates the assumed traffic volume decrease (vertical) and current air pollution (horizontal) and the appraised releases. Fig. 6 shows the results of this first appraisal.

Assessment air pollution **traffic volume change**	**Precaution area I**	**Precaution area II**	**Precaution area III**	**Precaution area IV**
5.000 m (high increase)	high pressure	high pressure	moderate pressure	low pressure
10.000 m (moderate increase)	high pressure	moderate pressure	moderate pressure	low pressure
15.000 m (low increase)	low pressure	low pressure	low pressure	low pressure

Assessment air pollution **traffic volume change**	**Precaution area I**	**Precaution area II**	**Precaution area III**	**Precaution area IV**
5.000 m (high decrease)	high release	high release	moderate release	low release
10.000 m (moderate decrease)	high release	moderate release	moderate release	low release
15.000 m (low decrease)	low release	low release	low release	low release

Fig. 4: Assessment Matrix – pressure air pollution. Fig. 5: Assessment Matrix – release air pollution

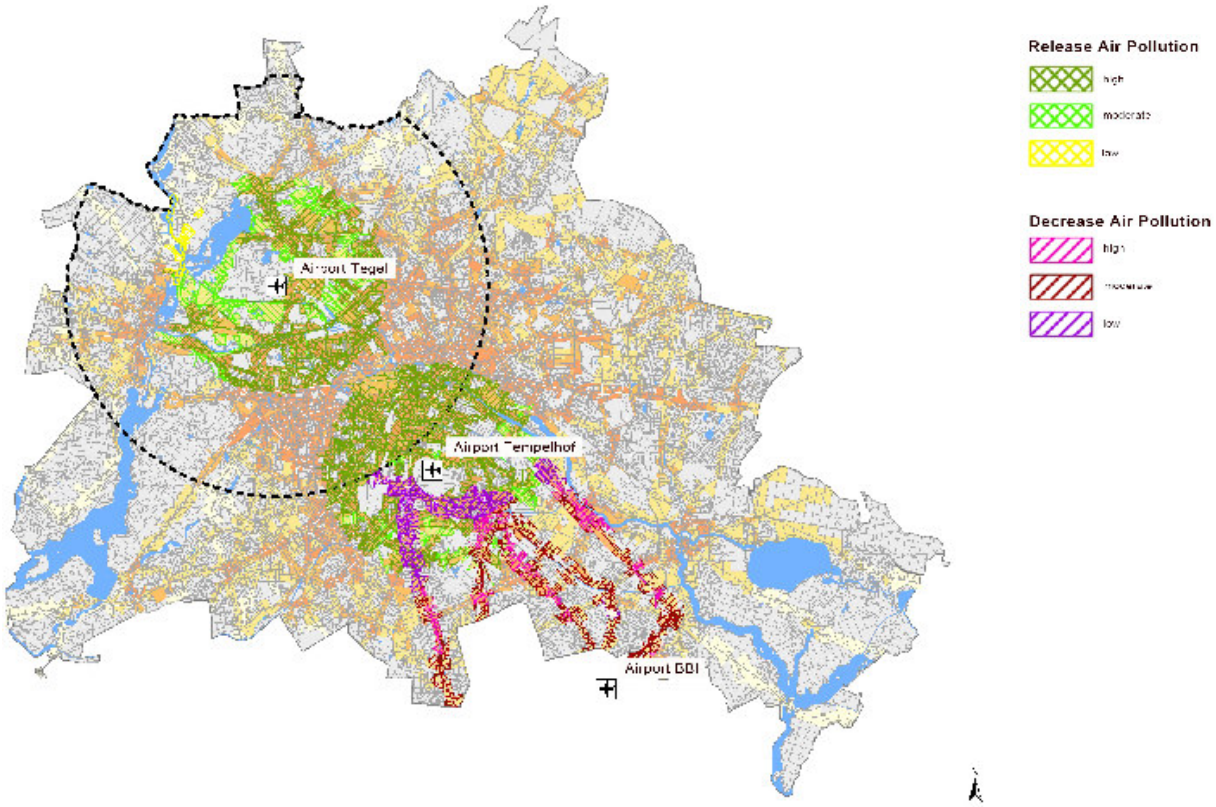

Fig. 6: Assessment map concerning the release and decrease of air pollution

3.1.2 Results

The presented first approach tries to simplify and operationalize the appraising of changing environmental pressures and releases induced by strategic urban planning decisions. The method is very rough and based on assumptions. However, strategic actions, like the case-study “airports Berlin”, have less predictable outcomes than individual developments or projects and need to handle a high level of uncertainty (JONES

ET AL. 2005; JILBERTO in CARATTI 2004). More detailed analyses have to be done at a lower stage of planning, as intended with the aspect of tiering (see chapter 2.2).

The release-pressure ratio of air pollution for the case study “airports Berlin” is illustrated in Fig. 7. The result shows a clear preponderance of the releseases of air pollution induced by the closing of the two inner city airports. On a total of 17.000 ha of Berlin a release is supposed. This is about 20 % of the city area. On the contrary a raised pressure is supposed on a total of about 400 ha. It is obvious, that the closing down of both inner city airports has great influence on the city itself. For instance the density of main streets with traffic caused air pollution is in the inner city considerably higher than in the peripheral area affected by BBI airport. Furthermore it must be considered that the pressures of air pollution induced by the expansion of the airport BBI are only implicated within the city boundary. The pressures of air pollution in the bordering districts of the federal state Brandenburg could not be considered, because an assessment of the current air pollution for NO2 and PM10 is not available yet. It can be assumed that the discrepance between releases and pressures will not be as clearly as illustrated in Fig. 7.

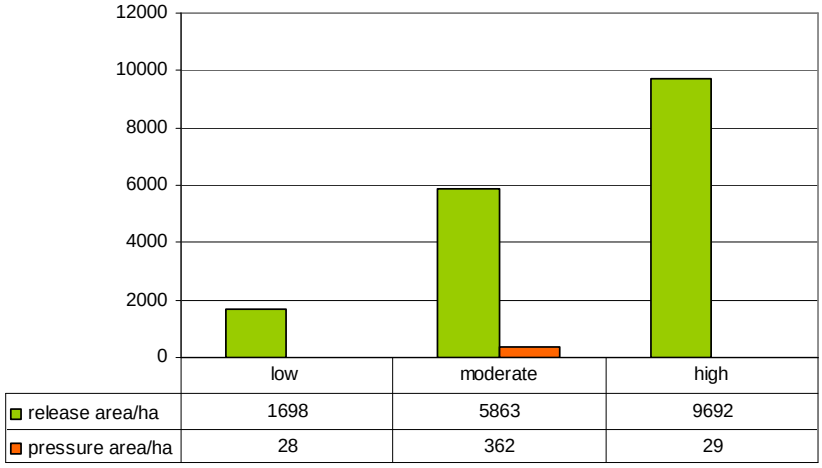

Fig. 7: Release-pressure ratio of air pollution in impacted areas

3.2 Future Developments

To avoid oversimplified assumptions about traffic volume changes and to obtain more realistic basic foundation for the impact appraisal it is aspired to involve a traffic simulation adjusted to the case study. In cooperation with the Department of Traffic System Planning and Traffic Telematics (Prof. Nagel, Berlin University of Technology) a multi agent micro-simulation with the softare MATSim[1] shall be realized. Within this simulation each person is modeled as an agent with a complete temporal dynamic description of the daily mobility behaviour. The sum of all agents reflects the statistically representative demographics of a region (see BALMER et al. 2008).

For the scenario “airports Berlin” traffic volume changes can be modelled for the whole city and the relevant bordering counties of the federal state of Brandenburg.

4 CONCLUSION

The presented project ‘Strategic Planning and Decision Support Instrument’ aims at developing a spatial explicit instrument to intensify the consideration of environmental aspects in urban planning processes at an initial stage. It will proactively address decision-making and promote sustainable development through the systematical integration of environmental considerations on superordinated planning levels. Currently, strategic environmental assessments are usually applied on area-related formal plans or programmes.

The scenario application is expected to contribute to a new quality of urban development processes, because an amplified basis for discussions is provided and planning processes can become more transparent for the public. The presented instrument does not generate new scenrios but is rather dependent on newly processed and available data. This requires the permanent integration and processing of heterogeneous geospatial data of the Berlin Senate.

[1] See http://www.matsim.org/.

A great challenge is the appraisal of less predictable environmental effects caused by the imprecise character of strategic planning levels. The presented approach for the case study “airports Berlin” is an example for the operationalization of a complex issue like changes in air pollution for the whole city. By that changing environmental pressures and releases can be easily compared which is very important for the comparison of different scenarios. This for instance contributes to an identification of areas of high impact and the planning of compensation measures. To obtain a more realistic basic foundation for the impact appraisal and to improve those functionalities it is aspired to combine the presented approach with a traffic simulation in the future.

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reviewed paper

Sustainable Mobility in Cities: Reducing the Carbon Footprint of Transportation in Tübingen

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1 ABSTRACT

The on hand paper describes an approach that aims to reduce the carbon footprint of transport in the city of Tübingen (Germany) to 50 percent until 2030. While the total amount of carbon emissions in Germany has been decreasing in past 20 years, the transport sector has still raised its percentage. Moreover the mobility needs of our society have grown noteably.

The author describes insights of a model project taking place in Tübingen. Tübingen is a mid-sized city located in South Germany near Stuttgart with about 85.000 inhabitants. Already today Tübingens transport system and the mobility of the inhabitants are exemplary in terms of sustainability (e.g. modal split, distances). However the local city council is ambitious to pass a resolution and implement applicable measures to reduce the greenhouse gas emissions.

Within this project, different strategies of urban and regional development, transport planning as well as technical approaches will be described and assessed concerning their efficiency by using transport models and computation tools. In several workshops including local stakeholders these strategies are being adopted and assumed regarding efficiency and acceptance to meet the -50 percent goal. At the end the city council is going to discuss the results and decide a masterplan with innovative measures for a sustainable mobility in Tübingen. After a successful pilot project the measures will be implementes and the experiences will be carried out to other cities in Germany and Europe.

2 INTRODUCTION

Over the past decades the consumption of resources and greenhouse gas (GHG) emissions has raised dramtically. In 2007 the transport sector caused more than 25 percent of the annual GHG emissions in fuel combustion of the European Union, whereas 94 percent were caused by road transportation. While in Germany the total amount of emissions has been decreasing between 1990 and 2004 the transport sector's has still amplified [UNFCCC (2007)]. In the first place the reason for this development was the growth of the transport volume during the 1990s [Kolke et al (2003), p.1]. Even though there was no significant raise of the transport volume after 1999 latest studies assume in a Business-As-Usual-Scenario for 2030 that a considerable raise of the transport volume and consequently no significantly reduction of carbon dioxide (CO2) in the transport sector are excpected [Zimmer (2008), p.1]. Usually, CO2 is used synonymously as an indicator for GHG as it has by far the biggest share in the total amount.

The mitigation of GHG emissions is one of the great challenges cities have to cope with at the beginning of the 21st century. Even in consideration of the expected technological progress in vehicular technology the headline goal of creating liveable, healthy and prosperous cities for everyone leads to the neccessity of changing the way urban transportation is practised in most cities today. Today, more than 74 percent of the population in Europe live in cities. The process of urbanization is still going on worldwide. This means, that new solutions for future mobility in an urban context need to be found. [Beckmann (2009) p.71]. The case study is supposed to make an example, how climate protection in the transport sector can be implemented by achieving co-benefits for the city and its citizens. The project takes part in Tübingen because a lot effort in terms of climate protection has ben taken by this city already and the next step for further GHG mitigation needs to be found.

For Tübingen, a mid-sized city in Southern Germany with about 85.000 inhabitants, a model project is implemented in which an over-all-stretegy aiming towards sustainable mobility for the city region will be developed in cooperation with local stakeholders. The pilot project is initiated in cooperationwith the Federal Environment Device within the scope of the initiative for climate protection program of the ministery

The objective of the case study is the design of a masterplan that is supposed to be implemented continuously during the next two decades. To avoide contraproductive effects of particular measures and to

exploit the potentials of generating synergies an integrated communal concept for climate protection is necessary. The preperation and implementation of these integrated concepts require diverse cooperations between different actors (politics, administration, economy, non governmental organisations, civil society, etc.). Especially the acceptance in public is seen as a key issue for the success of ideas and strategies in transportation planning [Beckmann (2009) p.74]. During the process of finding a suitable strategy different forms of participacion will be implemented. At certain stages of the project the city council is going to discuss and resolute certain milestomes of the project. Finally the council is going to decide a master plan including innovative concepts for a sustainable mobility over the next 20 years. An associated participation of local stakeholders and the support of political opinion leades are considered to be a substantial need for the realisation of substantial strategies.

The headline goals of the concept have already been resoluted:

- Climate protection: 50 percent less CO2 emissions of the transport sector.
- Improve the accessability of targets in everyday life for everyone.
- Improvement of the urban and residential quality (eg. noise, pollution, housing environment, maintenance, space consumption).
- Strengthening the local economy and research in the city centre, city districts and outskirts.
- 50 percent less fuel consumption.

The concept “Mobiliy 2030 Tübingen” will contain a package of measure in order to the adressed actors and the time frame of their intended implemetation. As every city has got its individual characteristics of the transport systems the concept for Tübingen will not be applicable to other cities. The methodology, the principles of the process and certain experiences can be helpfulto other cities on the way to sustainable mobility. After a successful implementation it can make a good example of sustainable mobility whilst taking the climate protection goals into account.

The impacts of many transport planning measures have not been evaluated satisfyingly yet. One reason for that is that the effects of single actions can hardly be pointed out as always interferences occure between them and other changes within a city and the surrounding region. Consequently the effects differ from one city to another. The traffic impact of classic instruments in transport planning, mostly infrastructure, operating and pricing, can be simulated by using transport models such as VISUM, emme or TransCAD. During the last years the meaning of soft measures has increased in communal transport planning. While these instruments of information, communication and marketing have become more important in practice, it is not possible to simulate their impacts by using transport models. Also scientificly underrepresented are the effects of regional and urban planning on the mobility behavoir of people. It is obvious that there is a strong relation between the qualities of an area a person lifes and her transport modal choice but the importance of the meaning for mobility behavior cannot be proved by debitable studies yet.

3 THE CARBON FOOTPRINT OF URBAN TRANSPORTATION

Scope of the study will be the everyday mobility of citizens, a field which can most likely be affected by communal measures. By realising this project the city of Tübingen is going to make an example how sustainable mobility can be realized in a way that deliveres a benefit in lifequality to the municipality and the citizens in social, economical and ecological dimensions.

The starting position in Tübingen is reletivly good as the city is already known for its green attitude. An active civil society, a mayor from the green party and the majority of the city council members (also from other parties) are basically willig to campaign for environmental issues. Already now, there has been a lot of progress in terms of actions for sustainability in the city.

As described in the previous chapter the energy consumption for personal mobility needs to be reduced significantly to meet global targets on climate reduction. The requirement for systemic and target-orientated activities in climate protection is the evaluation of GHG emissions. The implementation of a continual measuring enables a quantitatively validation of the benefits through energy and climate related policies.

To figure out the bottom line of CO2 -emssions in transportation different computation tools are available. Some of them are based on the consumption of resources by a certain population (e.g. ECO2 Region by

Climate Alliance - Alianza del Clima [ECOSPEED]) while others use consumption data of households (e.g. R.E.A.P. by The Stockholm Environment Institute [SEI]).

Furtherore there are a few tools available which have a territorial reference (mobilev by the Federal Environmental Agency of Germany). The last mentioned tools use data of transport models as an input in combination with national statistics. For this reason it is possible to simulate a change of the situation by using these tools. Most models work with data from national statistic which cn be specified by local references.

In case of Tübingen the choice for the applied approach was made through the scope of the study which is the municipal boundary. By using a transport model based tool it is possible to calculate the emissions in a certain area whereas consumption bases tools are not able to do so. In Tübingen this fact is of particular importance because there is a high number of daily commuters from the region. In fact, the number of commuters coming into the city every day can corresponds to one quarter of the population.

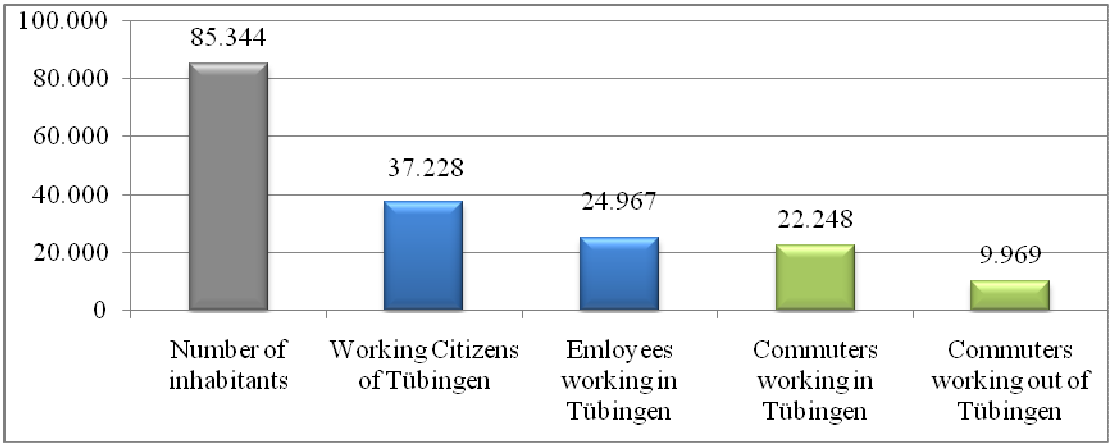

Figure 1. Commuters to and from the City of Tübingen, 2008 (source: Land Statistical Office Baden-Wuerttemberg)

The chosen method uses the demand data of a transport model in combination with an environmental computation tool. As there is only a network model of motorised individual transport available the emissions of public transportation will be calculated based on the fuel consumption of the vehicle fleet.

Basically the computation tool uses the length of a street section in the network model in combination with the traffic volume on this particular section. To enhance the accuracy of the bottom line certain charakteristics of each street section will be considered. The longitudinal slope of a streetssection, the frequency of stop and go and other properties are used to describe a section. Furthermore the structure of the local vehicle fleet can build another data input. In this way it is possible to achieve a preferably precise result. The database the software uses for vehicle related emissions is taken from The Handbook Emission Factors for Road Transport (HBEFA 3.1) [INFRAS 2010]. In the end, of course the accuracy of the calculation depends on the quality of the available transport model.

4 REDUCTION OF GREENHOUSE GAS EMISSIONS IN URBAN TRANSPORT

Cities are the key for climate protection on the local level. The maxim by taking action for climate protection is the triad of

- avoiding transportation,
- changing the modal split and
- making transportation more efficient.

By doing so the mobility for economy and society has to be at least maintained. At the same time it needs to cause less traffic or (by a more efficient use of resources) make the necessary traffic as enivironemtal compatible as possible [Deutscher Städtetag (2008) p.12].

To reduce the emissions of the transport sector it needs to be explained briefly, how transportation comes off. Based on the 4-steps-algorithm of network modelling transportation is a product of four factors:

- Trip generation describes the number of people covering a distance between two points. This factor depends on the necessity or the need of doing an activity like going to school, walking to the bakery or driving to the sports club.
- Trip distribution means the length of the trips being done.
- Transport mode choice consideres the way of travelling, eg. by car, bus or by foot.
- Trip assignment.

The factors Trip generation, trip distribution and mode choice have relatively strong impacts on the GHG emissions in the transport while trip assignment mainly affects the local emissions like noise and particles. Nevertheless the route choice also makes an impact on the global emissions as the consumtion of fuel depends on the fluency of traffic. In this study it is not going to be specified in particular as the scope is more on a strategic level. But of course, sustainable transportation aims to enable a fluently transportation in the city as it is.

Of special interest concerning the GHG bottom line is the technology used in transportation. In context of mobility in a city the emissions of motorized individual traffic deliver by far the biggest share within the transport sector. During the last years climate protection became a topic of public attention. Meanwhile the CO2-emissions of cars became an indicator discussed in media and politics. In midyear 2009 a CO2-related tax has been introduced by the German government. As resolute by the European Commission in 2007, the maximum emissions for produced cars within the EU must not exceed 120 g/km from 2012. At the moment the average amount of newly registered cars is about 154 g/km (April 2009, [Deutscher Bundestag (2009)].

On the local level there are a couple of instruments to regulate emissions, like the city toll in reference to the particulates a car emits or restrictions to reduce noise immissions. Concerning the emission of GHG there are no direct instruments for local transportation planning available in Germany. Still there are options to promote the preference of smaller engine vehicles e.g. in terms of user advantages.

In summary, it can be statet that cities are supposed to use their communal planning authority for the purpose of a transport-saving landuse and economical development. Particular focus should be on

- internal development before external development,
- stronger integration of transportation and town planning,
- improving public transport within the city and to the surrounding region and
- promoting bicycle use.

The measures of a consequent parking management should be implemented and the activities of administration and economy in mobility management supported [Deutscher Städtetag (2008) p.12].To figure out, where to potentials for the above mentioned measures are, a division of study areas will be made. Therefor the areas of the transport model will be aggregated and so a first overview of different approaches for CO2 reduction can be given.

In the next step, different scenarios on the development of transportation will be developed to see what is necessary to achieve the 50 percent goal. Therefor a Business-As-Usual Scenario will show, what is going to happen if no further action is undertaken.

4.1 Detection of Mitigation Potentials

In order to reduce the GHG emissions in transportation the current transport needs to be analysed. Based on a suitable structured transport analysis the potentials of mitigation can be defined. In case that a transport model is available, it has shown to be useful to determine study areas of a relatively homogenous urban structure. Indicators to use for the division of these areas can be density, land use, location, connectivity, etc. (depending on the individual characteristics of a study area. The division of the network model should be used as a baseline. The new devision is a very helpful step to simplify and better understand the given situation. After that the transportation volume within and between these new areas can be presented in a transportation demand matrix. Figure 2 displays the division of the new areas in Tübingen as well as the daily driven kilometeres by car.

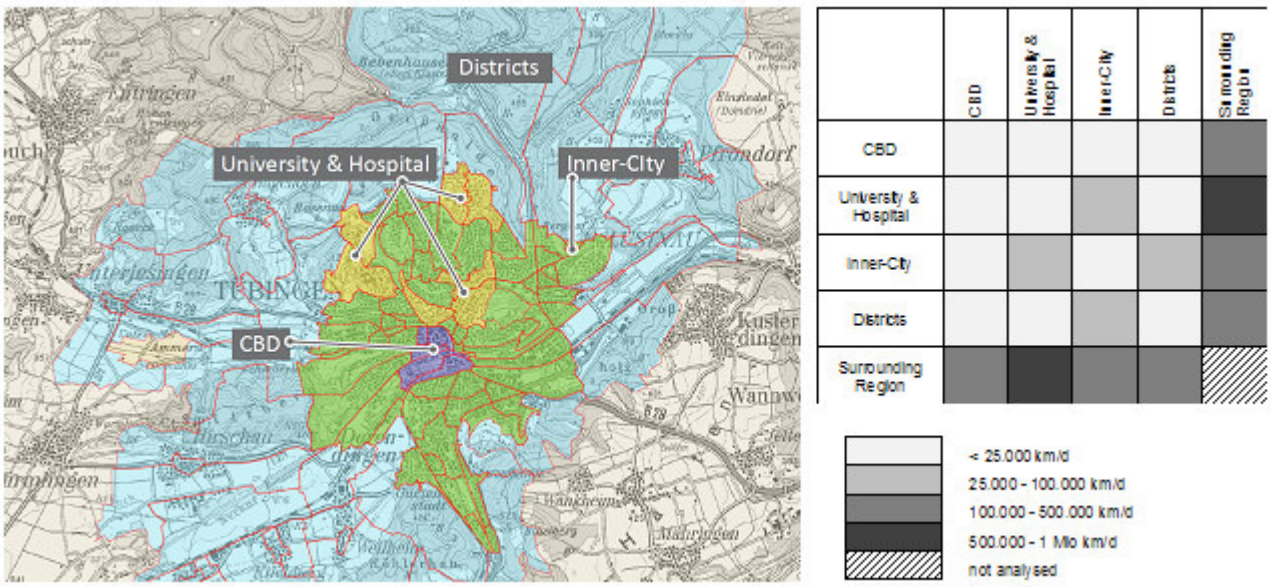

Figure 2. Division of study areas in Tübingen (map) and Transportation Demand Volume (matrix)

This matrix displays distinctly that most car traffic is caused by passengers travelling between the city and the surrounding region. Also clear from the transportation demand matrix is that there is a signifcant high number of commuters travelling to and from the university and the hospital. These facilities are the most important employers and both of them cause a lot of additional traffic eg. trips for education or visting. Based on this matrix it is now easier to assume the impact of different measures in the next step by defining on which connection a measure has potentially the highest effect. For example the promotion of walking would show an impact on the domestic traffic within the areas.

The evalution of additional data material gives indication about the mobility behaviour of the inhabitants. As to be seen in Figure 3 the modal split based on a household survey confirms that the shifting potential can be found in the regional traffic. While there is a comparatively environmental friendly modal share in the domestic traffic the internal-external trips are by far mostly done by car. Additionally the distance of the internal/external trips corresponds more than four times the distance of trips in the domestic traffic (24 km to 4,9 km) [SVT (2008)].

Even though the share of cycling and walking comes to 48% there is still a certain potential for the promotion of unmotorized transport on short distance as to see in Figure 4. Every fourth trip by car is shorter than 2,5 kilometers and more one third of all car trips are shorter than 5 kilometers. These potential need to be discovered and form the strating line for the measure development. Two components of the process to design a master plan will be described in the following chapter.

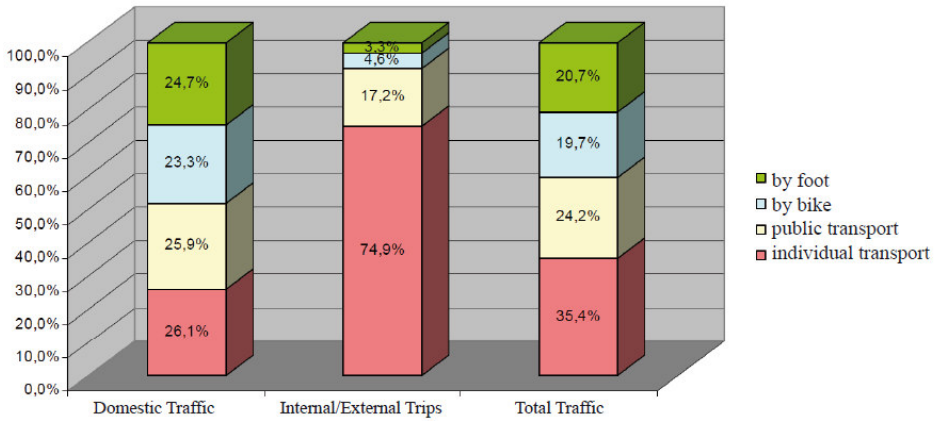

Figure 3. Modal Split in Tübingen (source: Householdsurvey by SVT Tübingen, 2008)

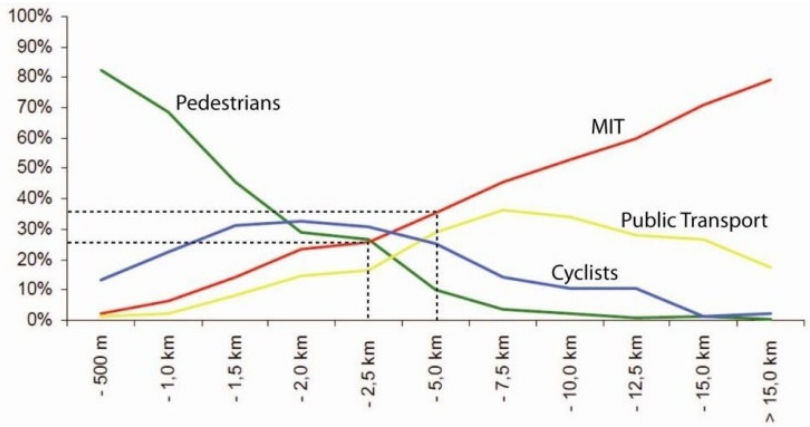

Figure 4. Trip distance and transport mode in Tübingen (source: Householdsurvey by SVT Tübingen, 2008)

4.2 Scenario 2030

The applied method to figure out what is necessary to meet the 50% goal is a scenario technique with a given target value. At first a "Business-As-Usual" scenario will be defined which describes what happens without taking any additional action until 2030. Therefor national and if available local or regional prognosis about demographic development, trends in mobility and the proposed technological progress are considered. Figure 5 shows the key data of different scenarios.

	Trip generation	Trip distribution	Mode choice	Technology	CO_2 Mitigation
Business-As-Usual	+10%	+20%	0	-20%	**≈ +10%**
Promotion of Ecomobility	+10%	+20%	-15%	-20%	**≈ -10%**
Electric Mobility	+10%	+20%	-15%	-50%	**≈ -40%**
Goal: Sustainable Mobility (-50%)	0%	-10%	-15%	-50%	**≈ -50%**

Figure 5. Overview on Scenarios for Sustainable Mobility 2030 in Tübingen

Looking at the trip generation amongst experts the assumption obtains that the number of activities per day will increase (and as a consequence the number of people travelling grows). At the same time the trip distribution is increasing. Between 1982 and 2002 the distance of the way to work has risen from 9,6 km to 15 km which is more than 50% [INFAS (2004)]. In shopping traffic the development was similar with nealy 50 percent growth. Leisure traffic which is usually claimed as one of the main reasons for the growing volume of motorized individual traffic has nearly remained constantly [Bracher (2009)].

The main reasons for the increasing mobility will also in the future be the economical growth and the increasing individual motorisation [BMVBS (2007)]. Poor spatial planning and urban sprawl are further reasons for an increasing demand for mobility [WWF (2008) p.23)]. The demographic change will have a cushioning effect indeed but it will be over compensated by the mobility growth within age and lifecycle groups [BMVBS (2007)].

In the Business-As-Usual Scenario it is assumed that the mode choice does not change within the next 20 years. Even though car-share in the modal split in urban transportation has been decresing in the last years this trend does probably not continue over a long period. The use of cars might grow within the next year as it is assumed that the car density will become higher. Furthermore the possession of a driving license will increase especially in the elderly age group which might lead to a growing car usage. In consequence it is to take action just for keeping the modal split at the recent level. In theBusiness-As-Usual-Scenario that minimum initiative is assumed.Looking at the technological dimension of transportation the most prognosis show a decreasing consumption of fuel will occure highly propable as a result of technological progress. Already by now, the automotive industrie offers cars in different categories including family vans with not more than about 120g CO2/km. The reaction to the risen interest for environmental friendlier vehicles by the car producing industry is rather tentatively. This development might be reasoned in the fact that a higher profit is achievable for larger engine types. Witin the scope of the economic stimulus package, the German government is investing 500 million Euros for the promotion and market implementation of electric mobility

between 2009 and 2010. Although, the share of electric cars will probably not exceed 10% of the car fleet in Germany in 2030. By taking into account the electricity mix proposed then, a significant reduction of GHG emissions is not to be expected.

Summarizing the four scenarios it it shows that only an integrated concept that affects all crucial factors of transportation can achieve this aim. For the concept Mobility 2030 Tübingen this means that a combination of regional and urban development regulations, suitable transportation measures and technological approaches has to be conceived.

4.3 The Key Factors to Sustainable Mobility

The finding that the strategy has to work on all these levels leads to the question: "How can a systemic change to sustainable mobility be achieved?"

How can the trip generation be kept on the present level? This question needs to be discussed controversially. On the one hand of course it is desired that people take part in social activities, interact with one another and not at last to create urban culture. In consequence, there is no potential of mitigation by reducing the number of trips is not desired as it would mean an asocial progress. But, on the other hand some undesireable ways could be saved without a loss in life quality. For one person it can be the way to the greengrocery, the post office or an agency. Many trips are made due to inconvenient alternatives in ecomobility such as certain pick-up and delivery services. A possible way to avoid these unpleasant trips can be the promotion of telematics, e.g. homeoffice or e-learning. Another option is a smart coordination of trips through better information and communication.

How will it be possible to shorten the travelled distances?

These approach leads to a city of short distances. Therefor instruments in urban and regional planning have to be implemented. The design and location of spaces and sites affect strongly on the mobility behaviour. With the aims to provide shorter distances for everyday life, suburbanisation needs to be retarded by expanding the slightly visible trend of reurbanisation. Mixed structures and atrractive open spaces promote the use of sites in the neighbourhood by walking or taking the bicycle. Also the requiremens for good service in public transport are significant better in dense structures. So, rather than realising new developments on the outskirts for housing, recreation or shopping, the focus has to be on internal development. Therefor it seems necessary to promote mixes uses also for existing areas. A definition of quality standards for urban districs and passing a resolution about it would allow the implementation of a blanket upgrading.

How can the choice of the transport mode be influenced?

This question has been discussed in transportation planning over the last 25 years in Germany. There are lots of measures known to attract the transport modes of ecomobility and to give restrictions on the indivual car-use. Figure 6 shows a number of measures and their effects on the modal choice. It has been proved in many cities and regions that a combination of push- and pull-measures is significantly more effective than just enhancing the transportation supply and its quality. In classical transportation planning the fosus was on hard measures which are more infrastructure-orientated. Within the last years soft polcies have gained in importance such as information, communication and coordination.

How can energy friendlier technology be promoted by communal planning?

At first, there are no instruments in transport planning that have a direct relation to the CO2-emissions of cars. But the local authority has got some flexible instruments that can be referred to the GHG emissions of vehicles like parking advantages or pricing concepts. With these instruments smaller engines or alternative driving systems can be promoted. To enable electric driving, a special infrastructure for recharging needs to be provided. The requiremts for the installation of electric recharging facilities are being reasearched and testet at the moment (e.g. STROPA-project [IMOVE (2009)]).

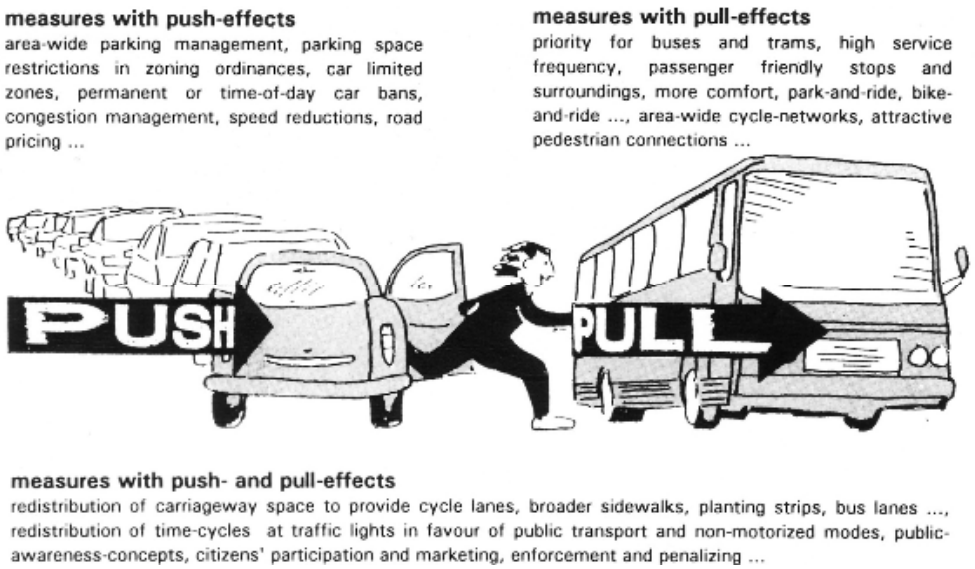

Figure 6. Push- and Pull Measures (Source: Hartmut Topp, free translation)

5 DRAWING UP A CONCEPT FOR SUSTAINABLE MOBILITY

The goal of 50 percent reduction needs an integrated concept that is supported by local decision makers and the involved stakeholders. Therefor a process with the involvement of non-governmental organisations, the city council and representatives of the local economy is substantial for successful realisation.

The project in Tübingen includes three interactive workshop sessions, each one on a certain topic. Furthermore experts contribute input to the workshops on their field of experience. Substantially for the implementation of the plan is a political resolution of the master plan and the contained measures. The assessment of the potential in reducing carbon emissions will be done by using different methods as it will be explained the following chapter.

5.1 The Assessment of Mitigation Potentials

The measures to be assessed are deduced from the insights of the analysis, thes results of the workshops and the experiences of the involved experts form the Federal Environment Agency and the further experts involved in the project team. The catalogue which is being worked out at the moment will include a wide range of approaches and measures concerning spatial structure, transportation supply, transport management, information and communication. As already mentioned the described study has got an emphasis on the GHG emissions of fuel consumption in transport. For the measure assessment the energy consumption for the realisation of an action will not be considered in the carbon footprint as the frame of this study does not include life-cycle-analysis.

As already mentioned the possibilities of valuating policies can be differently accurate due to the kind of instrument. We defined three different groups that can be described as follows:

- The first group includes a range of measures that can be evaluated in a transport models. Depending on the quality of the input data and assumptions the model contains an estimation of traffical impact can be done relatively solid. Some examples of actions that can be simulated in models are land use development, demographic change, road pricing, speed regulations and parking systems or service improvement in public transport.
- The second group covers measures that have been realized in other cities but cannot be put into a transport model. About some of these actions evalution data is available; others can only be assessed by experts. The effect of these mostly soft measures can sometimes be hard to figure out as there is always an interference with other actions or developments. For example mobility management, actions of information and communication belong to this group. The only option to rate the impact of these measure on a certain city as e.g. Tübingen needs an assessment by experts by the comparison between the impact to different cities with smilar charkeristics.
- On the third group are new and innovative ideas that haven't been realized yet or there has just a little experience been made with. These measures can only be assessed in discussion with local

stakeholders and mobility experts. But the reliability of the statements does not have any foundation. They are based on a good understanding of transportation and mobility behavior by a group of experts. Within this project a sort of Delphi-Process to assess the impact of different measure is going to take part at the end of Marc 2010. The participants are experts form different backgrounds that are active in several field of transportation all over Germany.

5.2 Political Resolution

Both the participation of local stakeholders and the preparation of the political desicion makers are important. We try to deliver early and complete information on the process to all relevant persons. Before the discussion about the project comes up in public and politics it is useful to deliver the right information early. Therefor the involvement of representatives of the civil society, the city council and local stakeholders into the process is necessary. For this reason a project advisory board has been constituted in Tübingen. In the advisory board 30 represenatives have the possibility to participate in the progress. The represented groups are in this committee are (partial):

- Mayor of Tübingen
- Leader of the Public Transport Company
- Represantatives from the city council (by different parties)
- Important employers
- Local economy
- Non-governemnetal organization (German association of traffic participants, General German Automobile Association, General German Cycling Assosiation).

In this way input can be brought into the project by stakeholders and at the same time information on the process can be taken out to different institutions. Thereby a lot of local groups and institutions can indirectly take part in the project and the project team gets feedback on the developed ideas. Figure 5 shows the organization chart of the project and displays the different ways of cooperation.

The important milestones of the project will be discussed by the city council such as the heading goals for sustainable mobility, different scenarios how to reach them and finally the measures for implementation. The resolution by the council is a requirement for the realisation of the strategy and the following projects. Particularly important to achieve political acceptance for the concept is to create an understanding for the necessity of action. Especially when it comes to unpopular measures (usually restriction for car use), decision makers need to know what the co-benefits for the civil society and the city are. For this reason the clarification of the gain in all dimensions of sustainability is essential. By only showing the environmental impact on GHG emissions a political acceptance will be hard to reach. And in the end the realisation of the concept needs communal investment wherefor justification and a strong argumentation are necessary.

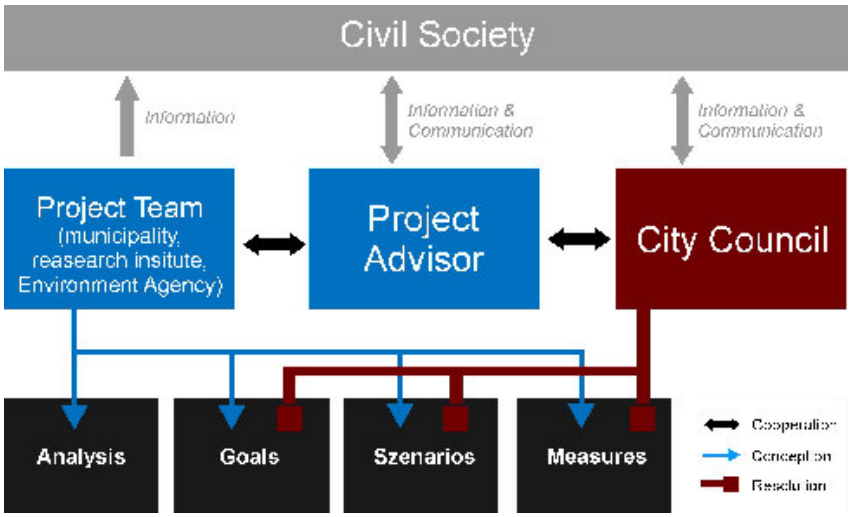

Figure 7. Organization Chart of the project Sustainable Mobility 2030 Tübingen.

6 CONCLUSION

The idea of achieving sustainable mobility in cities is not a new one. Several concepts to reduce the environmental impact by transportation are already existant. Mobility and transportation are closely related with space and time, communication, environment, energy, economy and lifestyle which are cross-linked with each other. These complex interrelations lead to the finding that there is not a formula for sustainable mobility [Topp (2004) p.14]. Every town, every region and country needs a concept that is aligned with the issues of local relevance to improve the transportation system, enhance life quality and keep the local identity.

We have models and tools to simulate the impact of certain measures. They can contribute to effective policymaking but they can also lead to poor decisionmaking if policymakers cannot assess the quality of a given applicationMoreover many policies and especially innovative concepts cannot be simulated in a model. It needs experience and a solid understanding of transportation systems to assess what a measure can achieve.

Basically clear is that only an integrated approach of urban and regional planning, transportation planning including push- and pull-measures can lead to success. The requirement for the implementation is political support and encouragement for the matter of sustainable transportation. Different forms of participation can help to achieve a better understanding about and higher acceptance for the policies.

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Territorial information systems (TIS) as an instrument for developing social capital in local communities in Serbia

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1 ABSTRACT

The broad problem that will be elaboarated in the research is efficiency and effectivnes of traditional approach in Urban planning, currently still present in Serbia. Urban planning in Serbia is chaleneged by transitional trends such as decentralization, participation, colaboration and buildnig partnerships to tacle spatial problems in relation with new socio-economic space. The main problem elaborated in the paper lack of common understending for the need of building patrneships among institutions and local communities to tacle spatial problems. Therefore, research questions arising from the problem framework are: How to build partnerships, collaboration and social capital in the closed spaces within local communities such as Local Authorities, Public Companies, Civil society? Can Territorial information system be an instrument for building social capital? If it is so, how it can break barriers and build trust and collaboration?

The hypotesis relevant to the problem is that level of social capital is in relation with data and information sharing among actors in local community. Level of social capital in local communities in Serbia vary, but it rearly goes beyond egocentric cocept where different stakeholders (individuals, institutions, organizations) use data and information to gain their personal interests, having low level of awareness of added value information sharing can bring and broaden framework of action and gain common interests as well as personal. In line whith this spatial organization and development is not managed properly, public interest is not fully recognized and phisical space is dominated by individual interests, producing negative externalities to environmental and equity issues.

Therefore, the aim of the research is to identify forms of social capital that can be built through the implementation of Territorial information Systems in local communities. The forms of social capital, formal and informal such as institutional arangements, building trust, networking and cooperation will be elaborated trough analysis of TIS pilot projects case studies implemented in six municipalities in Serbia in the period of 2005-08. The results of the research should show what level of social capital is needed as a precondition for data and information sharing, and what kind of social capital with positive externalities can be developed through implementation of TIS.

2 INTRODUCTION

Integrated planning and design for sustainable development where it integrates different planning sectors, different social arenas, horizontal and vertical levels of government is challenged in Serbia by transitional process. Integration of previously mentioned elements is strongly connected with level of existing social capital in the community, its cognitive and structural elements, such as trust, collaboration, reciprocity, and institutional framework, such as laws, organizations, protocols, etc. that provide the development of social networks. The paper will elaborate the possibilities for development different dimensions of social capital in the process of data and information sharing in the six communities in Serbia through implementing pilot Territorial Information Systems.

The first chapter will elaborate the relation between spatial dimensions and dimensions of social capital, emphasising their interconnectivity, following Lefebre's idea that phisical space represents it social dimensions. Therefore, integration of activities to tacle spatial problems in sustainable manner is conected with the level of social capital present in the community. The result of the chapter will be the Tool for measuring development of the socio-spatial dimensions towards integrative collective action.

The second chapter will descripe the process of developing social capital in communities in Serbia through implementation of TIS pilot projects relevant for the specific issue in each community. It will discuss possibilities and preconditions for integrative collective action through information and data sharing. The preconditions will be on cognitive and on structural level of social capital and will be defined as the conslusions from the comparative method of observing the process of TIS and social capital development.

spatial development AND social capital

Space dimensions and dimensions of social capital

Talking about the space following Lefebre's thought we are dealing with space integration (acc to: Lefebre, 1991) in the discourse of the central and marginal spaces (see: Semprini, 2004), their boundaries and the process of the content flow between them. Therefore, sustainable spaces integrate its different dimensions ant transform it to physical space through communicative action (see: Habermas, 1990). Planning traditions, through history of planning, deal with different socio-economic space form economic, physical, and environmental to sustainable concept of development (Baker, 2006). In line with this, physical space mirrors social, economic and mental spaces in the process of its production.

Each tradition forms and reflects the social capital it is built on or the capital that is built through the process of spatial development. Therefore, we are talking of the exclusive and inclusive attributes of spatial development. Each of them reflects social arenas in which they are conceptualized, developed and implemented. The concept of sustainable development integrates different dimensions of its production; we can say it builds up different dimensions of social capital and transform them into physical multidimensional, inclusive, integrated space (see: Elin, 2004). We can say that spatial development reflects dimensions of social capital built through the process of its creation.

Development of the social capital concept goes from egocentric to sociocentric. From Bourdieu to Woolcock the concept was developed through its cognitive and structural dimensions, in relation with its positive and negative externalities, focusing either on the human development, either on social towards collective action. The contemporary concept is strongly related to poverty reduction, and both on cognitive elements, such as local and global values, trust, solidarity, and on structural, developing institutions, laws, policies, etc. As Castells says we have to add value to instrumental networks the global information society has formed. „When the world becomes too large to be controlled, social actors aim to shrink it back to their size and reach" (Castells, The Power of Identity, 2004)

The paper will follow the concept defined mostly by Fukuyama and Woolcock where it has developmental attribute on each level: building trust, collaboration, information flow, partnership, collective action with positive externalities and inclusive attribute. Woolcock talks of bounding, bridging and linking, as developmental characteristics (Woolcock Michael, 1999). On the other hand Fukuyama calls upon circles of trust, their enlargement and intersections (Fukuyama, 2000). However, the crucial question is on which issue to start developing social capital towards building partnerships, collaboration, and integration of different spaces?

Collective action's glue can be in the area of Castells urban aims that each community can have: „urban demands on living conditions and collective consumption; the affirmation of local cultural identity, the conquest of local political autonomy and citizen participation" (Castells, The Power of Identity, 2004). Following his thought we can say that building up cognitive and stuctural elements of social capital can start on the common issue in the community, transorming the community's local practice and memory. Therefore, if we want developmental spaces the issue to start should have transformative power and should integrate different spaces, carrying partnership dimension. But, who to impose the issues with transformative power? Can it emerge from inside or should it be imposed from the outside?

Following social capital theory the transformative power comes from the membership of different areas of trust, through its enlargement, as well as from linking dimension where local communities develop their relations with meso and macro level. The assumption is that if we want to develop trust, collaboration and partnerships that have developmental dimension, not just reproducing existing social relations, it should be managed, facilitated and mediated by the 'agents' and 'agencies' on higher structural and cognitive level. Therefore, the assumption is that it can shift existing social capital by not controlling it; the transformative issue should come or be fully accepted in the community and mediated and facilitated by regional, national or international level. As Healey says it should develop both 'soft' and 'hard' institutional infrastructure (Healey, 1997).

In relation with space dimension the process should create inclusive spaces that integrate different values and builds platform for consensus building reflecting global and local values. Therefore, we are focusing on the process of its creation as well as on the process and on the process outcomes. Another assumption is that, as social capital development is iterative process, the first cycle of its initiating is crucial for its closure or

further development. In line with this the quality of the outcomes of the first cycle, both cognitive and structural, are the crucial point in the social capital development. The question is how to measure the quality of the social capital development process towards space integration?

2.1 Tool for measuring development of the socio-spatial dimensions

When we talk about urban planning practice we are dealing both with the quality of its process and product. The quality of the process and development of the fututre spatial dimensions, can be valued through the dimensions of social capital developed in it. The quality of the product such as strategic document, data base, policy, etc. can be valued through its sensitivity to inititate new developmental processes of social capital and the ways to measure it. Therefore, this chapter we will formulate a tool for measuring the quality of the proccess dealing with common issue towards developing multidimensional social capital.

TOOL FOR MEASURING SOCIAL CAPITAL DEVELOPMENT IN THE PROCESS OF DEALING WITH THE PUBLIC ISSUE*									
Public issue?			**Dealing with the spatial issue**						**Type of collective action**
			Process			**Product**			
	Dimensions	Elements	Phases	Type of social arena	Tools /techniques	Structure	Content	Tools /techniques	
Social capital: Development processes	**Bounding/ bridging/ linking** **Micro/meso/macro level**	cognitive	Local-global values? Owning the issue? Consciousness of present and future image? Owning the problems and objectives?	Closed/open; exclusive/inclusive? Arena's actors? Facilitation and mediation of the process?	SWOT/ force field Stakeholder analysis? List of problems, objectives, priorities vision ICT Techniques of intrapersonal communication Conflict management	Flexibility of the structure? Does it mirror the process?	Prescriptive or instructive? Thematic grouping? Facts or possibilities?	Graphs Diagrams Matrix Images 3D	**Reactive/ interactive/proactive**
		structural	Iterative process? Incremental process? Inclusion into regional networks? Policies/ laws	Institualisation of social arenas? Rules of communication? Initiatives on regional/national level? Integral local/regional projects?	Web		Openness of the content? Interactive content?	Analog, Digital	

*The tool is developed on the professional experience as well on the sources (UN-Habitat, 2003) (Fisher, Buildnig Bridges Through Participatory Planning, 2005) (Fisher, Building Bridges Through Managing Conflict and Differences, 2006) (Cultural Planning Tolkit: Apartnership between 2010 legacies now and Creative City Network of Canada, 2010). The conceptual framework for the tool is: The forms and dimensions of social capital (Grootaert Christian, Thierry van Bastelar 2002) (Fig. 1) and dimensions of social capital (Woolcock 2003) (Fig. 2)

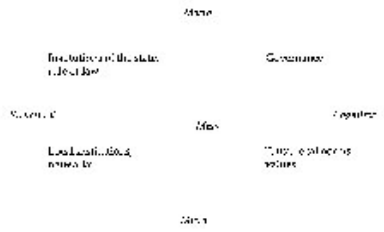

Fig.1: The forms and dimensions of social capital (Grootaert Christian, Thierry van Bastelar 2002)

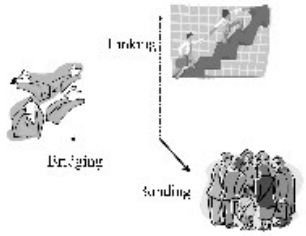

Fig. 2: The dimensions of social capital (Woolcock 2003)

3 USING TIS TO DEVELOP DIFFERENT DIMENSIONS OF SOCIAL CAPITAL

As it was said before the different dimensions of social capital in the local community can be developed if the issue has developmental and integrative characteristics. Therefore, we will elaborate the process of data and information integration among institutions and organizations in the local community as the issue to start developing cognitive and structural elements of social capital towards collective action. Territorial information system will be elaborated as an instrument in the process of cognitive and structural integration, as well as horizontal and vertical.

The attribute territorial gives to this info system the socio-spatial dimension, as the territory is seen as the space bounded by common interests. So, territory is the space that integrates different spatial dimensions that are relevant for the urban or spatial issue, and we can say it is a platform were the spaces of interest should be linked and integrated towards common interests. In line with this the territory is not something which is given by nature; it is a phenomenon that is created by people, their interests, networks, trust, and collaboration. We can say that richness of the territory is reflected by the richness of social capital developed in the process of dealing with the issue.

In line with this Territorial information system in contrast with GIS is the instrument that uses GIS to integrate data to produce new information that carries developmental arrow to social capital. Therefore, the cognitive and structural elements of TIS go beyond the boundaries of one institution or organization, and initiate integrative processes of building trust, partnerships, collaboration and collective action. The question is how to start, manage the process towards horizontal and vertical integration? The following text will elaborate the process of implementation of six TIS pilot projects in Serbia in the framework of UN-Habitat Settlement Integration Refugees Programme.

3.1 Process of cognitive and structural development in the municipalities

The situation in Serbia when the process of TIS implementation has started was that selected local communities had awareness of using GIS and some of them has started implementation of it inside the boundaries of one institution, digital data and data bases existed in different public companies, departments, institutions. Therefore, the approach was to start with implementation of TIS pilot projects that should integrate minimum three institutions in local community. The period of implementation was one year.

The structural elements of TIS development during the period of implementation was in the constitution of two groups in local communities that was relevant for implementation of TIS. The first was coordination body, on the level of decision making which task was to bring political support to TIS development. The members of coordination body were managers of public companies, local representatives, directors of LA departments, etc. The second one was the working group, which had technical task to work on TIS

development. The members of working groups came from the different institutions relevant to the common issue. Both of the groups were appointed by the authority in the municipality.

Before the constitution of any structural elements the first cycle of raising awareness of TIS was implemented in the municipalities in the form of interactive trainings delivered to beneficiaries of interest. The aim of the trainings was to establish common understanding of data and information sharing can bring to the win-win solutions in the local community as well as on the raising knowledge on TIS concept, structure and implementation. The mission of the trainings was to promote benefits TIS can bring to the community.

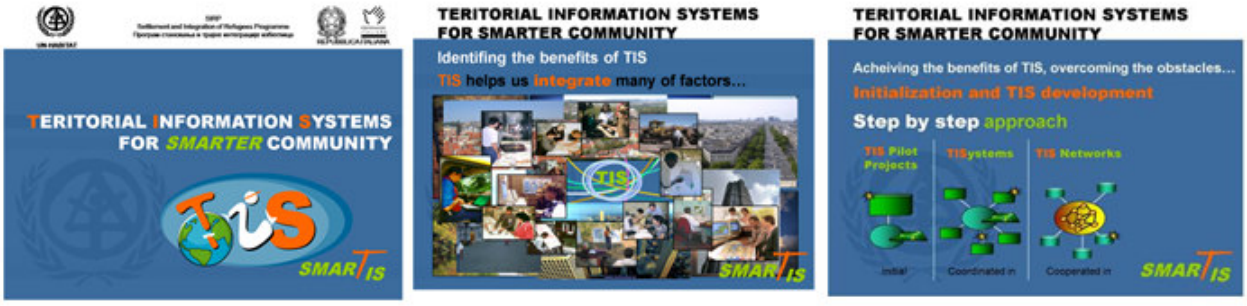

Fig. 3, 4, 5: TIS basic training: SMARTIS – TIS for Smarter communities (iterative, step by step approach)

This structural element on local level was the frame for cognitive development of social capital, as well as future structural development in the form of institutionalizing TIS after the pilot project is finished. The first element of cognitive development was the TIS Pilot Project document which was done by the members of working groups in consultation with coordination body. The Project document was consisted around the selected issue that will be dealt with in the process.

The issue was elaborated on the workshops were the members of both structural elements from each municipality was present. The workshop was aimed to develop acceptance of the issue among the people in the TIS team. Methods and techniques used in the workshop were brainstorming, nominal group technique, problem tree, active listening. As an outcome from the workshop each municipality selected a common issue to be dealt, defined objectives and results that will be achieved during the implementation of TIS. The issues were: Tourism development, Rural Development, Land management, Development of industrial zone.

After the acceptance of the TIS Pilot Project the series of trainings on how to use TIS software was organized for the members of the working groups when they gain knowledge and skills how to model data base, fill it with data, create and traduce maps, reports, diagrams. The trainings delivered technical knowledge to the people, members of the working groups in each municipality.

The first cycle of TIS implementation was aimed to data integration and resulted in the integrated geo-database model - conceptual and physical. The integrated data was from different sources and on cognitive level it established cooperation between institutions, departments and public companies, managed by coordination body. On structural level it resulted in metadata as well as in model diagram and personal geo-data base. The results of each municipality was presented, discussed and evaluated on the workshop. The techniques for evaluation in order to improve quality of geo-data base model were a form of group questionnaire when each team should answer and give suggestions in the group discussion. After the group elaboration the proposals for improvement were presented and discussed between WG from each municipality.

The second cycle of implementation was aimed to develop thematic maps that will emphasize benefits of data integration through its visualization. Besides factographic maps showing territorial resources, the thematic maps had developmental attribute, providing integrated ‘new’ information that will enable smarter decisions in managing the territory. On cognitive level it promotes partnerships to tackle common territorial problems that go beyond boundaries. The thematic maps was created in the process of on the job training in each municipality were members of TIS working groups using technique of brainstorming, nominal group technique, elaborated themes that will be relevant to the issue as well as additional data needed for their creation, together with alpha-numeric reports, charts and diagrams. Two neighboring municipalities with the same issue started to collaborate and exchange experiences in the process of developing territorial data base.

Fig. 6, 7, 8: TIS on the job training: Developing thematic maps through participatory process

The results of the second cycle of implementation were presented on the conference where besides the members of coordination body, working group from each municipality the representatives of relevant ministries, regional associations and other municipalities that started working on data integration was present. The conference was aimed to open dialogue on the achieved results so far and to initiate systematic work on TIS development in Serbia. The conference initiated linking dimension of social capital development, in the form of dialogue, workshops on topic of institutional and technical arrangements that should be developed in the form of norms, rules, procedures, policies and laws.

Fig. 9 - 14: Cities in Dialogue - Cities developing integrated territorial information systems TIS

The third cycle of implementation was to finalize the projects and to publish thematic maps and territorial data base in interactive manner on DVD, web and in the form of the brochure. In each form of publishing the results emphasized the benefits TIS and integration of data, visualization, and reports can bring to the community. Also, through publishing the dissemination of the concept of TIS to the public has been done. Furthermore, some of the municipalities have presented their results in the form of workshop inside the community, emphasizing benefits of TIS.

Fig. 15, 16, 17: Presenting results in open arenas, awarded with first prize on International salon of urbanism

Fig. 18 - 23: Publishing results, process and outcomes CDs and brochures

3.2 Mediating and facilitating the process, cognitive and structural elements

The deveopmental dimension of social capital in the proces of dveeloping TIS was in the space dimension of its mediation and facilitation. The period of this process lasted much longer than its implementation, actually two years before the start of implementation and one year along of its process. The mediating and facilitating space was managed under the umbrella of UN-Habitat and in partnership with consultant team from the Faculty of Architecture University of Belgrade. The whole process of designing the approach for the implementation and developing different dimensions of social capital was prepared and tailored to the conditions in Serbia both on cognitive and structural level.

Fig. 24, 25, 26: TIS study tour in Prato and Modena, Italy

Each worksop, conference and training was fully prepared and tailored to the specific condidtions in each municipality. On cognitive level the process was mediated and facilitated thtough communicative action using methods and tecniques most appropriate to the existing level of social capital in each municipality. Each form of dialogue was designed towards its outcomes and inputs for the second phase of developing TIS. The facilitating and mediating team was constantly trained by UN-Habitat on the subject during the whole process. So the theam was educated on cognitive tecniques such as improved comunication, conflict management, participatory planning, good governance.

On structural level the proces was designed in the form that it was supported along the development of TIS. The development was constantly followed and guided in the communication process by consultants. Therefore, it was possible to monitor the development towards expected results. Futher more, the break points in the form of workshops, conferencies, trainings were designed and positioned in time to reinfroce developemntal dimensions of social capital in form of better collaboration, integration, communication and partnerships. Trainings were on the different level from basic to advanced and on the job. They had developmental caracteristics in building human capital as well es social through interaction, bounding the team.

Beside the structural elements for each break point and social arena, the structural elements were developed to follow in line process of TIS development in the municipalities. Structural elemnts along the process were rules of communication, tools designed by consultants, intranet and forum. Each structural element reflected cognitive values to be achived, such as transparency, information flow, accesibility, inclusivnes.

Fig. 27, 28, 29: TIS intranet - instructions for use

The tools was designed as a support to the step-by-step elaboration of results and to follow the incremental cycles of implementation of the TIS development process. Each tool carries its cognitive elements such as purpose of the tool, how to use it, which steps to follow and related techniques to be applied, which equipment/materials are necessary, how to document achived results. The set of TIS tools included: conceptual database model table; matrix of data sources, users and typology of data; data sharing protocol; database model diagram; rules of acquisition, digitalization, and storing of data; rules for the elaboration of maps and layouts; metadata structure. The tools focus on roles each member of the team had and support interaction, participation, team-work throughout the process of implementation.

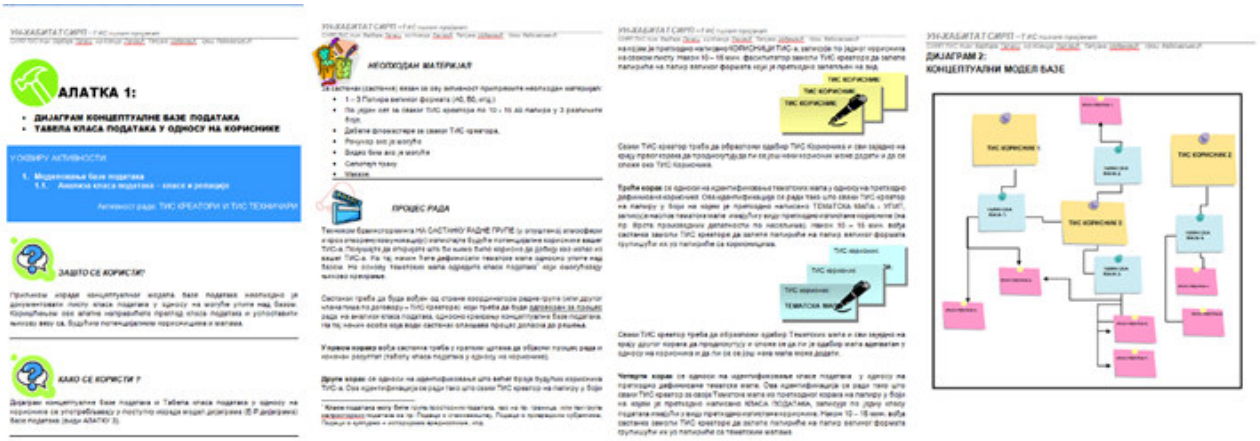

Fig. 30, 31, 32: TIS tools – encouraging participatory approach in developing TIS elements

Intranet provided acessibility to the relevant documents an materials during the process of implementation. Each member of the working team had it own accessibility with different premissions. The intranet provided structural platform for sharing support materials provided by consultants, documents produced by municipality working groups, etc. On the other hand forum was designed to share experiances between TIS municipality working groups on different topics during the implementation period. As a support in using the platforms TIS consultants developed guidelines how to use it.

4 CONCLUSION

According to the presented cases and using the designed tool for measuring social capital development we can say that structural dimension was constant in all municipalities designed by mediating team and accepted by the municipality. The structural elements, according to the tool, covered all social capital dimensions: bounding, partnerships and linking, providing 'soft' infrastructure for the development of cognitive elements. Therefore, we can say that all municipalities had the same preconditions to develop cognitive glue in the process of data and information sharing through building trust, collaboration and collective action.

However, the process outcomes say different story. In the situations when cognitive holes showed up (such as lack of trust and collaboration) they were 'glued' by the authority figures on national and international level (UN – Habitat, Faculty, Ministries). Therefore, each municipality in the process which was mediated has achieved expected results, defined in the Project document. However, not all of them continued to work on TIS activities in municipality. The cases were this process continued showed high level of cognitive glue in the process which was mediated. The first was strong acceptance of the 'issue' for data and information sharing; the second was strong bonding dimension among the team during the previous process. The third was strong leadership from authority figure inside the municipality and the forth high level of promotion of TIS activities in the municipality, on international fairs, etc. We can conclude that in this municipality the collective action developed from reactive to proactive and social capital was developed in all dimensions in different percentage.

Therefore, we can say that data and information sharing can be the platform for developing social capital if there is strong cognitive glue for this process. If we consider discussion in the previous chapters, Territorial information systems carries the cognitive element in its concept of the territory and if the process of its development is mediated from the top and strongly accepted on the bottom level it can be an instrument for developing social capital in municipality. The first precondition is that structural elements of social capital on all dimensions must be provided by the mediating authority. The second is that cognitive elements must be developed during the process inside the municipality such as building trust, collaboration and partnership also by mediating team through workshops, trainings, and support material.

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The "Green Palisade" Concept: a scenario of waste and wastewater as resources city

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1 ABSTRACT

"Liveable city for everyone means a high environmental quality performance whenever we are breathing." From this interpretation, this paper should focused on two main 'refuses' from our daily life - waste and wastewater – and options for their use as resources. In this sense a scenario for one area in Jakarta's (the capital city of Indonesia) satellite cities, Bogor, where most population concentrated will be delivered.

Bogor City has been 100% transferred into urban area in the last few decades and expected to have more significant urban rising in the future. The inhabitants in Pulo Geulis, one area in Bogor City, potentially throw their refuses into the rivers which surround the area. A scenario is designed to implement waste and wastewater as resources and make them as benefits among themselves and others. At the same time it improves the community livelihood of life and contributes in lowering global GHG emissions from waste and wastewater sector. This paper calls it as the „green palisade" concept.

Keywords: green, community livelihood, waste and wastewater, river, polution avoidance, GHG reduction

2 BACKGROUND

Environment is a combination of aesthetical, social and physical concepts with an interrelated synthesis among resources, man and the species (Jain 2009). Liveable cities must be supported by suitable environment quality and public health. Taking waste-and-wastewater-from-household-activities as resources into considerations, humans routines will be greatly determine the quality of environment and public health. This will be a great challenge for Indonesia where the society's participation in community livelihood improvement is still weak (BPS 2008).

This paper will focus in one 'isolated' area in Bogor City. Bogor is a name of one of Regencies in West Java, Indonesia, and it is also a name for the capital city of Bogor Regency. In this paper Bogor is used to represent the city only.

It is Pulo Geulis, located at the center of Bogor. Pulo/pulau means Island in english and geulis means pretty, so Pulo Geulis means pretty island. Pulo Geulis is a delta that formed by Ciliwung River long time ago. The reason of selecting Pulo Geulis as case study is because the river surrounded area, where river littering potentially become environmental problem.

By developing the 'green palisade' concept in the area, the paper tries to contribute to the green urban community development particularly using the resource potential from waste and wastewater sector. The specific aims of this paper are to reveal the economic value from waste and wastewater resources and to look at some ways in decreasing the natural resources exploitation in the area. This paper also looks at the potential as renewable energy sources from this sector.

With the "green palisade" concept it is expected the society awareness for community participation in their livelihood improvement will increase. Also, 'the green palisade concept' is expected to improve the soil quality in the outskirts of the area and therefore give chances for trees to grow. At the same time it decreases the potential GHG emission released uncontrolled into the atmosphere.

2.1 The Green Community Development and waste and wastewater sector

The 'greens' are generalized as the principle of community self-reliance, improving quality of life, harmony with nature, decentralization and diversity (Roseland 2001, p. 90). In fact the waste and wastewater production increase moves along with the open space decrease. Therefore problems often hit high-populated

cities where waste minimizations, such as home composting, are limited due to the free space availability (den Boer 2007).

Developing countries familiar with low-level quality of waste and wastewater management. Often this sector stimulates diseases, cause environmental degradation and triggers food insecurity. In the relation with climate change, waste and wastewater sector contribute 2-3% of the total green house gas emission generation between 1997-2003 and 4.5% only for Developing countries (Bogner et al 2007, p 596). In this sense, since cities in developing countries are commonly most populated, waste and wastewater sector has important role in influencing the green urban community development.

2.2 Indonesia, Bogor, and Pulo Geulis

Indonesia is a tropical country in the South-East Asia. It has rainy and dry season, from October-April and from April to October, respectively. Jakarta, the capital city, has amazingly developed in to a metropolitan city with population of 8.8 million populations (BPS 2008). Since decades Jakarta expands its influences and shapes the Greater Jakarta; the five cities chain abbreviated as JABODETABEK (Figure 1). Nevertheless these cities become dependent one another. Currently these satellites cities are experiencing significant urban rising where almost 100% of the area has turned into urban structures (Table 1).

The Center Bogor is the densest sub-district in Bogor City, with 13,445 person/km2 (BPS Kota Bogor 2008). Located about 10-15 minutes walk to the south part of Kebun Raya Bogor (80 hectare Bogor Botanical Garden), this area looks very contrast. Trees are very rare here. Dense settlement with one-family/single houses, small alleys, bridges and massive fences are the main urban infrastructures on the site.

2.2.1 Bogor and the selection of Pulo Geulis

In January and February Bogor normally has highest rainfall, 500 mm/month. This rainfall is 200-250 mm/month higher than the high-classification given by Indonesian National Institute of Aeronautic and Space (LAPAN). Bogor is located in a high land, 150-330 m above the sea level, at the southern part of Jakarta. Geographically, this city has four Mountains with many fresh water sources, relative hilly land (0-15% angle of inclination). Bogor is passed by six rivers and has the highest rainfall rate compare to other cities in Indonesia (BPS Kota Bogor, 2008).

Fig. 1: the Greater Jakarta, including Bogor (Source: Jakarta City Map)

City	Total Area (km^2)	Urban Population (%)	Rural Population (%)	Total Population (Million)	Density (Person/km^2)
Jakarta	656	100	0	8.8	13,400
Bogor	118	100	0	0.8	6,700
Depok	200	97.5	2.5	1.3	6,500
Tangerang	164	70	30	3.2	19,500
Bekasi	210	97.5	2.5	1.9	9,000

Tab. 1: Rural-Urban Transform by Population in JABODETABEK (Source: BPS, 2008)

One of Bogor's rivers, Ciliwung River, also pass Jakarta. At the peak of rainy season the river size could not compete with the flow due to the solid waste along the river. Then it blasts over the surface and cause flood almost all over Jakarta. Mainly it is because the limitation of soil ground and its absorption capacity. This condition turned Bogor into a "flood transmitter" for Jakarta on the peak of rainy season.

By utilizing waste and waster from household activities at the field study, not only the soil quality is improved but also decreasing the amount of water that entering Jakarta. There will be significant amount of water reduction if many places in Bogor implement the concept, thus decreasing the flood potential in Jakarta.

2.2.2 Current Waste and Wastewater Treatment in Bogor

Like many other municipalities in Indonesia, municipal waste and wastewater management is administered under Environment and Cleansing Board. In Bogor Public Authority Act (PERDA) no.4/2007, it is stated that every inhabitant is not allowed to throw any kind of refuses in to environment except under the mayor's permission. Based on this Act, the inhabitants should do waste separation into organic and inorganic; set up their own standard waste bin for temporary collection; and throw their refuses at the certain selected places with the presence of monthly retribution. The municipality will transfer the waste in to the Bogor dumpsite near Galuga Mountain, named TPA Galuga.

The Act also stated that the Municipality and private sector operate all wastewater treatment where the inhabitants should pay retribution. Contrary to the strict regulation there is no wastewater network in Bogor but one sludge treatment plant (IPAL). Bogor Environmental Report (2003) states that only 22.35 % inhabitants have their own septic tank. Almost 80 % of households in Bogor dispose domestic wastewater directly into the rivers or canals. Some people built their own septic tank under their house, at the back or front side. When the tank is full, normally the municipality/private sector's truck collects/picks and transfer them up to the IPAL. Currently Bogor Municipality is building an integrated sludge treatment plant (IPLT). From these two current situations we conclude that to achieve better environmental and public health, there has to be another approach to solve domestic waste and wastewater problem.

2.3 Methodology

All information in this paper is collected through several methods such as direct investigation in October 2009, shared stories in environmental issues from different medias (newspaper, Blog, etc.) and literature reviews. Investigation has been made with the help from several local inhabitants but they are not representing any group of ages, individual interest, etc. All scenarios are developed based on these findings. Some data, such as waste and wastewater generation, are taken from municipality level.

3 DEVELOPMENT OF THE CONCEPTUAL MODEL

Pulo Geulis is inhabited by around 2,000 persons on a-1.8-hectare area, formed and surrounded by the Ciliwung River. From organizational perspective, Pulo Geulis is divided in to five neighborhood associations (RT). The area is very dense, with around 400 relatively small single houses and most of them have their back façade to the river. Located between two river flows, this area gets smaller and smaller due to abrasion (Figure 2). Therefore people in this area protect their property by building solid/massive grounds and constructions.

Land limitation is also one of important issues in here. It increases the sense of protecting the property construction like fences and walls. Moreover this is done to avoid the rainwater coming in-to the houses. Thus the fences create 1-2 m wide alleys, which restrict the water absorption and direction of the flows.

Bogor’s yearly humidity and temperature in the year 2007 is between 72-95% and around 21.8-26 0C, respectively (BPS Kota Bogor 2008). The yearly rainfall in 2007 is between 31-555 mm/month where the highest rate came in January and February with 555 and 527 mm/month, respectively. The lowest rate came in July and August with 37 and 49 mm/month, respectively. Still in 2007, during the highest rainfall month, the rain occurred in 20 and 22 days while it only occurred in 4 and 4 days during the lowest rainfall, respectively (BPS Kota Bogor 2008).

The inhabitants do washing, fishing, bathing (children), and some even defecating in the river. From the observation, during the working day we found many inhabitants on the site and most of them are woman and children.

These women are mainly housewife. They stay at the house and do the household chores while adult men are working outside the area. Some women make traditional crackers from vegetables as the way to earn money from home. Therefore the women and children are likely to be the most paying attention and critics inhabitant to any changes in the area.

Fig. 2: Pulo Geulis – Between two river streams

Because many houses are backing the river, many inhabitants do not include the river as aesthetic aspect in their property. By contrast they are directing their wastewater network, used water from bathroom, kitchen, rainwater and other refuses, in to river. Amounts of abandoned waste spots can be seen in some points in the site.

Some house have private toilet. Due to the absence of wastewater network, some inhabitants built decentralized septic tank. But because of the small spaces of the dense settlement, the capacity of the septic tank is also very limited. This brings problem of collection and transfer whenever it is full, as the transfer truck could not reach the collection point.

Based on Bogor Data from Dinas Lingkungan Hidup and Kebersihan or Environmental and Cleansing Board in 2008, Bogor as municipality generates 2,205 m3/day of waste, where 73% of them came from the household sector. This brings waste generation 0,0024 m3/day per person in Bogor. If we assume more than 50% is organic waste, it means around 0.85-1.4 m3 organic fresh waste can be collected each day (collection rate between 50-80%) in Pulo Geulis only. Moreover, with 70-80% of water consumption in Indonesia reach 80-100 l/person/day; this will be significant amount in reducing amount of water that enters Jakarta.

3.1 The Limitation and Potential Factors

The ‘green palisade’ concept development begins with the limitation and potential factor in the area. The main consideration for waste and wastewater management in the area takes in to account the economic benefit for the society and factors that could strengthen the social equity.

The limitation of the area is mainly the limited accessibility since 2 river streams surround it. This condition may give bigger chances for the inhabitants to throw their refuses to the river. Physically the area is very dense and almost no open space is available. The existing social and public facilities and also the inhabitants activities, where many women stay 24 hours in the area, are taken as the potential factor of Pulo Geulis

Based on the limitation and potential factors on Pulo Geulis, combination of centralized in-situ waste and wastewater management with low maintenance is preferred. Centralized in-situ is chosen because the condition of the accessibility (limitation) and the strong social community (potential) existence. This will narrow down the list of waste and wastewater treatment in to the small-scale organic treatment plants and lead to the woman and children as a key group as important factors to be considered.

3.2 Waste and Wastewater Scenario Development

Considering the accessibility and function as social and public facilities, six spots are observed as potential places to be taking place for the waste and wastewater scenario. Those are social community office, a social facilities where the community usually held discussions and administrative things; two mosques, public facilities where the Muslim community usually pray together; security post, a social facility where the inhabitant takes turn as security observer at the area; river basin, where the inhabitants can get closer to the river; and one of abandoned spots at the riverside, which currently used as illegal 'dump site' by the inhabitants.

1	Limitation Factor
	Land Morphology: • surrounded by 2 river streams (land abrasion) • limited accessibility Urban Infrastructure: • dense settlement • very limited open and green space • small alleys with massive boundaries • tight bridges • houses backing the river • abandoned spots as 'dumpsite' Social Community: • throwing refuses in to the river • middle to low economic income
2	Potential Factor
	Social Community: • woman and children as key group • different religion beliefs live in harmony • existing public and social facilities

Tab. 2: Pulo Geulis Limitation and The Potential Factors

The centralized in-situ activities are expected to strengthen the sense of belonging of their inhabitant and the social equity, since they play the role as user and controller. The impacts, either negative or positive will directly refer to the area in Pulo Geulis. The local women will mainly motorize these daily activities.

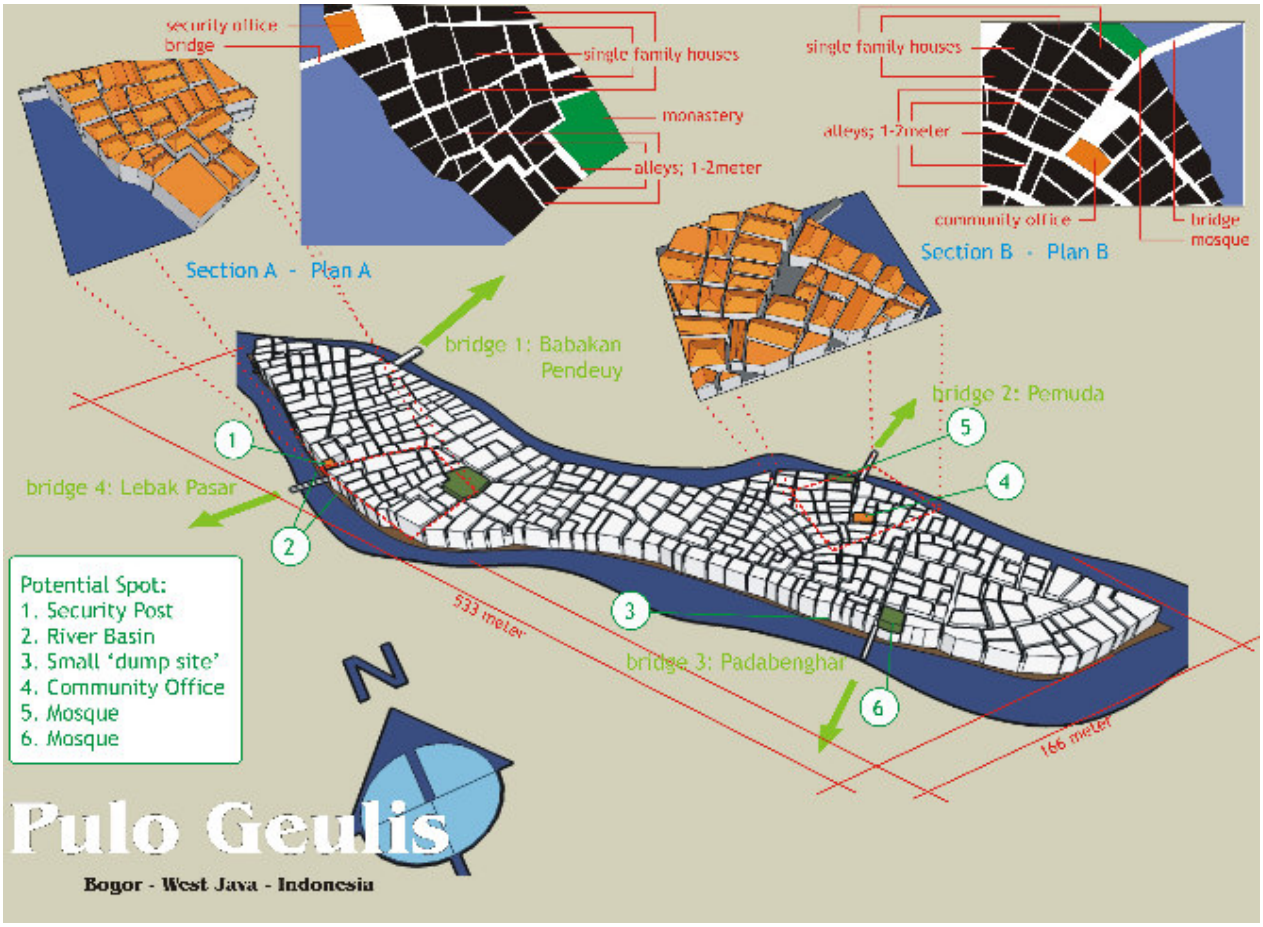

Fig. 3: Pulo Geulis –Eksisting Condition and Potential Spots Discovery

3.2.1 Waste Scenario

The paper suggests two main types of waste treatment for this area: 1) centralized recycling and 2) combine centralized and decentralized composting.

The key factor for these two activities is waste separation at source into two main fractions: non-organic (dry waste) and organic (wet waste) fraction. These organic and non-organic wastes are collected everyday with handcarts and then brought to the recycling center. The recycling center located at previous community office (spot no.4). The reason in selecting this spot is in order to improve the value for the society. Besides the current function, this facility will also play role as composting center, recycling center, recyclable bank and socialization center for these new values.

The collector(s) is the woman from each neighborhood association (RT), community groups or anyone who has interest in utilizing the waste resources, which regularly takes turn based on the schedule. The schedule can be discussed among the society.

Organic waste

The organic waste is suitable for composting. Composting is the aerobic breakdown of organic material such as straw, sawdust, wood, manure or leftover food and liquid sewage by various types of microorganisms and produce valuable material for the compost (Wahyuningsih 2007).

At the recycling center, the organic fresh waste resources will be composted in a compost container. There are varieties of small scale composting containers applied in Indonesia. One of them is Takakura, Japan technology composting container that enables well-aerated composting but prevent flies entering and without bad odors (Wahyuningsih 2007). With its 60-liter box (30×42×60Hcm ~ 0.08 m3) capacity, it is easy to carry and arrange them at the recycling center or at the inhabitants’ house.

The compost product will be useful as fertilizer, to make the settlement greener by pots planting. Beside its function for centralized composting activity, the recycling center also plays role as a ‘class’ where the

inhabitants can exercise the composting and then self-practice in their house. This self-practice is voluntary to those who have interest in home plantation.

The compost product can be uses to build greywater towers as well, as private or public. The definition and the integrated application with greywater tower will be discussed further in greywater scenario part.

Non - organic waste

The recycling center connects to the role as a recyclable bank. Here, the non-organic waste resources will be divided in to the one with and without economic value. The one with economic value will be stored in the recyclable bank and wait until it reaches enough amounts to be sold. The recyclable material segregation and utilization is potential as one of employment options for the inhabitants. The woman can work from home to make economic products such as bags, artificial flowers, etc. from selected material at the recyclable bank.

The one without economic value will be transferred in to nearest temporary collection point (TPS). With active involvement from the inhabitants, this will significantly reduce the waste brought to the landfill.

In the case of Surabaya City, another big city in Indonesia, the implementation of composting and recycling has successfully implemented. Many stakeholders are involved in 3R (reuse, reduce and recycle) project. The municipality has intensely promoted the program by distributing free compost containers while the local Non-Government Organization (NGO) organized a community clean up campaign. This campaign actively involves the inhabitants and the community group in waste reduction on their area. At the city level this activity reduced 20% of Surabaya municipal solid Waste (Maeda 2009).

The motor of this activity is the existing local community group. This group promotes waste segregation at source and goods manufacture from recyclable materials, such as plastics, for income generation (Maeda 2009). Therefore at the same time the project also promotes community empowerment. It is recommended to take the Surabaya successful case as further study.

3.2.2 Wastewater Scenario

The paper suggests Anaerobic Digestion (AD). AD is the controlled process of anaerobic digestion (Waite 1995 p.ix). It allows biogas generation that can be used for cooking. Located on 533 m long and 166 m wide area, Pulo Geulis has potential to be surrounded by wastewater network along the outskirts. The network will collect most of household sanitation networks that mainly end up at the river. Therefore exiting septic tanks will be closed and replaces by the black water network.

Black water network

Black water is wastewater that is produced from toilet activity. It mainly contains of faeces, urine and used water. This network will collect the black water pipe from households sanitation network at the outskirts. To be more effective, the network will be divided in three parts, where each sanitation network will reach the closest storage. There will be three AD plants for this area and one storage tank at the basement level per each.

AD plant I in existing security post (spot no.1), AD plant II and III in mosque (spot no.5 and 6). The locations for AD plants are selected because the function as public/social facility and the accessibility that allows the trucks' trunk reach the storage tank whenever they are full. The faeces, urine and used water are then brought to the municipality sludge treatment plant (IPLT).

Still on the black water network, three public toilets will be made, following the construction of AD I, II and III (spot no. 1, 5 and 6). The free-of-charge use of this public toilet will accommodate the community needs. One story on each mosque will be added and the public toilet will take place at the lower level (on the ground).

In order to avoid another expenditure to build door-to-door gas network, the gas will be accommodated and saleable in a 3kg-gas-tube, as that is the familiar/existing tube in the market. With the help of pump/pressure technology and water principle that flowing to the lower place, the storage tank will be made in the level minus one (-1 or basement) from the ground. The income from the gas trading can be used for AD and public toilet maintenance.

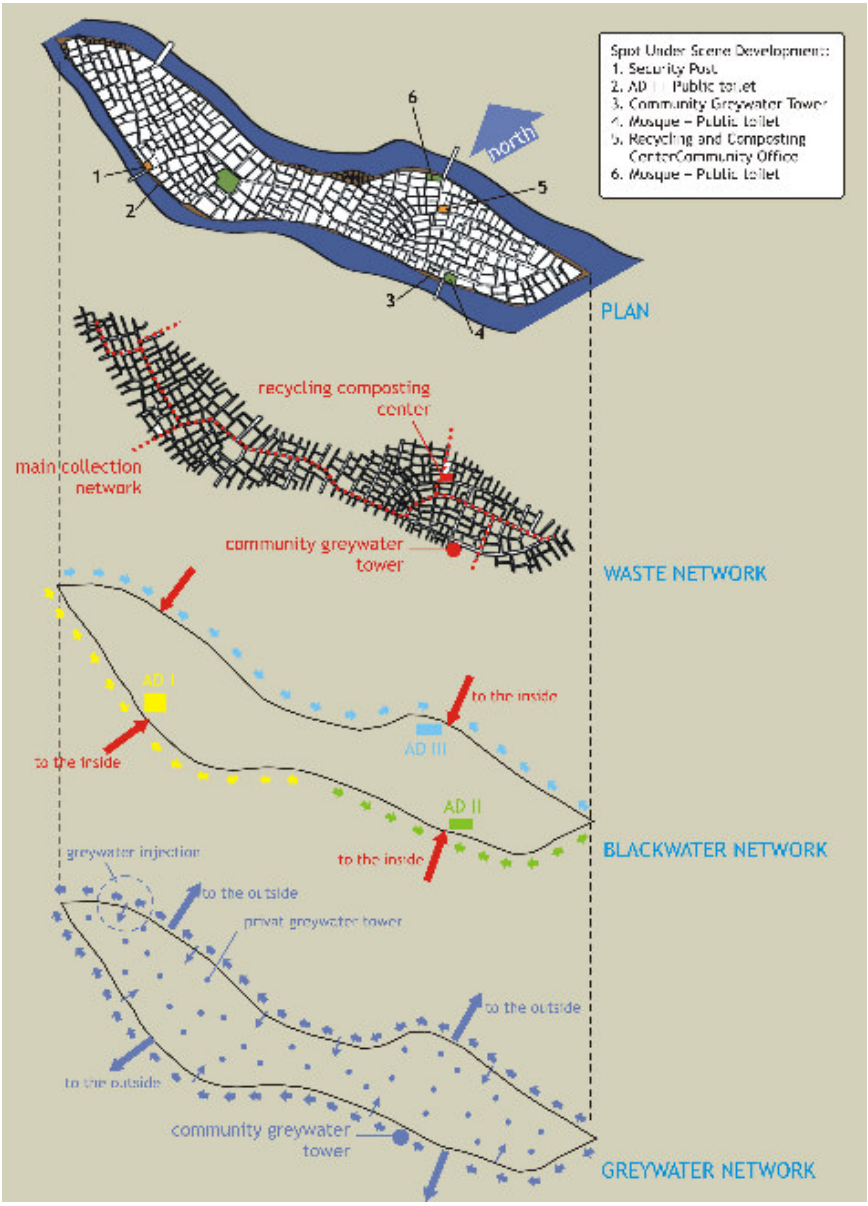

Fig. 4: Waste and Wastewater Scenario Development

Greywater network

Greywater is wastewater that is produced from other household activity such as washing, bathing, etc. Integrated with the composting activity, the greywater network will support the communal greywater tower application at the existing ‘dumpsite’ (spot no. 3).

Greywater tower is one technology to utilize greywater, with flexible diameter (30-50cm). The external structure consists of poles (iron bars or fence post) and shading material surrounding soil and central stone packed drain. The purposes of the stone are to spread the water flow throughout the column (Morel and Diener 2006). Greywater is poured daily with buckets on top of the central stone core. The water trickles through the central stone core and is more or less evenly distributed within the soil column. Due to soil limitation, the soil will be replaced with compost. This will give better result as compost contains nutrition (soil amendment).

The selection of this existing ‘dumpsite’ is in order to avoid the continuation of illegal dumping before it deteriorates the environment further. Moreover the soil cover on the land fits the agriculture activity. The societies can voluntarily implement it in their house for individual greywater tower.

Leafy vegetables, such as spinach and kangkung, are planted into slits of the shading material surrounding the soil column. The slits are offset to one another thus giving more space for root development. Tomatoes, chili or onions are suitable to be planted on top of the column.

The used water from rice, vegetable, and dishes washing can be use to watering the individual greywater tower. It is even possible to chance the tower media into hanging pots whenever there is no free space available. Other greater amount from used water generation such as from bathing, cloth washing, etc. will be directed to the greywater network.

The same as black waster network, the greywater network will collect the greywater pipe from households surround the areas together with the rainwater. The grey water network will be divided in to two parts, left- and ride-side network. To avoid the bacteria contamination from the greywater this network is built 20-30 cm sub-surface. The scenario avoids the centralized greywater collection on the land surface as it potential spots for diseases vector to grow.

In the case of rainwater, since there is no existing drainage at the area, all rainwater will join the greywater network. The greywater and the rainwater are then used to watering the greywater tower and partly circulated through the outskirts that still have soil land. The network will reach any soil land in the area, whenever it is possible, thus triggers soil fertilization and threes growing. In some period the trees at the outskirts will create a real green palisade. In case of over capacity greywater, they will be released in to the river.

The last, to exchange the old post, the two bamboos bungalows at the left and right side of the AD I plant, attached to the slope, will be the new security posts. Located near the river basin (spot no. 2), these bungalow will have access to the river, thus gives opportunity to create 'good looking' by experiencing planting in greywater tower/pots. This is the point that people can see from the nearest main street in Bogor.

4 CONCLUSION

By giving the in-situ scenario, it is expected the inhabitants' motivation and responsibility to participate in the community livelihood will rise as the inhabitant will receive the good or bad impact directly. The community control is the key factor for successful implementation. Therefore all result will be based on community efforts. In this case the community has to be responsible for what they did individually and communally.

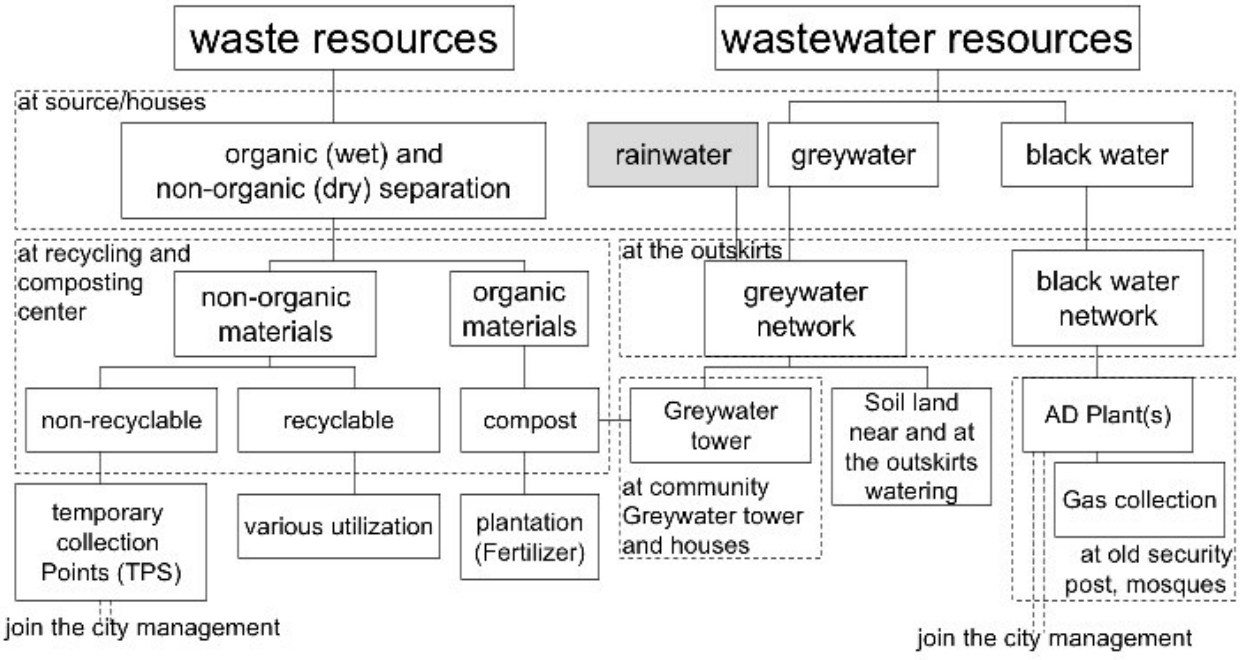

Fig. 5: Scenario Development - Summary

At the optimum implementation, the wastewater scenario improves the soil quality in Pulo Geulis and thus turns the outskirts into the green palisade. Moreover these activities stimulate income generation, and employment. The integration of waste and wastewater scenario contributes to the benefit from vegetables and fruits cultivation, thus it manages the food insecurity. With successful implementation, the network can be developed as a role model and expanded or scale up to the neighborhood societies.

However the concept should begin with public campaign from public authority, influenced or public figure, university/research institute or NGO to the community, and the inhabitants’ commitment in order to deliver the idea and the excellent achievement. It is also necessary to give some training in doing waste separation and built communal/individual greywater tower as a pilot. The municipality also has to commit in finding the funding for construction. The case of initial funding is very sensitive, since it could be the bottle neck and the main question about the sustainability of the implementation. From Surabaya Case, it is found that the local authority and local NGOs play significant role in motoring such activities. Therefore the first role of local government and NGO in Bogor has to convince the society, to built such mutual relationship among them.

5 ACKNOWLEDGEMENT

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The assessment of traffic livability, including local effects at home, during trips and at the destination, based on the individual activity pattern and trip behaviour

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1 ABSTRACT

The environmental quality of the living environment is mainly linked to the direct and indirect impact of traffic in the neighborhood of the dwellings. In the Flemish mobility and urban planning, the term 'livability' is used focusing on the living conditions of people's home location: what is the satisfaction about their living environment? The more specific term 'traffic livability' is used to describe the impact of all types of traffic on the livability of a dwelling location. Some methodologies were developed for an objective measurement of the traffic impact on quality of life. In Flanders the most commonly used methodologies are the 'traffic livability index' 1 and the 'bearing capacity'2, which use a very narrow interpretation of the traffic livability, as they are highly based on the local road design (number of lanes, cycle path, …) and the local traffic characteristics (traffic flow, speed, traffic safety, …) of the street of the dwelling. The main critic is that these methods should measure over the complete living environment of a person, rather than just at the dwelling. For this reason, an alternative methodology was developed for an objective measurement of the impact of traffic on the local quality of the living environment. Compared to the current practice, this new methodology aims at the following objectives:

- The evaluation is not done for the average person, but includes individual needs and travel patterns, based on personal characteristics, representing the large diversity of the mobility needs.
- The methodology should reflect a daily activity pattern, including the traveled routes and destinations. The traffic livability of a specific household in a specific area will reflect the full extent of their needs at home, during the trips and at the destinations.
- Traffic livability is measured by means of a broad set of indicators, representing different types of traffic impacts (accessibility, traffic noise, traffic emissions, …). The separate indicators are combined into an evaluation of the traffic livability, including an extensive set of secondary effects.

This is mainly realized by a better simulation of the personal trip behavior, using the data from the Flemish Trip Behavor Survey. In order to evaluate the livability at a certain home location (a number of) households are sampled from this database, with the specific characteristics of the household (composition, car availability, children, …), the people in the household (age, employment, …) and their activities and trip pattern. With this information, the different indicators for traffic livability can be evaluated on the home location, as well as during the trip and at the destination.

2 PROBLEM STATEMENT

The environmental quality of the living environment is mainly linked to the direct and indirect impact of traffic in the neighborhood of the dwellings. In the Flemish mobility and urban planning, the term 'livability' is used focusing on the living conditions of people's home location: what is the satisfaction about their living environment? This is different from international litterature, where the term is normally used in a more general sense, taking into account the social, economical, environmental, circumstances in a certain city or area.

More specificly the term 'traffic livability' is used to describe the impact of all types of traffic on the livability of a location. In Flanders, with its typically strong interference between different road functions (transit vs. local traffic) and between urban and traffic functions (traffic vs. housing, shopping, …), traffic livability is an important issue in mobility and urban planning. As traffic livability is an important indicator for the evaluation of urban projects and traffic measures, for setting policy priorities, etc, it is important to

have an instrument for an objective measurement of the traffic livability. Two major difficulties are that (1) a large series of different traffic impacts on the surrounding functions need to be measured and that (2) the relative appreciation of each impact is a rather subjective matter. Some methodologies were developed for an objective measurement of the traffic impact on quality of life. In Flanders the most commonly used methodologies are the 'traffic livability index' [1] and the 'bearing capacity' [2]. Typically these methods use indicators about the local road design (number of lanes, cyclepath, …), the local traffic characteristics (traffic flow, speed, traffic safety, …), the local traffic emissions (traffic noise, traffic emissions, ...) and the sensitivity of functions along the road (e.g. schools). The livability at a certain address is expressed as a composition of the characteristics of the local road section in front of the house. This is a very narrow interpretation of the traffic livability, with important restrictions:

First of all, this presumes that quality of life is very locally determined by the location and situation of the house. This is contradictory to elementary planning theories, as by Klaeboe[3, 4] or Appleyard [5], both stating that quality of life is determined by the complete living neighborhood, rather than just the house location. People judge their living quality during a vast set of activities, some taking place at home, some taking place at other locations (office, shop, sports center, …). In this view, 'livability' should also include annoyance at work, at school or at other locations, and even the effects during trips to these locations. For example traffic noise disturbance is often not caused by the traffic in the local street, but by traffic from a nearby major road.

A second limitation of the current methodologies is that they ignore the importance of traffic networks. Local shortcomings do not only harm the local residents, but harm all road users passing by, which means that the impact of a local shortcoming spreads out to a much wider extent. Evenso not the local traffic emissions are determining, but the cumulation of the emissions on all nearby streets. A dangerous pedestrian crossing doesn't only harm the residents of the street, but all pedestrians passing by.

3 PROPOSED METHODOLOGY

3.1 Selection of an indicator set for 'traffic livability'

The existing methods all split down the 'traffic livability' into the separate types of traffic impacts, and define a set of indicators for each of them. The newly proposed methodology will follow the same structure, with a similar set of indicators. The main improvement will be on a technical level, concerning the way the indicators are evaluated. The indicator set is based on a litterature review7 of the term "traffic livability", collecting an overview of the frequently used traffic impacts and indicators. This resulted in a breakdown of the term into four components: accessibility of basic functions, health impact (as traffic emissions, sleep disturbance, …), effects on environment (noise annoyance, visual impact, …) and effects on the social functioning of the neighbourhood (barrier effect, attractiveness, …). Each component is divided into some partial effects with their specific indicators.

Measuring traffic livability will be realized by measuring these indicators and aggregating them to a global score for each component and for the total traffic livability.

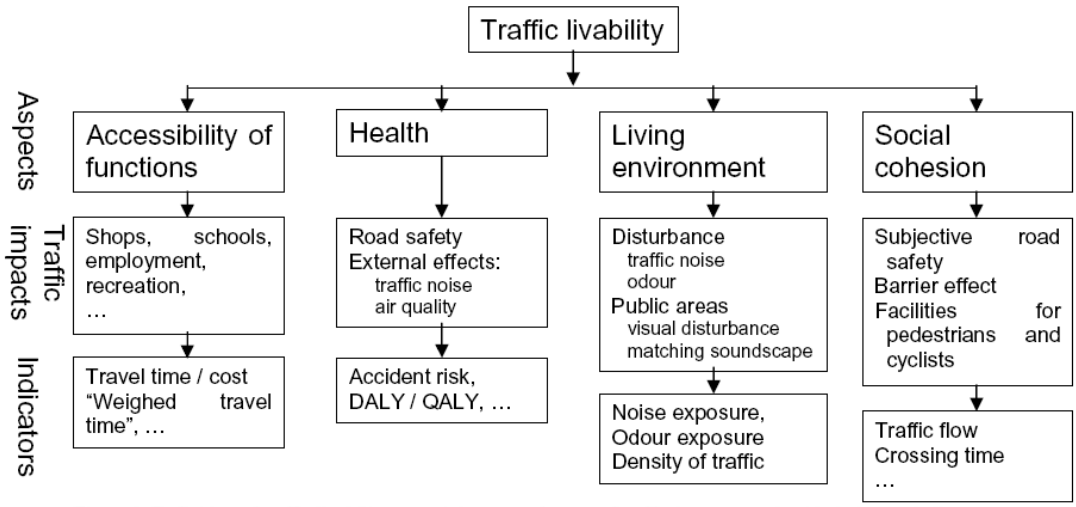

Figure 1: Definition of traffic livability, containing several types of traffic impacts, each with their own indicators

3.2 Methodology for the evaluation of the indicators

The main shortcoming of the existing methodologies for measuring the traffic livability is the (over-) simplified way of evaluating the indicators. The living quality of an address is considered to be determined by the traffic impacts at this very specific location: the local noise level, local air quality, etc, as if making a simple overlay of several layers. As ersatz indicators, these impacts are measured using the local characteristics of the nearest street (road width, bicycle facilities, …) and its traffic (e.g. traffic flow, traffic speed).

To reach a better representation of the neighbourhood perception, an alternative methodology was developed for an objective measurement of the impact of traffic on the local quality of the living environment. Compared to the current methods, this new methodology aims at the following objectives:

- Traffic livability is measured by means of a broad set of indicators, representing different types of traffic impacts (accessibility, traffic noise, traffic emissions, …) . The separate indicators are combined into an evaluation of the global traffic livability.
- The evaluation is not done for an average person, but takes into account individual needs and travel patterns, sampled from the Flemish large-scale trip survey. This means that personal characteristics (age, marital status , professional activities, …) and family characteristics (number and age of children, car availability, …) and the consequent diverse mobility needs, are incorporated in the evaluation.
- The methodology reflects the daily activity pattern and trip pattern. Beside the traffic impacts at home, also the effects during the trips and at the destinations are included in the evaluation. This means that the evaluation of traffic livability covers the complete living neighborhood, rather than limiting it to the dwelling itself or the street it is located in.

The Flemish Trip Behaviour Survey

A major input to reach these objectives is the Flemish Trip Behaviour Survey (Onderzoek VerplaatsingsGedrag, OVG), a large scale survey collecting trip data by means of trip diaries covering the whole of Flanders. The survey data consist of three data sets containing the family characteristics, the person characteristics and the personal trip data. The survey has been executed in 1994-1995 (OVG-1), in 2000-2001 (OVG-2) and in 2007-2008 (OVG-3).

- OVG-1 and OVG-2 used the ‘family’ as basic entity. The surveys covered 2.500 families each, surveying all family members, representing about 8.000 persons. The methodology in this paper was elaborated using the data from these surveys.
- In the most trip survey OVG-3 the methodology was slightly modified: the survey now used ‘persons’ as the basic entity: again 8.000 persons were surveyed, but covering 8.000 different families. The survey still includes the family characteristics, but the trip diaries are completed for only one selected family member.
- For OVG-4 and following surveys, the approach will be further modified. Instead of surveying 8. 000 every 5 year, there will be a yearly survey of 1.600 persons. Every 5 years, there will be a similar sample of 8.000 people. This change will not affect the proposed methodology for the measurement of traffic livability.

The different approaches in OVG-3 and further OVG-surveys will necessitate a slight adaptation of the proposed methodology, in order to use the survey data in a correct way. Evaluation of the indicators by sampling the trip behaviour The main issues for improving the existing methods, are to take into account the specific personal activity pattern and trip behaviour, instead of evaluating the perception of the ‘average person’, and to make an evaluation over all trips, all modes and all routes for this person. This is done by a Monte Carlo simulation, sampling random families and/or persons from the Trip Database of the Flemish Trip Behaviour Survey, and consequently sampling a logical destination from a set of pinpoint locations.

The traffic livability of a dwelling location is then evaluated in the following steps:

First of all, a random household[1] is sampled from the Trip Database of the Flemish Trip Behaviour Survey. In the database a large set of characteristics are available about the household (composition, car availability, …) and its members (age, income, …) and their daily trips (number, purpose, distance, …). These parameters can be taken into account during the later evaluation, to simulate specific desires and appreciations. In the current stage this sampling is done completely random, but in a later stage some specific parameters could be take into account to sample rather younger or elder families, larger or smaller families, rather mediated or not, etc. according to the neighbourhood characteristics.

For all the trips that are made by this household, the following step is to select a logical destination. This destination is again sampled from a database of possible destinations per trip purpose. For school trips one of the schools in the area will be selected, for shopping trips one of the shops. The destinations for the purpose 'recreation' could be sport grounds, leisure centers, restaurants, etc. The sampling of a destination is not completely randomized, as the trip distance from the survey is used as a parameter in the selection, in order to keep a close reproduction of the survey results (for example to keep a logic mode choice for the given distance, avoiding 10 kilometres walking of 500m car drives).

For the collected trips (with mode) and destination, the third step is to calculate a logical route from the dwelling to the destination. Several methods are possible, for example by means of an interactive communication with a supporting traffic model or GIS-tool (the traffic livability model questioning the route from location A to location B). At this moment, preference went to a method using 'centroids' representing the surrounding streets (as used in traffic modelling). Using the centroids, it is possible to prepare a set database of routes between 'centroids', so that the route between two locations is approximated by the route between the nearest centroids.

Knowing the destination location, the route and transportation mode of all the trips of each household member, it is possible to make the evaluation of this person's perception of the traffic effects at home, during the trips, and at the destinations.

By sampling a sufficient number of dwellings per street segment (or a sufficient number of households per dwelling), this method results in an aggregated perception of traffic livability, representing a realistic variety of activity patterns and transportation needs and covering the complete living space of the population, rather than just the dwelling location. The expectation is that this will better reflect people's perception, as stated in surveys or interviews.

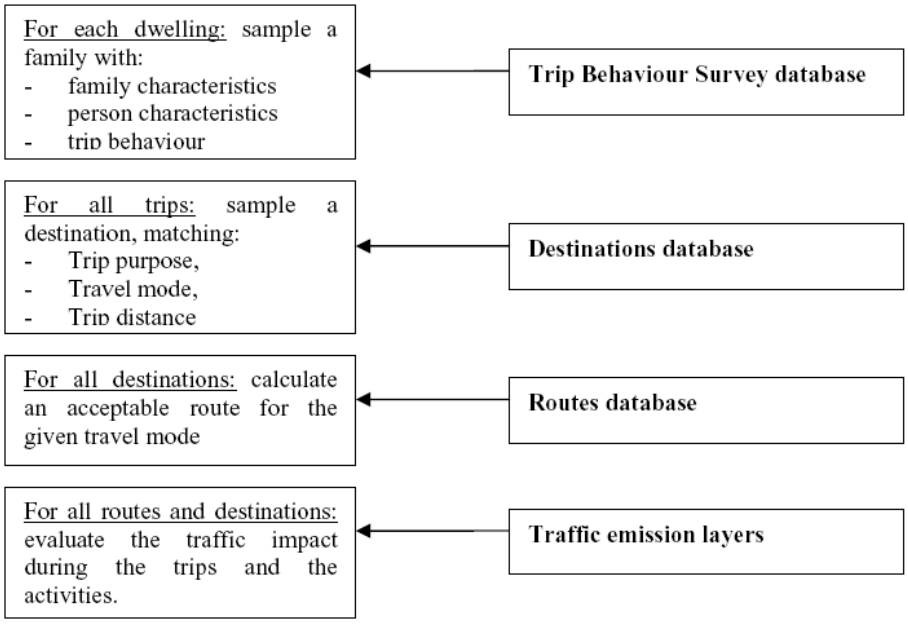

Figure 2: Structure of the evaluation of traffic livability by means of household sampling

Estimation for the generation of local traffic

[1] Starting from OVG-3 the survey is based on persons instead of households. This means that the methodology will be slightly adapted. Instead of sampling complete households including all the members, loose persons will be simulated.

Another result of this sampling, is that, after sampling all families living in the model area, the routes of all local car trips, bicycle trips and pedestrian trips can be totalized to an estimation for the local traffic generation by car, by bicycle and on foot. For car traffic, this local traffic can be a valueful addition to the existing macroscopic traffic models, which focus on the main roads, and therefore lack detail about the local traffic on minor streets. For bicycles and pedestrians, the method allows the estimation of the intensity and routes of the local bicycle and pedestrian flows, based on the local needs and destinations. This is important information for the evaluation of network quality, as will be illustrated in chapter 3.2.

3.3 Global model structure

The sampling of households and their activity and trip pattern is only a part –albeit the most innovative part– of a larger model structure, which is represented in the following scheme. As indicated, the model consists of four major parts:

- the input GIS layers and databases;
- the exposure simulation;
- the traffic model;
- the indicator aggregation.

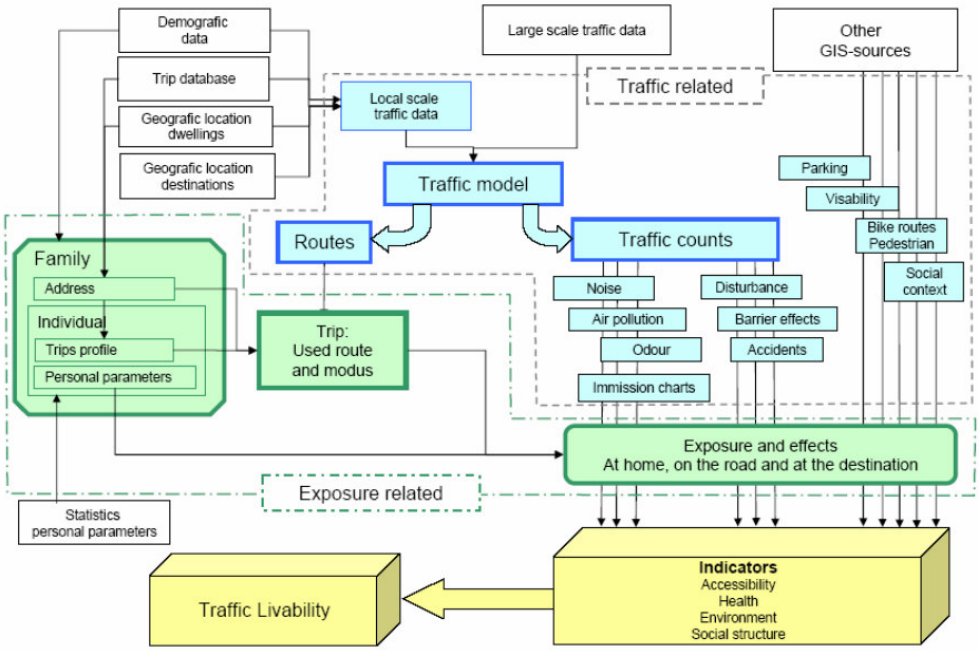

Figure 3: Global structure of the traffic livability model

The input components consist of GIS layers and databases. The GIS-layers contain attributes about the infrastructure, traffic, dwellings, points of interest, population density, etc. The databases contain demographic statistics and survey data about trip behaviour and time usage.

The core of the method is the exposure evaluation. For each household included in the simulation, a trip pattern is sampled from the trip database and linked to suitable routes obtained from the traffic model. These routes are used to sample exposure to noise, air pollution, and safety risks. With the data about the destination (location, purpose), the exposure at the destination can be included.

The traffic model is at first used to calculate the transportation mode and the route for these trips. Apart from this, the model is also used to generate the overall traffic flows and traffic characteristics (such as traffic speed and congestion), which are used to derive traffic noise immission and air pollution maps, evaluate safety risks, etc.

In the final component, the indicator aggregation, the results from the traffic model are used to evaluate the effects during the trips and activities from the exposure module. At first this evaluation is done for each separate indicator and for each individual person in the model. Afterwards, the results are aggregated

geographically (grouping individuals to a street or neighborhood level) and/or thematically (grouping indicators to a thematic score and a global livability score).

Two alternative methods are possible to do this aggregation. A first possibility is to first aggregate the different components of traffic livability for every person in the sample individually. This approach has the huge advantage over existing techniques that it allows to accurately account for combined exposure. The alternative is to perform the aggregation first at a population level for every component of traffic livability separately, to obtain a population averaged effect. With this order of aggregating, the model keeps its explanatory value: when certain measures or scenarios result in an improvement or reduction of the livability, this change can be re-traced, in order to detect which aspects of traffic livability or which indicators cause these changes.

3.4 Technical implementation

The model is developed in Python, using GIS libraries. The sampling of households and destinations is functioning and the calculation of routes from the dwelling to the destinations. The evaluation of a number of indicators concerning accessibility and traffic noise is implemented, including the effects during trips. The aggregation of the indicators is in a premature state. The route calculation, is currently handled in the open source GIS system GRASS. One of the future steps will be the implementation of a (macroscopic) traffic model for this purpose, in order to take better into account capacity restraints and congestion. Further steps will be the implementation of the missing indicators, the technical implementation of the aggregation module, and the calibration and validation of the model results, including some sensitivity tests of the model results (sensitivity to the scores and weights of the individual indicators, the distinctiveness of scenarios, …).

4 THE GHENT CASE-STUDY

4.1 Intermediate steps in the evaluation

The traffic livability model is implemented for a case-study of the Flemish city of Ghent, including both the city center and the suburbs. By means of some of the intermediate results of the model, we first illustrate the working of the model. The fundamental model input is illustrated on the following map, showing on one hand (a selection of) dwelling locations (“origins”) and on the other hand a set of destination points for several purposes (shopping, school, work, …) with a varying attraction (depending on the size and number of shops, the number of students, the number of employment, …).

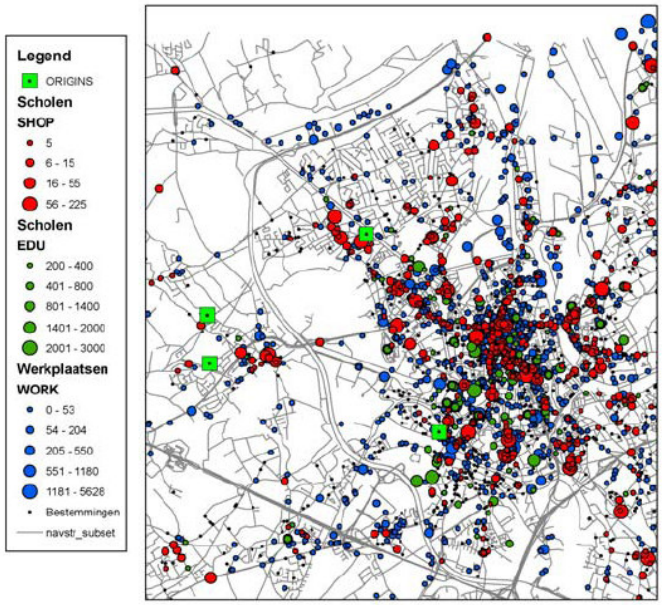

Figure 4: Illustration of the model input, consisting of a set of dwelling locations and destination points

In the first part of the model, a household is sampled for each of the dwellings to be evaluated. Using the reported trip behaviour, a set of logical trip destinations is sampled, and the routes and travel modes are calculated.

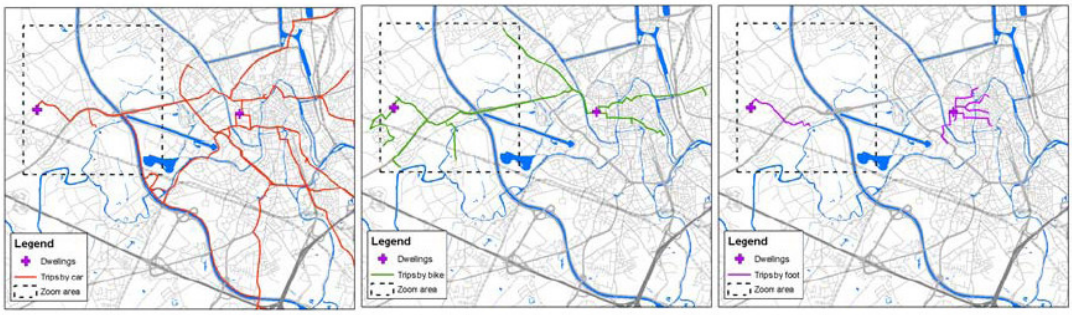

Figure 5: The calculated routes by the sampled households in two dwellings, including the trips by car (left), by bike (middle) an foot (right)

By means of overlays of these maps with 'emission layers' of the different indicators (traffic noise, traffic emissions, traffic safety, …), the indicators can be evaluated, considering the dwelling location, the destination location and the route and mode of the trip.

4.2 Preliminary model results

The preliminary model results for some typical situations will be used in order to highlight the added value of the proposed methodology, compared to the methods that are currently used in Flanders. Estimation of local traffic flows For each dwelling in the study area, a set of maps is calculated from the same type as in Figure 5. Aggregating the maps for all dwellings results in an estimation of the local traffic flows, as shown in Figure 6.

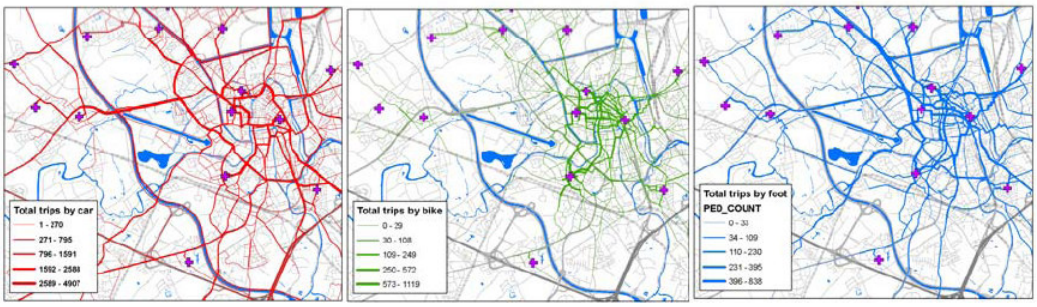

Figure 6: Estimation of the local traffic flows, generated by the sampled households, by car (left), by bike (middle) and on foot (right)

The local flows of car traffic will be an important parameter in determining the traffic emissions, traffic noise and traffic safety on the roads. This is especially useful for the traffic impacts and the exposure on minor roads, which are often poorly included in the existing (macroscopic) traffic models.

The local bicycle flows and pedestrian flows will be incorporated in the evaluation of the infrastructure for these road users. The absence of a cycle path will then score more negative if more cyclists use this road. On the other hand, the presence of a cycle path only has a positive effect if a sufficient amount of cyclists pass by. This is contrary to the classic methods which measure the quality of bicycle infrastructure near a dwelling simply by the presence of a cycle path on the nearest road (yes/no), regardless of the use of it. Furthermore, because the evaluation is based on routes instead of streets, a good infrastructure in the own street is not sufficient to get a good evaluation (as in the current methods). Only if the complete route from the dwelling to the destination is well-equipped, the bicycle infrastructure will score well. This means that a missing piece of cycle path has a negative impact not only for the people living nearby, but for all people using this link for their bicycle trips. Therefore it will affect the traffic safety and traffic livability for the whole neighbourhood.

Evaluation of the aspect 'accessibility'

The aspect of 'accessibility' is divided into the accessibility of several types of functions:

- accessibility of the dwelling;
- accessibility of working places;
- accessibility of schools;

- accessibility of shops;
- accessibility of locations for recreation.

The first item is measured in more general terms, such as the travel time of distance to the nearest train station, bus stop, city center, highway entry, etc. The other items are evaluated by means of the sampled trips for each of the purposes by the households in the area. Because the evaluation of accessibility is based on the actual routes, it is done on a network level. By feeding the model with realistic travel times (travel time data or results of a traffic model), traffic congestion can be incorporated in the evaluation. As the travel routes are separated by mode, the appreciation of accessibility can be made multimodal.

Evaluation of the aspect 'traffic noise'

For the aspect 'traffic noise', the main improvement is the evaluation of the traffic annoyance during trips (e.g. for bicycle trips) and at the destination (e.g. at school). This is illustrated in Figure 7, where both dwellings A and B have a similar location, similar properties and a similar (local) noise level at the dwelling. In the trip behaviour, both dwellings will be strongly oriented towards the city center (e.g. for shopping, schools, services, employment, …?), situated in the North-East corner. This means that the noise annoyance on the routes from both dwellings will be very different, as routes from dwelling A are crossing the ring way with high levels of traffic noise, which is not the case for dwelling B. For this reason dwelling A will get a better score than dwelling B.

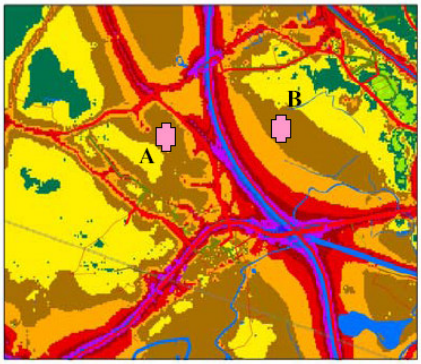

Figure 7: By including the traffic annoyance during trips in the evaluation, the complete living environment is considered.

The same effect will be noticeable for other aspects as the traffic emissions or traffic safety on the routes. This allows detecting several types of barrier effects within the traffic livability.

Another issue, as for most other traffic impacts, is to determine which indicator represents best people's perception. Choices to make are for example which quantity to use for the noise level (Lden, Leq, …) and how to calculate the total noise exposure during a trip, as is illustrated in Figure 8 and Figure 9. In current practice only the exposure at the dwelling (a) is considered. An obvious alternative would be to totalize the total noise exposure over the whole length of the trip (b), but this may include effects that are too far away from the actual dwelling and are not perceived as a part of the living environment. Therefore it may be more representative to calculate the total noise exposure only over the first part of the route (c), within a certain range of the dwelling. A further correction may be to give more weight to the highest noise levels on the route, as these are perceived as most hindering. The noise annoyance during a trip is also likely to depend on the travel mode used (e.g. higher sensitivity during bicycle trips).

The graphs show that the noise level at the dwelling (a) has little correlation to the noise exposure on the routes. The noise exposure on the routes (b) is quite concentrated, as most (long distance) trips meet high level somewhere on the route, which dominate the total exposure. This shows another advantage of restricting the exposure to the first part of the route, closest to the dwelling: this measure is more distinctive between noisy and quiet areas. Graph (d) shows that on average, bicycle route follow more quiets routes than the other travel modes.

The choice of the indicator with the best representation of people's perception will be a part of the model calibration. This will be based on the results of the Written Survey on the Living Environment (Schriftelijk Leefomgevingsonderzoek), a survey about perceived annoyance by noise, odour and light in Flanders.

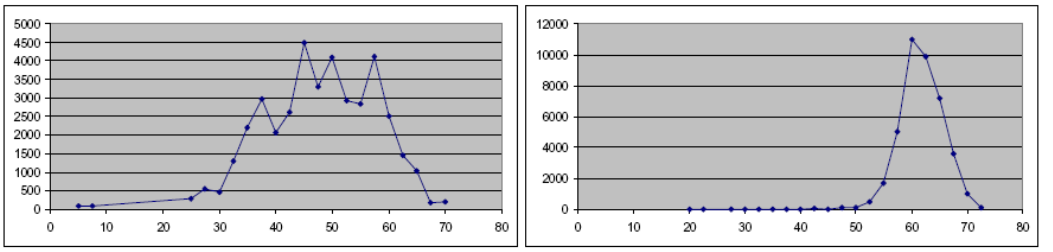

Figure 8: The distribution of the sampled exposure for some relevant indicators for the annoyance by traffic noise: the noise level at the dwelling (a), the total noise level over all trips (b).

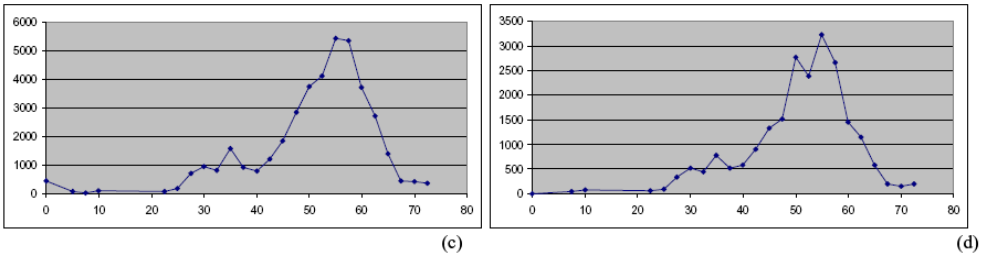

Figure 9: The distribution of the sampled exposure for some relevant indicators for the annoyance by traffic noise: the total noise level over the first section of all trips, closest to the dwelling, calculated for all trips (c) and for all bicycle trips (d).

5 CONCLUSIONS

In this paper, an innovating model is presented for objectively measuring the traffic livability. Whereas classic methods focus on the traffic impacts at the dwelling location, the proposed method incorporates the whole activity pattern, and the corresponding trip behaviour in the evaluation. This is reached by a Monte Carlo simulation of households, including their trip behaviour, using the database of the Flemish Trip Behaviour Survey. The trafic livability at a specific location is evaluated for a sampled household, simulating their trip and activitues as if they were living at this location. This way, the traffic annoyance is evaluated on the dwelling location, during trips and at the destination. This guarantees that not only annoyance by traffic on the nearest road is considered, but that also traffic noise, traffic emissions, etc from surrounding roads is incorporated. This also allows to evaluate some indicators on a network level, as complete routes are considered. For example, a absence of a cyclepath on a road section can be weighted with the number of cyclists passing by.

After a geographical (per road segment, quarter, ...) and thematical aggregation, this results in 'traffic livability maps', showing the traffic livability per location for specific traffic effects or the global traffic livability.

Further model applications include:

- explanatory analysis for specific indicators, about the average scores and distributions at different aggregation levels.
- predictive calculations for forecast scenarios including spatial development, traffic projects and/or environmental measures.
- analysis for specific target groups, by restricting the sampling of households to a specific subset.

This will allow specific results for the living quality of target groups like elder people, households with children, frequent bicycle users, … These results will offer a valid ground for policy decisions, as well on a strategic level (defining policy priorities in terms of problem areas or thematic focuses) as on an operational level (evaluation and comparison of specific measures).

6 ACKNOWLEDGEMENTS

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The assessment of traffic livability, including local effects at home, during trips and at the destination, based on the individual activity pattern and trip behaviour

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The capabilities of remote sensing to derive urban location factors for probability-based spatial growth analysis

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1 ABSTRACT

Urbanization is arguably the most dramatic form of irreversible land transformation. Though urbanization is a worldwide phenomenon, it is especially prevalent in India, where urban areas have experienced an unprecedented rate of growth over the last 30 years (UN, 2007). This paper focuses on the capabilities of remote sensing to identify and derive spatial urban location factors which influence future urban growth. We utilize multitemporal remotely sensed data sets from Landsat and TerraSAR-X sensors as well as a digital elevation model (DEM) from the Shuttle Radar Topography Mission (SRTM).

The land cover of the test site, the highly dynamic incipient mega city of Hyderabad in India, was classified and a change detection analysis was performed to monitor the dimension and the spatial configuration of urban growth since the 1970s. The results of the change detection as well as the DEM serve as basis to derive and develop spatial location factors influencing urban growth. Parameters like the slope, the major street network, continuous intra-urban open spaces, main direction of growth, etc. were calculated. Furthermore external data sets on locations of commercial centers, airports, etc. were integrated. Based on regional theory for every single parameter a specific hypothesis was stated. For example: We assumed that high slope gradients have a lower probability for future settlements or that new commercial centers have a positive influence for future settling. In addition, results from a comparative study of the 12 largest Indian cities (Taubenböck et al., 2009), like saturation effects for built-up density, were integrated as additional information.

An approach combining all urban location factors for the metropolitan area of Hyderabad was developed to identify areas that are theoretically highly probable for future settlements. The approach was applied to the spatial physical extension of the urban area of 2001, the so called urban footprint. Accuracy was assessed for predicted areas of urban growth comparing the result to the actual urban footprint acquired in 2009. The results of the method basically showed high probabilities for those areas which actually have experienced growth, but the limitations of the approach revealed low absolute accuracy. This is due to the manifold parameters having an impact on spatial growth – e.g. socio-economic, physical, demographic or political parameters – which could not be derived using remotely sensed data. Thus, the method basically enables location study to differentiate between preferred and unlikely areas of future urbanization.

2 INTRODUCTION

For the first time in human history, in the year 2006, more people were living in cities than in rural areas (UN, 2007). This is the result of high urbanization rates in the last decades, especially in less developed countries. This trend will be continued in the near future. The United Nations (2007) estimate that in the year 2050 70 % of the world's population will live in urban areas, with a total population growth from 6.7 to more than 9 billion people. In the same time the urban population will increase from 3.3 to 6.4 billion people. Very high growth rates have been observed in India, where the total population has doubled during the last 50 years, while the urban population has grown nearly five times (Taubenböck et al., 2008). The number of Indian mega cities – cities with more than 10 million inhabitants – will increase from the current three (Mumbai, Delhi, Kolkatta) to six by the year 2021 (new additions will be Bangalore, Chennai and Hyderabd), when India will have the largest concentration of mega cities in the world (Chakrabati, 2001).

In general, the emergence of mega cities is not a problem per se. The dynamic urbanization only creates negative effects, if it fails to control the structural development, to finance the necessary public infrastructure (electricity, potable water, waste management, schools, hospitals, etc.) and to control the social, economic and environmental impacts of fast growing cities (Keiner & Schmidt, 2003). However, the explosive urbanization often disables sustainable development, which results in unplanned and uncontrolled urban growth.

The basis for sustainable development strategies lies in the observation and understanding of the urbanization process. Sustainable development needs information about the characteristic properties of spatial growth, like growth rate, direction and pattern (Taubenböck et al., 2009). Remote sensing is able to provide such information and to measure spatial development for a long period of time.

The observation and extraction of information about the state of development in urban areas is the basis to forecast the future development of metropolitan regions. During the last years models of land use change and urban growth have been expanded and have become important tools for city planners, economists, ecologists and resource managers to support intelligent decisions" (Herold et al., 2001). In this study we investigate the capabilities of remote sensing to derive factors that characterize and influence spatial urban location to identify suitable and probable areas of future urban growth. Furthermore we test a straightforward forecast model using location factors to assess future spatial development of the Hyderabad metropolitan region. We aimed to address several specific questions:

- Which urban location factors relevant to location theory can be derived from multi-sensoral medium resolution satellite data?
- Are we able to assess preferable and unlikely areas of future urban settlements combinig remotely sensed data and a simple urban growth model?

2.1 Literature review

Remote sensing techniques can provide information about land cover with a high level of detail as well as high temporal frequency and has already shown their value in mapping urban areas (Herold et al., 2003; Jürgens, 2001, 2003; Maktav et al., 2005; Taubenböck et al., 2009). Besides the observation of a status at a particular time, remote sensing provides also the possibility to observe the development of an investigation area by change detection (Lillesand & Kiefer, 2004). Spatiotemporal analysis using time series of remote sensing data enables the derivation of urban footprints, thus to monitor and quantitatively describe the urban structure and development (Herold et al., 2003; Lucas et al., 2007; Taubenböck et al., 2009). Through the observation und analysis of the spatial development preferred growth areas can be identified and location factors (Push- and Pull-factors) for the future urban development can be derived (Heineberg, 2001). Such factors shall be obtained in this study and are to be combined with the existing remote sensing data in an urban growth model.

During the last years urban growth models have become important and innovative tools for city planners and decision makers. The increased attention is based on enhanced remote sensing data and improved computer technologies. However, the application, performance, and outputs of urban growth models depend strongly on the quality and type of the data available for parameterization, calibration and validation (Herold et al., 2003). There are different approaches to model urban growth, the main are Cellular Automaton (CA), Artificial Neural Network (ANN) and traditional statistical models. CA-based models offer many advantages. Their decentralised approach, the link they provide to complexity theory, the connection of form with function and pattern with process, the relative ease with which model results can be visualised, their flexibility, their dynamic approach, and also their affinities with geographical information systems and remotely sensed data (Torrens & O'Sullivan, 2001). Among others, Clarke et al. (1997), Clarke and Gaydos (1998), Alkheder et al. (2006) and Herold et al. (2001) have used CA-based modeling approaches. ANN-based models were developed to model the brain's interconnected system of neurons so that computers could be made to imitate the brain's ability to sort patterns and learn from trial and error, thus observing relationships in data (Pijanowski et al., 2002). The learning ability is the great advantage of ANN-based models with respect to other modeling approaches. For instance, Liu et al. (2005), Pijanowski et al. (2002), Liu and Seto (2008) and Jain and Feyissa (2008) have used ANN-based modeling approaches. Traditional statistical models are the oldest approaches to model urban growth, e.g. Markov-chain analysis and

Regression analysis. For more information we refer to Baker (1989), Cheng and Masser (2003), Jahan (1986), Muller and Middleton (1994), Theobald and Thompson Hobbs (1998), Weng (2001) and Wu et al. (2006).

2.2 Study area and data

2.2.1 Study area

Hyderabad is the capital of the Indian State of Andhra Pradesh. The sixth largest City of India is a sprawling metropolis with a population of 6.4 million in 2007 and a current growth rate of 2.3 percent per year. The city´s population is expected to achieve 14 million in 2021 turning it into one of the megacities of tomorrow (City Development Plan-Hyderabad, 2001).There are a number of industrial estates, three directly in the Hyderabad district and about 19 in the Rangareddy district belonging to the Hyderabad agglomerations which were mainly established between 1975 and 1985. Main industrial sectors include chemical and bulk drug, metals, timber, plastics, rubber and textile industry as well as electronic industry. Hyderabad hosts several major companies and public sector enterprises with central research and training institutions as well as universities and professional colleges. The dynamic city has emerged as a knowledge hub making rapid strides in information technology („Cyberabad“), biotechnology and medical care but also in tourism (Taubenböck et al., 2007).

2.2.2 Data

In this study we utilized remote sensing data of the Landsat and TerraSAR-X sensors. The Landsat program represents a series of earth observation satellites that have been continuously available since 1972. It started with the Multi-Spectral-Scanner (MSS) featuring a geometric resolution of 79 meters and a spectral resolution of four bands (green, red, two near infrared bands). Since 1982 the Thematic Mapper (TM) has operated with 30 meter geometric resolution and seven spectral bands. Since 1999 the Enhanced Thematic Mapper Plus (ETM+) has operated with an additional panchromatic band at 15 meter geometric resolution. The radar satellite TerraSAR-X, developed in a public-private-partnership between the German Aerospace Center (DLR) and EADS Astrium GmbH, was launched in 2007 and supplies high-quality radar data for purposes of scientific observation of the Earth (DLR, 2007a). TerraSAR-X has three scanning modes (ScanSAR, StripMap, SpotLight, high resolution SpotLight) with a geometric resolution between 16 meters in ScanSAR mode and 1m in high resolution Spotlight mode (Herrmann et al., 2007). For the analysis of the urban area of Hyderabad we used Landsat data of the years 1975, 1989 and 2001 and TerraSAR-X data of the year 2009 acquired in StripMap mode with a geometric resolution of 1.55 meters. In addition, we used a digital elevation model (DEM) from the Shuttle Radar Topography Mission (SRTM), with respect to the topographic circumstances of the Hyderabad metropolitan area. Figure 1 shows the intensity image of the radar signal for Hyderabad with bright pixels indicating urbanized areas. A full coverage of the sprawling metrolpolis required three TerraSAR-X scenes.

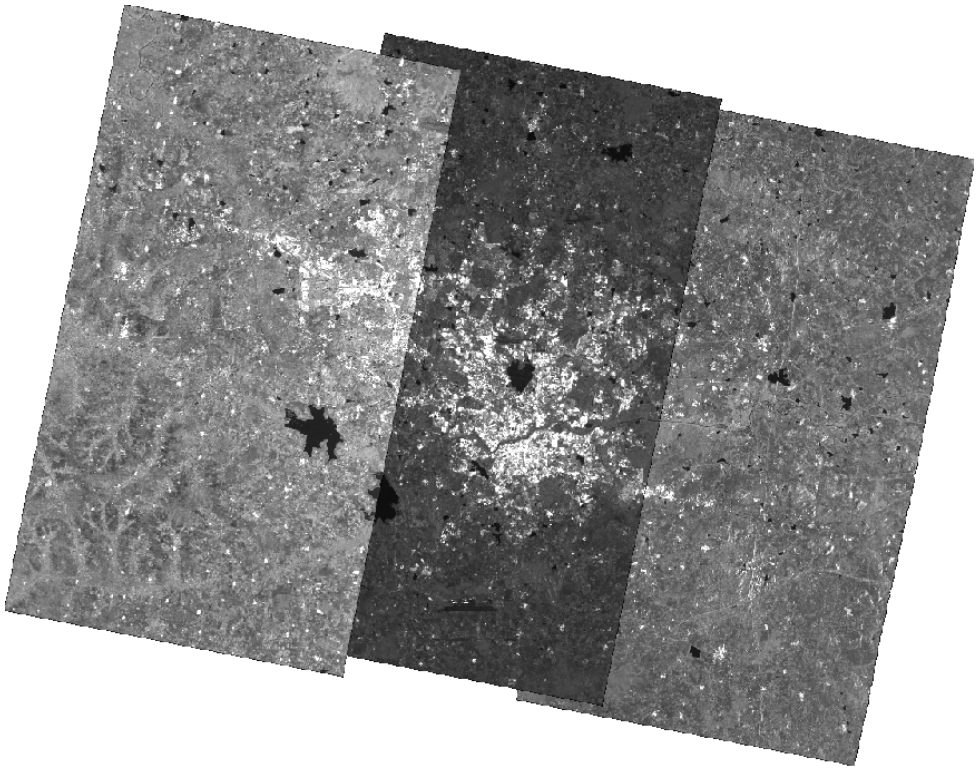

Fig. 1: TerraSAR-X data Hyderabad 2009

3 METHODS

3.1 Time-Series analysis using multi-temporal and multisensoral remotely sensed data

This study focuses on the capabilities of remote sensing to derive physical location factors that allow characterizing the urban landscape on a regional geometric level in theoretically favoured and non-favoured areas. We assume that these location factors enable to identify suitable and probable areas of future urban growth.

The basic spatial land-cover information is derived for different time steps using all available remotely sensed images – Landsat and TerraSAR-X data. A hierarchical, object-oriented classification methodology is implemented extracting the thematic classes 'built-up areas', 'non built-up areas' and 'water' separately from all optical Landsat images. The object-oriented methodology was used to combine spectral features with shape, neighbourhood and texture features (Clodt, 2009; Taubenböck et al., 2009). A pixel-based classification approach is used to extract urban and non-urban structures from a single TerraSAR–X image. The urban footprint is extracted by analysing the speckle characteristics of a TerraSAR-X scene based on an estimation of the local coefficient of variation and the fading texture of the whole scene. The basic concept is to extract reliable urban features, which are represented by bright point scatterers (corner reflectors). The so called urban seeds depict especially the reflection information about vertical structures. To derive the urban footprint image analysis techniques are used to densify the detected urban seeds. We used an optimized threshold procedure, which extracts urban seeds from the original intensity image and a strongly smoothed speckle divergence with a 35x35 window. As a further optimization we estimated the final urban footprint with smoothed speckle divergence and smoothed urban seeds (Esch et al., 2010). The post-classification spatial overlay and intersection of the classified urban footprints for the years 1975, 1989, 2001 and 2009 allows the retrieval of quantitative information about the spatial development of the test site, e.g. dimension of urban growth, growth directions or built-up density. The focus in this paper is on the time interval 2001 – 2009, for the other years we refer to Taubenböck et al. (2007, 2009). Figure 2 displays the change detection for Hyderabad from the 1970s until today.

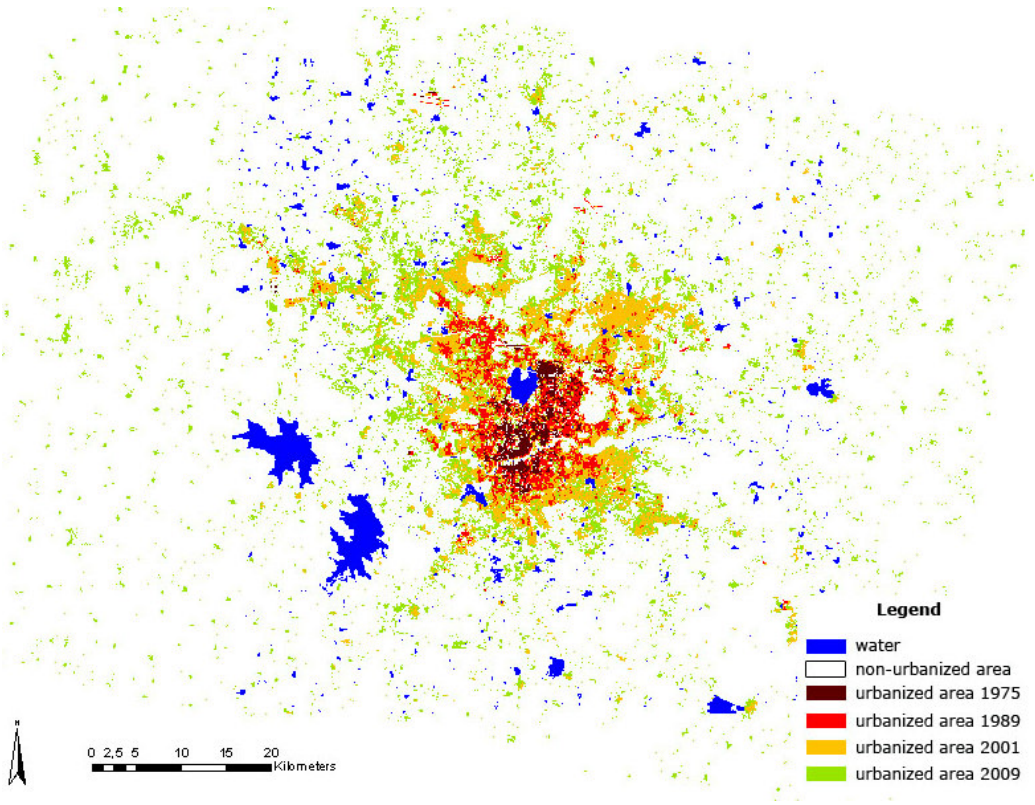

Fig. 2: Change Detection Hyderabad 1975-2009

3.2 Development of urban location factors

The results of the change detection as well as the DEM serve as data basis to derive and develop spatial location factors influencing urban growth. Parameters like the slope, the major street network, continuous intra-urban open spaces, main direction of growth, etc. were calculated. Furthermore, external data sets on locations of commercial centers, airports, etc. were integrated. Based on a regional theory for every single parameter a specific hypothesis was stated. Overall, three categories of urban location factors have been derived:

- Topographic environmental layers
- Location bound layers
- Continuous intra-urban open spaces

The hypotheses we state regarding the different urban location factors arise from studies in the field of urban growth modelling (chap. 2.1), the polarization theory of city development, push- and pull-factors (Heineberg, 2001) and characteristic features that influence urban growth (e.g. accessibility). The topographic factors include the DEM and slopes of the earth's surface. For these two factors we state the following hypotheses:

- 1. The terrain height influences probability for settlements
- 2. Steeper slopes decrease probabilities for new settlements.

The location bound factors comprise buffers with increasing distances to the urban core, the major street network, industrial areas, airports, etc. Furthermore we use urban growth sectors, which define preferred directions of growth. We state the following hypothesis regarding the location bound factors:

- 3. With increasing distance from the city core the built-up density decreases.
- 4. With increasing distance from the city core the probability for new settlements decreases (cp. Fig. 3a)
- 5. Already existing dominant growth directions serve as pull-factors for settlements (cp. Fig. 3b & 4)

As an example, we divided the metropolitan area of Hyderabad into 16 sectors (directions). Thus, we use the change detection between 1975 and 2001 to learn from the past spatial development of Hyderabad to identify, calculate and define preferred directions and locations of growth.

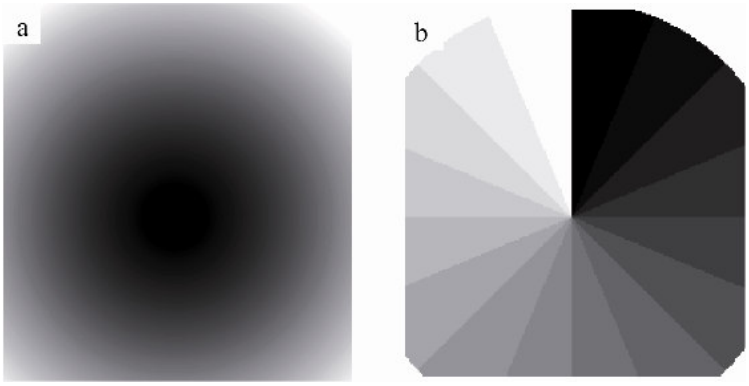

Fig. 3: Two environmental layers: a) buffer b) urban growth sectors

Furthermore, the major street network and industrial areas of the Hyderabad metropolitan area were derived. For this purpose we used the TerraSAR-X data, an analogue map on the street network (Gotsch/Kothe, 2008) and Google Earth as reference. These two factors were implemented in the urban growth model with the following hypotheses:

- 6. The street network is a pull-factor for future settlements
- 7. Industrial areas are pull-factors for further industrial development

These pull-factors induce a stronger weight of these areas in the urban growth model. The change detection of Hyderabad revealed as third category of location factors temporal continous intra-urban open spaces, which have not been urbanized between 1975 and 2009. Thus, we assumed that these places are restricted areas and nonrelevant for future urban growth (cp. Fig 4).

The hypotheses and their related layers have to be transferred into location-based probability assessments for future urbanization. The idea is to estimate the target distribution by finding the distribution of maximum entropy, subject to the constraint that the expected value of each feature under this estimated distribution matches its empirical average (Phillips et al., 2004). We use the open source software MaxEnt (http://www.cs.princeton.edu/~schapire/maxent/) to compute location-based probabilities for input variables. The urban footprint of e. g. the year 2001 serves as input variable or training data set. Using Bayesian theory (Richards & Jia, 1999) the training samples are calculated in statistical combination with the information of the sample environmental or location bound layer. Thus, for the example of the growth directions, the maximum-entropy-method learns in an iterative process the dominant sectors and assigns to non-urbanized areas relative probabilites of future urban growth.

The computation of pull-factors influencing parameters for urban growth, like e. g. the major street network, are based on buffers. Within these buffers we assign decreasing growth probabilities with increasing distance to the street network. This kind of weight calculation has been done for all layers, except the intra-urban open spaces layer which have been left unmodified. This layer will be used to exclude these defined areas from the modeling result. Figure 4 shows sample results for the computation of transferring the different thematic layers into location-based probability assessments.

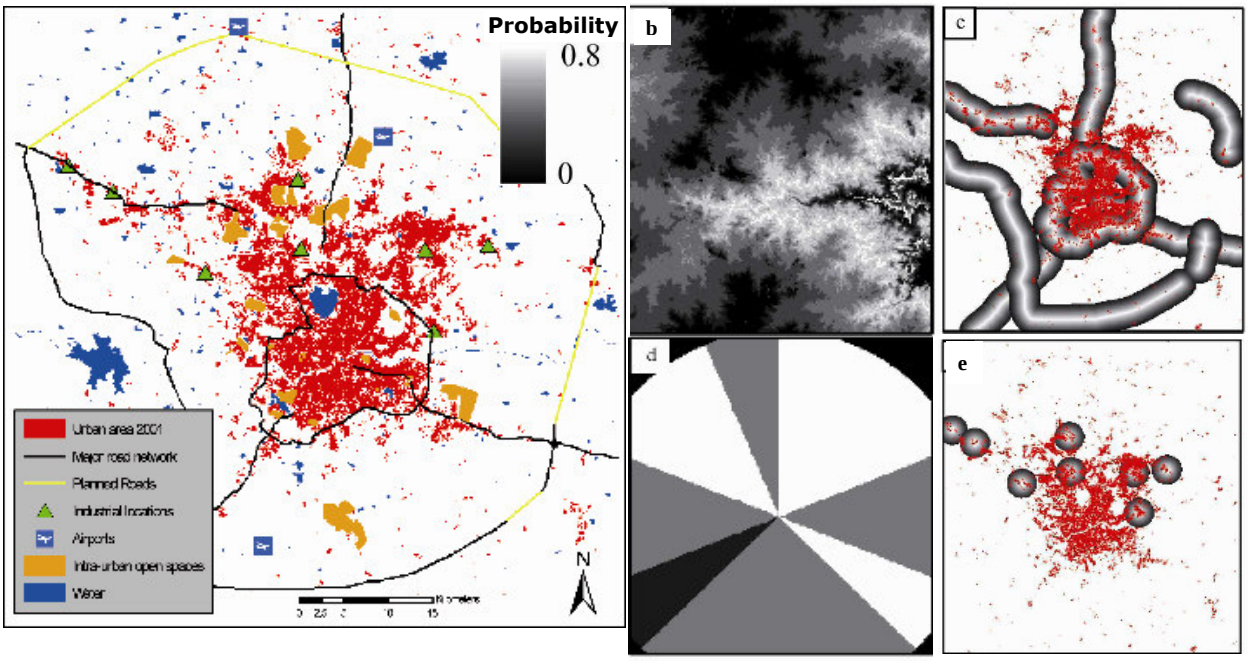

Fig. 4: a) Location bound environmental factors; calculated probabilities for settlements regarding the DEM (b), the pull-factor highways (c) the main directions of growth (d) and the pull-factor of major industrial sites (e)

3.3 Probability-based urban growth analysis

Based on location theory, the assessment of appropriate and thus probable areas for future urban growth is calculated. A probability-based approach is implemented using an additive approach. The additive approach combines the multiple hypotheses (the modeling results for individual location factors) adding up all computed probabilites on a pixel-level (cp. Fig. 5). Furthermore, additional structural information on urbanization in India is integrated using results from a different study (Taubenböck et al., 2009). This study revealed saturation effects in the urban cores regarding built-up density in the 12 largest cities in India. Thus, our model does not allow, independently from the probability values, urbanization in the urban core, if built-up density exceeds 80 %. After addition of the probability values, the areas with the highest growth probabilities are identified and selected for urbanization.

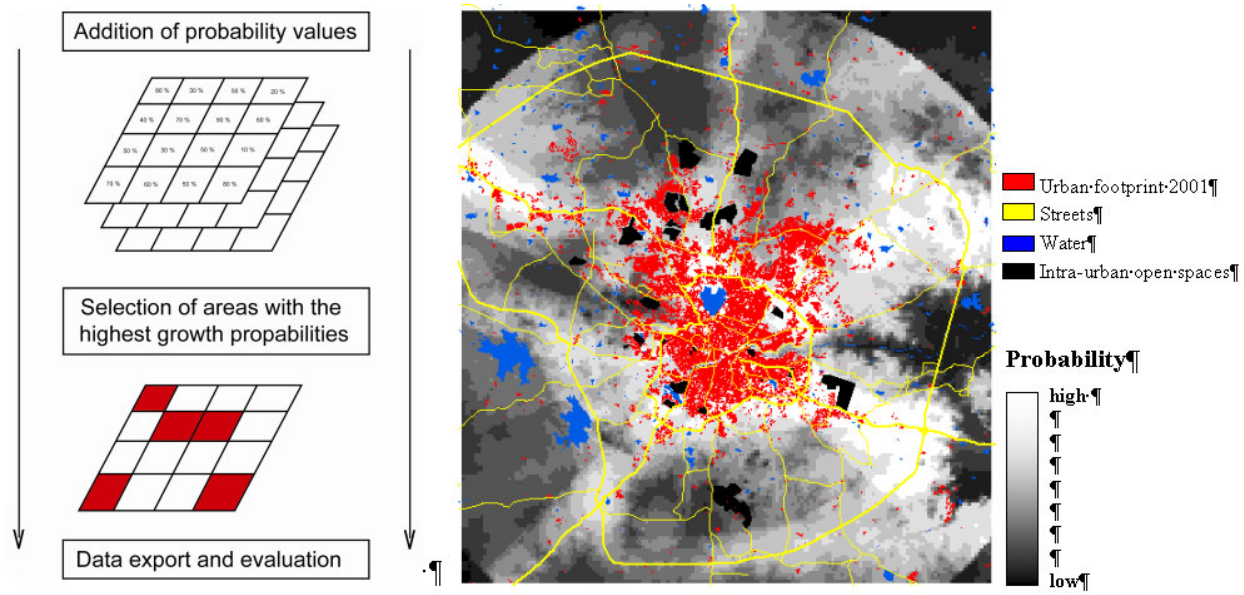

Fig. 5: Schematic represention of the additive modeling approach

4 RESULTS AND DISCUSSION

The result of the urban growth assessment process is shown in Figure 6. It was produced with the additive urban growth model introduced in section 3.3 and was calibrated with all thematic layers introduced in

section 3.2. It is shown where the highest probabilities for future urban growth for the metropolitan area of Hyderabad is calculated (Fig. 5). The result shows highest probabilities for urban growth in a ring near to the center of Hyderabad as well as at focal points in the near suburban areas, in the North-West, South-West and South-East of the city. Densification in the urban center is restricted by the 80% built-up density constraint. An accuracy assessment was performed to verify the classification as well as the growth assessment results.

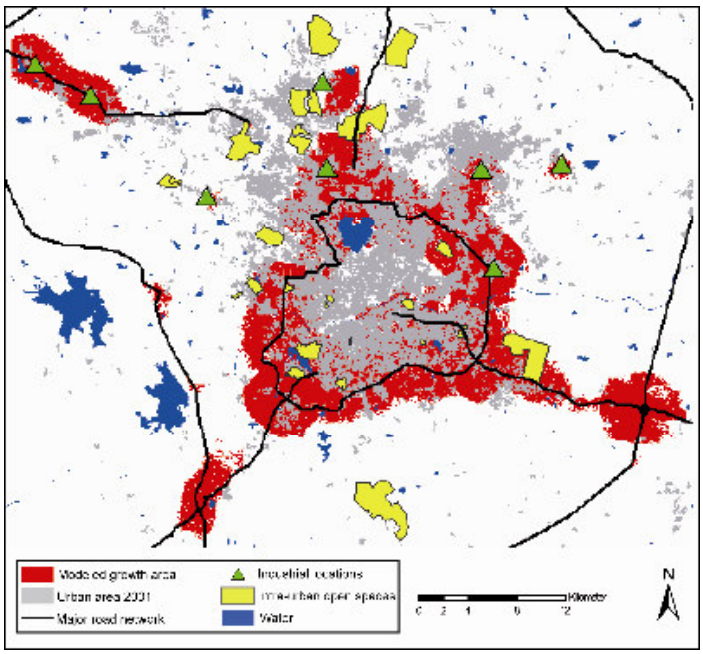

Fig. 6: Modeled urban growth

The accuracy assessment was done in two parts: The first part focuses on the validation of all input data derived from remotely sensed imagery. Therefore the three extracted land cover classes (built up areas, non-built up areas, water) were compared to reference data separately. High resolution Quickbird data (2005) as well as Google Earth (2008) were used as reference. The accuracy assessment was performed with 200 randomly distributed control points for each class, and was quantified in an error matrix by visual comparison. The overall accuracy for the classification of the TerraSAR-X data 2009 for Hyderabad is 96 % correctly classified pixels. The Landsat classification 2001 for Hyderabad, which was used as starting point of the urban growth model, reaches an overall accuracy of 85,75 % (Pengler, 2007).

The second part of the accuracy assessment analyses the growth prediction of the additive approach. The validation was performed with 2 methods: The first method calculates the absolute accuracy of the modeling result. Thereby, we intersected the modeled urban growth with the real urban growth derived from the remote sensing database. The absolute accuracy of the assessed urban growth is 23.6 % correctly modeled pixels.

The second method compares the modeled growth areas and the real growth areas derived from remotely sensed data for defined spatial sectors. By deviding the urban area into 16 growth areas (cp Fig. 4b) it is possible to analyse the accuracy of the modeling results with respect to reference areas. Thus, the accuracy is assessed without the requirement of being absolutely correct in absolute locations. For it, we compared the modeled growth area with the real growth area in every single sector. The accuracy of the spatial analysis ranges from 23 % to 320 % correctly classified pixels. The result shows in nine of sixteen areas an overclassification or an under-representation of assessed urbanized pixels. In seven of sixteen growth areas we have a satisfying accuracy with a range between 80 % and 112 % correctly modeled pixels.

Furthermore, the growth assessment result is assessed statistically based on the calculated probability values and the growth measured in reality between 2001 and 2009. The result shows that the pixels having faced urbanization in reality show a mean growth probability of 52 %. Furthermore, half of the real growth areas reach growth probabilities between 52 % and 73 %. In our approach, only pixels were assigned as possible growth values reaching 73 % growth probability and more.

The result reveals that the areas experiencing growth in reality definitely gain high urbanization probabilities. The straightforward additive approach excludes most of these areas, due to the fact that other areas get, based

on location theory, higher probabilities. A further development related to the integration and preparation of environmental layers and an interdisciplinary extension (e.g. social components) of the additive growth model can contribute to a better urban growth modeling result. First of all, the quantity of urban growth factors offers good opportunities for an enhanced urban growth model with respect to other studies in the field of urban growth modeling (cp. Chap. 2.1).

The accuracy assessment shows that the absolute accuracy to predict urban growth of this approach is only 23 %. Thus, it reveals that the idea of using location theory on an urban footprint level does not do justice to the complex reality in urban areas, where decisions for new settlements or even uncontrolled urban sprawl are based on manifold reasons –political, socioeconomic, personal, ecological, etc. On a closer look, the accuracy assessment also reveals that the areas which were urbanized in reality in the considered time frame show a high urbanization probability based on the location theory. Thus, the spatial analysis on urban footprint level using remotely sensed data is one essential brick within the manifold impact factors that have to be considered for urban growth modeling.

5 CONCLUSION

Recapitulating the two research questions we defined earlier in the introduction (1) "Which urban location factors relevant to location theory can be derived using multi-sensoral medium resolution satellite data?" (2) "Are we able to assess preferable and unlikely areas of future urban settlements combining remotely sensed data and a simple urban growth model?" we can conclude: (1) Multisensoral remote sensing has the capability to provide independent, up-to-date, multitemporal and area-wide spatial location factors for such dynamic areas as incipient megacities with high accuracies. Thus, the products are appropriate on reginoal geometric level to quantify the urban patterns over time as basis for location studies. (2) The additive approach to assess areas appropriate for future urban growth allows an area-wide location analysis, reveals high probabilities based on location theory for areas of urbanization in reality, but fails to predict reality with absolute high accuracies. The capability of remote sensing to provide not only information on the regional scale used in this study, but also on individual building level allows a thematic progression for location-based analysis. Furthermore, the capability of remote sensing to indirectly infer information on e. g. population distribution, socioecomonmic paramters or land use aims at a more holistic data base for understanding the complex urban systems and opens up a wide field to improve this strightforward approach to assess appropriate areas for future settlements.

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The construction of the concept of neighbourhood children from the big city

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1 ABSTRACT

The child with the psychosomatic separate scale in compared to that of a productive adult human, it perceives the wall space in the neighborhood and the city based on different psychological and logical connections. The research is focusing its attention on how children structure the concept of neighborhood living within the extended urban environment of modern Athens. Which are the factors of the space that contribute to obtain the sense of neighborhood and create a sense of intimacy in the banal urban landscape are investigated. In research have participated 209 pupils, boys and girls aged between 10-12 years old that attending in primary schools in 10 municipalities of the Greek capital. A method of multiple questionnaire responses is used.

2 INTRODUCTION

The concepts that are related to situations in space arise within sociospatial ecosystem and they are in direct correspondence and contact with the existent material elements of space. The concept of neighborhood is of primary significance for the residents of a large city as it comprises the primary unit of structured space which gives the sense that it is actually a neighborhood. Such a small scale environment of urban space is the most ideal for the life of children in a large city. But the modern city changes dramatically fast, changing simultaneously the image and the nature of neighborhood. The present essay makes an effort to detect the limits and the size of neighbourhood in an intensely urbanised environment as conceived by children in the city of Athens.

In every language and culture the concept of neighborhood is described with many and different definitions and ideas. Every social group focuses on different reference marks while on a scientific level the theories of space perception interfere.

Tuan1 names as neighbourhood the place where the individual has the sense that he is at home while Holahan and Wandersman2 define it as the intermediary level between home and city, within the limits of which the residents have the awareness that they belong to the same community. The word neighbourhood refers directly to the word adjacency explaining the basic criterion of classification of place in this category. Most definitions of neighbourhood are based on the concept of proximity stressing that neighbourhood is the people who live next door3. The quantitative and social data of the area play an important role in the discrimination of neighbourhood from the other forms of man-made space. George Hillery4 gave 90 definitions in his attempt to found the spatial expression of community and social interaction. The common point of reference of all these definitions is a) the region, b) the common bonds and c) the social contact. Neighborhood and community are general terms that describe the built space and the special connections of the persons within it. Neighborhood is defined concerning space with the determination of limits within the social interaction of the members and the common bonds take place. Hancey and Knowles5 confirmed that the residents of urban regions tend to define smaller regions as their neighbourhood, while as one moves away from the urban core to the suburbs and the regional communities, the area becomes bigger in size. Also women, the long-lasting residents of place, the parents of young children, tend to define neighbourhood as a small area.

Ruth Glass6 attempting to overcome the problem, suggests two alternative definitions necessary for the completion of the idea of neighborhood. In the first one she refers to “the distinct territorial social group, distinct by virtue of the specific physical characteristics of its differentiation. The second definition is given as “territorial group” the members of which are met in common ground that belongs to them, expressing within it the basic social activities and they organise spontaneous social contacts. Neighborhood is a place with a name known to its inhabitants, it is smaller in size than a community , having common facilities such as a general stores or a school, and is marked by social relations that include the exchange of assistance and friendly visiting. Furthermore the differentiation is comprised by the life standard that the inhabitants follow which depends on their culture and the socioeconomic class they belong to. The physiognomy of the neighborhood’s structured space has to do with the natural features of space such as orientation, its place in

the earthy terrain of the area, the existence of liquid element (sea, river, lake), green etc. The social features are given with clues that are referred to the socioeconomic, cultural, ethnic, instructional composition of the population.

Skaevelant and Garling7 examined the relation among the natural features of neighborhood and the impact they have in the procedure of acquisition of the sensation of neighborhood by the habitants. The analysis of the questionnaire showed that there are seven dimensions of the natural space that characterize neighborhood:

- the private space
- the visual appearance
- the arrangement of the environment's elements
- the inhabited area's density
- the commodiousness
- the streets' level and the access
- the sizes of private open air

The "New Urbanism" movement in the planning of neighborhoods urges that the meaning of neighborhood is structured at the habitants of an area with the pedestrian access to stores and schools, with the existence of roofed passageways and with houses built near the street8. Nasar and Julian9 also found that the existence of greenery increases the sensation to the habitants that they belong to that place. Kuo, Sallivan, Coley and Brunson10, showed with their researches the conduciveness of the greenery of a neighborhood to the tightening of social bonds.

Hunter A.11 examined the changes that have been conduced as a result of the increment of the city's scale in ecology, the symbolic function and the social structure of the local urban communities of Chicago. He mentions that the definition of community depends on the habitants' ability to scatter and share a set of symbols. Consequently, the mechanisms of the symbolic apprehension of neighborhood are shifted continuously as people react to the social and ecologic changes that happen with the increase of the scale of the structured space. Hunter came to the conclusion that although we have lost our unique natural urban community of the past with its powerful local culture that contains the common name, rich in intimations and a distinct set of natural limits, we are now in a dynamic system of symbolic communities that semantically organises the complexity and the rapid change of the social and territorial environment of the city's habitant.

According to the National Committee about the neighbourhood of the U.S.A.12, neighbourhood is ultimately what its habitants think it is.

2.1 Child and neighbourhood

The child with its special psychosomatic scale as regards the one of an adult productive person, conceptualizes the built area of neighborhood and city based on different psychological and logical associativities. After the end of the babyhood period where the child during the early years of its life lives in its homestead, comes out to the world just like every mammal, out of the nest, right ahead, where usually the street passes. Then it stands in the area of neighborhood, of the special shelter-place, residence and sentimental fullness next to his/her intimates. The small step out, the lack of experience in the space and the different perception of time contribute in the percipient ultra-enlargement of the elements and the situations that take place. Traditional neighborhood was spread out on a small surface centuries ago within a relevantly small city, consisting of a community of neighbours that were few in number. The giant growth of the cities and the change that was conduced with the application of the technological achievements, the apartment buildings and the cars, changed the neighborhood. In many cases we have giant neighbourhoods or atypical neighbourhoods in which the habitants don't have any association among them. Fellin P. and Litwak E.13 opine that the increased mobility in the neighborhood acts disorganizationally and destroys the neighborhood's consistency. The rate that the persons are embodied in the environment of neighborhood depends on personal and communal features that possibly reduce because of their mobility when these features vanish with the urbanization then the previous consistency with space resolves and the limits become ambiguous for the subjects. The research focalizes on the way in which children comprehend the

meaning of neighborhood in this big scaled urban environment with technology demanding knowledge and abilities that stiffen the children's movement. The purpose of this research is to determine:

- What is neighborhood according to the perception of children living in a big city
- Which elements of the structured space contribute in the formation of the concept of neighborhood from children
- To point out the elements which create a feeling of intimacy and identity to children in the ordinary and faceless urban environment.

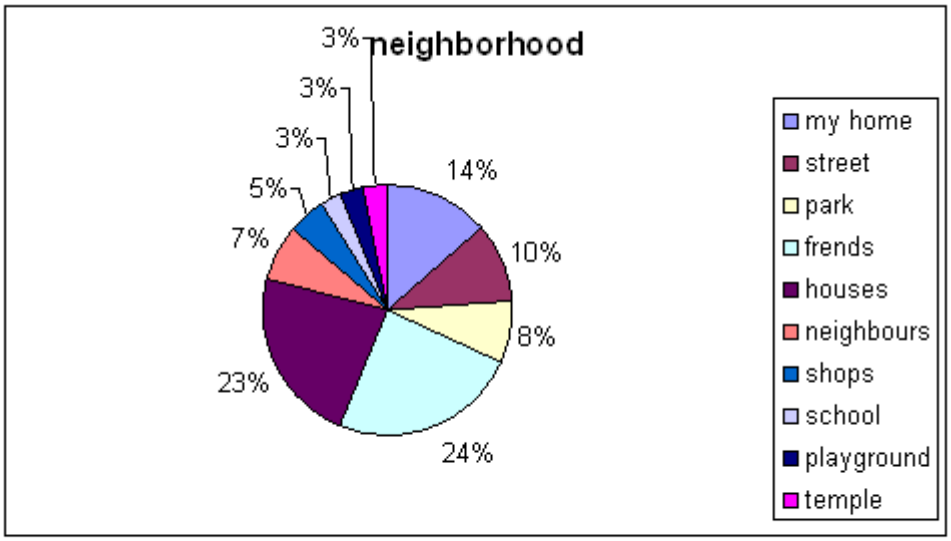
3 METHOD

209 students took part in the research, boys and girls, 10-12 years old that study at 10 elementary schools in townships of the Greek capital. The selection of the students' age was done with the criterion being the ability that children have to answer multiple choice questions that indicate the possession of sophisticated thinking. The schools were chosen with the criterion of the rate of urbanization of the regions they were located at. The schools' neighborhoods are the typical neighborhood of a Greek city with the disappearance of the natural element, the serious problems of access and transport and the absence of public open air that could be used for play and pastime by the underage students.

The research was carried out with the help of a multiple choice questionnaire. The question "when you say my neighborhood, what image comes to your mind" is an open question that aims at imprinting the concept of neighborhood according to the childish perception.

4 DISCUSSION

Out of the 209 students, 175 answered the question mentioning over and above of an element that in their opinion composes the image of neighborhood while 24 didn't answer. 10 elements that structure the meaning of neighborhood and are material or immaterial were recorded. The material ones like buildings and plazas take up with their mass a particular place in the space while the immaterial ones are social functions and situations like game, friends and the neighbours' warm presence. The total number of options is 294.



	N	Minimum	Maximum	Mean	Std. Deviation
frequencies	294	8	69	45,50	23,02

69 out of 175 children, with a percentage near to 24% stated that their friends are what makes a part of the city be recognized as their neighborhood. The houses adjacent to theirs with 68 options and 23%, the homestead with 14% as well as the street in front of the house with 29 options and a percentage up to 10% are the basic elements that structure the feel of neighborhood and as an extension the feeling of intimacy. Plaza follows with 23 and 8%, next-door's familiar people, which is the neighbours, with 21 and 7%, stores with 16 and 5%, school with 10, temple with 9 and field with 8. The students relate the "friends" option with pastime, an activity of vital importance for the child since by playing he/she expresses himself/herself

socially and transforms the viable reality that surpasses the abilities of his/her psychosomatic composition. The results evince the importance of the existence of coetaneous in the area so as to be obtained the feeling of "belonging" this area and to obtain the characterization neighborhood. Besides the social facts, the child perceives the elements that compose the area and recognizes them with the criterion of proximity towards his/her homestead. It's the buildings he/she has approached, has visited many times and can describe in many ways. The homestead is the reference and relation point with every other element that has been chosen. It's the center where the child places himself/herself and observes the world; it's the shelter and the first cozy environment after mother's uterus. He/she understands that there's no neighborhood without houses and that his/her neighborhood is where he/she lives. The street that passes in front of his/her house and in front of the other houses that lie seriatim next to his/hers, takes the fourth place regarding the importance of the neighborhood's intellectual structure. The street connects the familiar with the unfamiliar that lies outside the neighborhood; it's the communication point between inside and outside. However, it's not the place where playing in the modern city appears with greater frequency because of the traffic and the occupancy of the sideways and the sidewalks by cars. Children stay on the road only for little time and most of the times they usually use it to cross it. What is remarkable is the fact that school is component element of neighborhood for 10 children with a percentage up to 3%. Although the schoolyard is the dearest playground, it has a small presence in the imaginable map of neighborhood.

5 CONCLUSIONS

The concept of neighborhood is composed as an image in the children's mental composition on conditions that are referred to physical and social elements. Children conceptualize the environment's datum in proportion to the level of their psychosomatic development and their needs that result from the discreteness of childhood. They give priority seriatim to contemporary friends, to neighboring houses where possibly these friends live, the homestead and the street that passes in front of them are neighborhood. The image is completed by the plaza, the neighbors and the stores.

The street that passes in front of the house is the most important of the structured elements that structure the meaning of neighborhood. The present conditions that dominate on the cities' streets enforce the assumption of initiatives for the protection of the children's social ecosystem. The prevention of neighborhood's fission from the vehicles' traffic that deters the presence of children becomes imperative. The importance that the child gives to the people who live in the neighborhood shows that it is the irreplaceable territorial-social frame for its scale because there, is where he/she is socialized and forms his/her personality.

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The Mediterranean Games of 2013, as a vaulting horse for Sustainable Development for the city of Volos

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1 ABSTRACT

Problem statement: International and national athletic events can affect sustainable development in the areas where they take place. The Mediterranean Games of 2013 will be held in the city of Volos, which is located in east-central Greece. According to the organising committee environmental concerns play the foremost role, both as an organizational priority and as the central operational principle for complete and perfectly organized Mediterranean Games. This research examined the perception of the local population on the expected contribution of the green Mediterranean Games of 2013 hosted in the city of Volos to the concept of sustainable development. **Approach:** By using empirical social research methods, sample data of 150 questionnaires were collected on the characteristics of residents and their opinion about the games and the infrastructure developments that take place in their city in order to support the games. Also, by using SWOT analysis the strong and weak points of the area were defined in order to compose the physiognomy of the study area. **Results:** The main perceived strengths of the city by its residents are its convenient location and the beautiful surrounding area. The main weaknesses are the atmospheric pollution and the traffic congestion. In total, 76% of the respondents believe that the Mediterranean Games will be a good promotional publicity for the local products resulting in the increase of their production. Also, 90% of the respondents believe that following the games the city of Volos will develop as a touristic destination and 51% of the respondents believe that the organisation of the Games of 2013 will be beneficial for the city. Furthermore, using the $\chi 2$ statistical test it was found that the belief that the promotion of the local products will increase after the Games is positively related with the belief that the city will become a touristic destination after 2013 (p-value<0.05). **Conclusion:** The organization of green Mediterranean Games of 2013 is perceived by the local population to be beneficial for the city of Volos; it is expected to strengthen the sustainable development of the region and provide the spark for the transformation of Volos in a really viable city.

2 INTRODUCTION

It has been a long time since the foundations of regional Sustainable Development were established. The main characteristic of sustainable development is the promotion of perpetual life, and the main priority is the assurance of quality of life in all areas: environment, economy, culture, etc., for all people and forever. (Brundland Report). Today, Sustainable Development as an objective resolving around four pillars – sectors: a) Social sector, b) Environmental sector, c) Economic sector and d) Cultural sector. These sectors, affect and shape the conditions of sustainability of a region because their interactions determine the viability of Sustainable Development. (Mitoula R., 2006).

Subsequently, the Rio Summit in 1992 made a decision for collective action in the 21st century with the aim of sustainable development and the improvement of living conditions of people. This decision was published asthe action plan for the 21st century-called ' Agenda 21 '. (Mitoula et al., 2008)

In the context of Local Agenda 21, among other things, the design of the future is based on the active participation of citizens and other authorities. Their participation in democratic processes of co-decision allows them to learn about the causes, nature and consequences of problems and solutions (Bourkas, 1998).

In many countries of the world, such as USA, Canada, Australia, England, Denmark, Germany, Norway, Sweden, etc., many municipalities have chosen this practice as the basic political tool for Sustainable Development. In Greece, this political tool has not yet been accomplished.

The present work examined the perception of the local population on the expected contribution of the Mediterranean Games of 2013 hosted in the city of Volos Volos is located in the region of Thessalia in the prefecture of Magnesia, located at the center of Greece. It is a coastal city with the 5th largest population of all cities in Greece. The city of Volos has been a historical actor in the rural and industrial development of

Greece but is in the midst of economic, environmental etc. difficulties. Now the city has the unique opportunity not just to envision but also to ensure a prosperous future. due to development anticipated for the Mediterranean Games of 2013 which were awarded to the cities of Volos neighbouring Larisa. Sports and cultural activities in modern societies are a powerful stimuluson and opportunity for their development.

The large infrastructure redevelopment projects are expected to transform the everyday life of citizens of the entire region of Thessaly, contributing to the sustainable development of the region. The objective of the host cities of Volos and Larisa is to change their image, to improve the everyday lives of their citizens, and to acquire such infrastructure that will ensure high rates of economic growth for the coming years.

Within this context, the positive attitude of citizens, is not only legitimate but also necessary. The positive attitude of citizens is officially required both in Local Agenda 21, which was signed by the majority of countries of the world and is the most representative text for the Sustainable Development of areas, and in the general policy and strategy of the EU for these issues

3 SWOT ANALYSIS: STRENGTHS, WEAKNESSES, THREATS AND OPPORTUNITIES

The physiognomy of Volos comprises many strengths and opportunities, as well as several weaknesses and threats. The correct application of all these elements will shape the best image for the city and the surrounding area and will herald a new beginning for a more sustainable future.

First of all, Volos is a city with great history. The aim of all local organisations is to demonstrate to visitors the best image in the region, in order to win the impressions of the visitors and make the city a popular touristic destination of Europe.

The big touristic attractions of Volos and the surrounding area are the local products, the Pilion Train and the historical monuments of the area. Also, Volos has a number of unique advantages which are not easily found in other Greek cities. The city is close to the sea and the mountain of Pelion where many stories from mythology took place. Also a new growing University and an important industrial zone offer the possibility for new jobs and hopes for prosperity.

On the other hand, the city of Volos faces many problems like any other modern cities, such as: traffic, air pollution, lack of parking spaces, lack of public spaces for pedestrians, lack of green areas and reduced aesthetics of buildings. In addition, there are unemployment, insecurity and financial difficulties.

Therefore, the residents wish to live in a more sustainable city with more opportunities for jobs, a clean environment, more green areas and less traffic. Residents believe that the infrastructure projects to be constructed for the Mediterranean Games can solve many of the above problems but at the same time to strengthen the local economy.

However, it is important for the city to organise Green Games since they aim to a Sustainable Development of a city. In this case all local organisations as well as all residents must be aware of various issues such as recycling, compost, reforestation, use of Renewable Energy Sources, etc.

General objectives for successful games of 2013:

The analysis of the internal environment of the city, taking advantage of the strengths and weaknesses and the assessment of external environment, show that there are large areas of intervention, major objectives to which the city should focus its efforts in order to achieve its development objectives. These objectives relate to the quality of life, education and research, the environment, social cohesion, tourism, industry and regional integration, culture and generally all those elements which it constitutes the broader term of Sustainable Development. Some of these objectives are:

- Strengthening the quality of life, infrastructure, environmental, aesthetic and the identity of the city.
- Enhance the quality of human resources and a strong scientific – research Development pole with center University of Volos.
- Social cohesion and protect endangered human resources.
- Development of tourism of the city and the possibilities of leisure with exploiting the opportunities offered by the history, mythology, culture, the University, conferences, sport and the natural environment of the wider region.

- Strengthening of industrial identity of the city and the development of activities with emphasis on knowledge, innovation, quality and extraversion utilization.
- Use of the potential economic integration at local and regional level and creating the emergence of city in main component of the third pole of development of the country (dipole Volos – Larisa).
- Natural resources protection.
- Protection and awareness of all to the environment.

4 PROJECTS IN THE AREA OF THE GAMES

On the occasion of future games, has scheduled a series of projects and infrastructure will be in the region, which are considered essential for a sound and successful organization of 2013. All this will be an important legacy for the city of Volos and Magnesia in general, is expected to play a decisive role in sports, tourism, social and investment development of the region. For this reason already local actors in the region in cooperation with the competent ministries, have started the race so that timely completion of projects.

Sports infrastructure projects proposed in Magnesia, in accordance with the assertion of the Mediterranean Games folder, are:

Main spaces:

- EAK (football): renovation phase, extend the stand (8.600-10,000) with a temporary metal skeleton, filling in spaces below fiscop, renovation phase, grass and lighting.
- Velestino (Football): General renovation, grass and light.
- Swimming pool EAK(Swimming): increase of 400 to 1,500 (metal), behind the new fiscop spaces of journalists, missions, offices, renovation of changing rooms.
- EAK (Archery): appropriate coating floor, fiscop 1,000 posts, lighting.
- Exhibition place (open-air), shaping outdoors space, 600 seats, offices under the fiscop (new project).
- Exhibition place (boxing-fencing), 1,000 locations. General renovation, changing rooms – heating, air conditioning.
- Karla (Rowing-canoeing seakayak), full study (new project).
- Exhibition place (Bicycling), structures in rural areas.
- Nies (Golf), private project (new project).
- Closed swimming pool New Ionia (Gymnastics) convert pool in floor.
- EAK – Closed (judo-karate), increase in number of seats 1,000, air conditioning and lighting.
- NOV (Sailing) study total (new project).
- EAK Shooting range (shooting), full reconstruction – study.
- Karla - Rizomylos (Shooting) integration of an existing, increase places in 1,000.
- •Adamopoulos (Ping-Pong), general renovation, lighting, air conditioning.
- New Ionias closed hall (Volleyball), increase places in 1,000, general renovation.
- Alikes Beach (Beach Volley) full study (new project).

Training centers: Niki Volou, Closed Portarias, Closed Almyrou, Closed Agrias, Closed Karagats, 1st, 2nd και 3rd Gymnasium of New Ionias.

Facilities support games: Mediterranean village new study – construction, Panthessaliko (Press Centre) light construction on outdoor areas.

Other projects:

With regard to the most important of the projects in relation to infrastructure:

- New Agchialos (Airport): complete passenger station. Link to National Road input and format. Connection with railway line of Volos – Almyros (Industrial area).
- Road projects: full reconstruction department Velestino – Volos. Lighting – islets – settings improvements. Complete reconstruction of the old national road Volos – Larisa (Island, lighting, etc.). Full reconstruction route to Rizomylos (shooting) and Kanalia. Improve national network within the city (Iasonos Road, etc).
- Road out of Volos: To complete two branches: to Agria and to Soros.
- Railway (New project): Railway Volou - Larisas with electrification (Complete, 2012, budget 65 mil. €), Setting line from Krafsidona to METKA. Override New Ionias. Modernizace of the line Volos – Paleofarsalo. Velestino – Almyros. Pelion train.
- Tram (Volos – New Ionia) (New project) The ecological character, the credibility of Tram as a mean of transport and the multiple benefits provided by the network in areas where developed, have raised concern of many local communities, who want a mean of transport like the tram to satisfy the needs of their urban mobility. Specifically, the municipal authorities of Patras, Ioannina, and Volos decided to adopt the system of Tram, on-demand local civil society and relevant actors. The TRAM s.a., in cooperation with the OSE, has undertaken "Feasibility Study for the servicing of the city of Patras Tram", taking into account economic, technical and environmental criteria. After Easter of 2010 is expected to be published the tender for the selection of the company will take over the economical and technical and sustainability study about the Tram in urban Band of Volos."

In relation to the projects of the city:

Transport:

- Iolkos Road. Regional parking and underground parking square University (NOV – Slaugtherhouses – Courts, Freedom square, square Riga Ferraios, University square)
- Central control system for lanterns
- Link Egnatias Road through the roundabout of Kalochori - the roundabout of Nikaia
- Completion and operation of the passenger station in port

Rehabilitation:

- Coastline and beaches
- Regeneration Southwest area of Volos – Entrance of Volos
- Rehabilitation-sided building hosts roads of the city
- University square format
- Upgrading shopping centre area
- Pedestrian walkways-biking-Green

Culture:

- Renovation of the municipal theatre (open and closed)
- Shaping enclosed spaces of custom house (space for exhibitions and theatre)
- Emergence of archaeological sites (theatre, palaces, Archaeological Park etc)

Infrastructure:

- Just infrastructure – new hotels (private initiative)
- Renovation Exhibition Centre (examination for sports Mediterranean Games in other enclosed space)
- Ensuring adequate quality and quantity of water (replacement water desalination)

5 THE RESEARCH

On the basis of the above the commitment of Mediterranean Games 2013 is an opportunity and the correct handling and actions can lead to Sustainable Development both the city and the nearby areas. In all, the open debate with the citizens is essential to achieve the maximum the whole effort. In this context, we decided to explore the views of citizens and their disposal, to draw some extremely valuable conclusions that can be taken into account by the official bodies and researchers dealing with relative subjects.

To carry out the research, shared and collected 150 questionnaires to the equivalent number of Volos' citizens randomly selected with 100% response rate. The questionnaire included a total of 27 closed questions. The questionnaires were filled out with the constraint that the people who were completed the age of 18 years. The investigation was carried out in time intervals between 12/8/2008 to 14/8/2008 and 14/9/2008 to 16/9/2008. Keen was questionnaires to be filled mainly from local residents, to have some personality after will list views inhabitants of the region, they knew better than any other city. Each questionnaire have been supplemented anonymously, while the average time to complete the ranged between 8 to 10 minutes.

The questions were kind, in order to provide the best possible data for further processing and research, but at the same time be the starting point to complete the research. The questionnaire form have 27 numbered questions, of which the first seven related demographic content items such as gender, age, marital status, etc. The remaining twenty questions we would say that fall into two groups of questions, of which the first concerns questions which illustrate the point of view of citizens around the Mediterranean Games and large projects scheduled, while the second group relates to questions which are the attitudes of Volos for the existing situation in the city today.

For the investigation of the relationship that might exist between beliefs (questionnaires) given to citizens of Volos, Chi-square independence tests has been conducted at 5% significance level. It is noted that the audit independence and the processing of data of the questionnaires, made with the help of Excel and statistics packages SPSS 14 for Windows.

Question 1: From which you were informed that the Volos in cooperation with Larisa undertook the Organization of the Mediterranean Games 2013?

The majority of respondents, rate of 95%, were natives Volos and the surrounding areas in this, and only a 5% were visitors, residents of Athens, for reason had found time in Volos. The citizens seem to prefer to update their local type of each format, after significant percentage 81% responded that updated for games of 2013 from a local newspaper or local channel, which shows that this sample does not use instruments such as the Internet to update it for the local situation.

60 people, 40% said they were informed of the acceptance by the city of Volos of the Mediterranean Games 2013, from a local newspaper, and 2 more replied that the learned from local Channel 41%, 13 said they learned this from the Athenian Press, 9%, just 5 of 3%, while 10 people from another source, (relatives, friends), 7%.

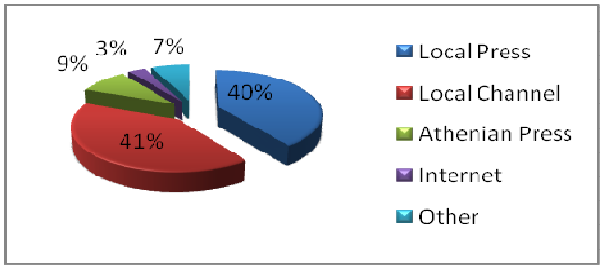

Fig. 1: Percentages of way of briefing

Question 2: In your opinion in Volos life after the Olympic Games of 2004 getting better, deteriorate or remained the same?

Volos was Olympic city the period of the Olympic Games of 2004. With the aim of this capacity, we raised the question, which called for the respect of citizens about how life has changed or not in Volos after the Olympic Games of 2004. The majority of responses gathered in that life remained the same after 2004, 38%, while equally significant proportion that life rather getting better, 32%.

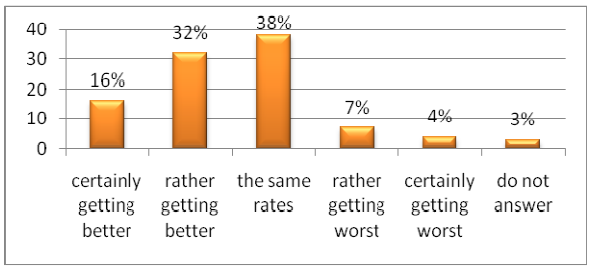

Fig. 2: Percentages about life after the 2004

From the statistical control X2 has observed that those who argued that life in Volos after 2004 continued to deteriorate maintain their beliefs and life after 2013 at a rate of 75%. Similarly, those who argued that after the 2004 life getting better, say that the same will happen after 2013 at a rate of 86,3%. The group of people who responded that the life remained the same in 2004, responds with the same elevated rates (54,1%) and life after 2013. There is therefore believe that depending on how residents evolved life after 2004, created and expectations for life after 2013, which must be taken seriously by all officials involved in the organization of the games, so that after 2013 to have perhaps more positive views from greater proportion, in comparison with the views for the summer of 2004.

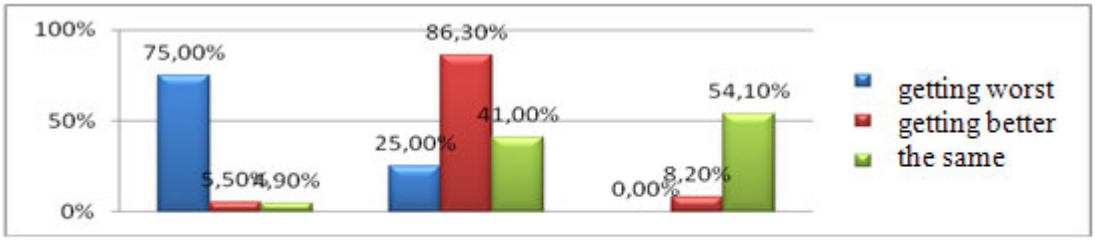

Fig. 3: Cross-correlation life after the 2004 with life in Volos after 2013

Question 3: Do you think that the Mediterranean Games will make known and to promote local products on markets abroad after 2013?

A very important element for Volos and the wider region of Magnesia, are the local traditional products, such as: Chipuro, Zagoras Apples, Sweets, etc. Promoting and exporting is a point that concerns society, economy, and culture of the region. Following the above, given the opportunity using the questionnaire be asked citizens to produce their own respect how will contribute the Mediterranean Games in 2013, the promotion of local products on markets abroad. A total of 115 people (76%), replied positively that they believe that the Mediterranean Games will be the best advertising of local products, resulting in the increase of their producers.

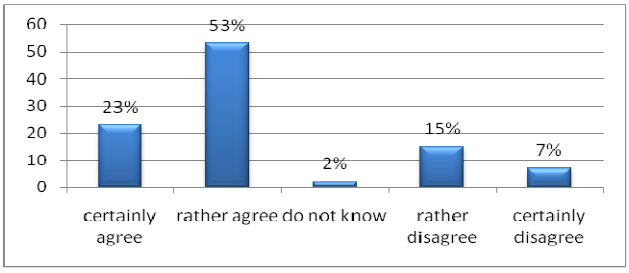

Fig. 4: Percentages about promotion of local products

Question 4: Volos and the wider region will be after 2013 tourist destination and for people outside the borders of Greece?

Certainly such a perspective will have many positive consequences especially for the economy of the region, but also for society, because it will help several professions to evolve and to open new horizons for business. Nevertheless, needs attention after beyond the best for the economy, there is the question of environmental protection. Thus, both the attendance of a multitude of tourists, and the development of local production and

exports, should not be developed at the expense of the natural environment. Therefore, there is no time is necessary to make the proper preparation and to create conditions which will contribute to effective sustainable development of the region.

The relevant question it appears that 90% of respondents believe that Volos will be developed tourist after 2013, which seems and through analogue research of Public Issue where corresponding query the percentage that responded positively reached the 54%, (Public Issue, 2008).

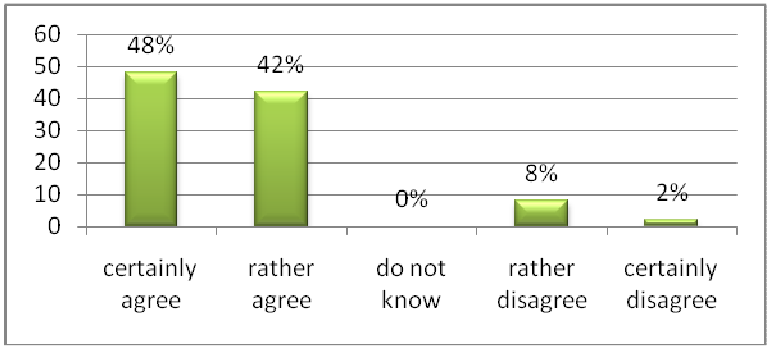

Fig. 5: Percentages of Volos as a touristic destination

This hypothesis was the promotion of local products abroad, is associated with the increase of foreign tourists in the region. From the statistical test X2, observed that the overwhelming majority (97.4% of those who believe that local products will be supported after 2013, agrees that Volos will be a tourist destination after 2013, smaller percentage (65,7%) of those who believe that although will be the Volos tourist destination, local products will not be promoted. the promotion of local products and the recognition of Volos as a tourist destination after 2013, are two variables by a relationship of dependency between them.

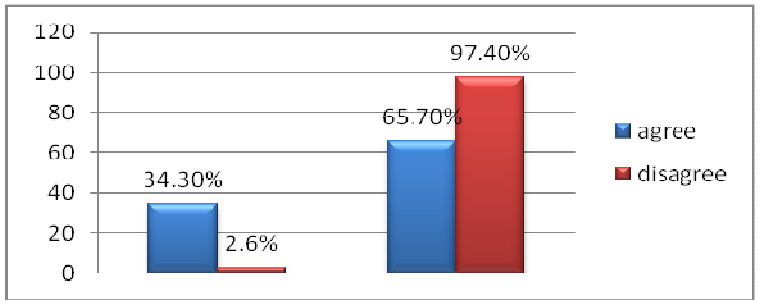

Fig. 6: Cross-correlation of local products with whether Volos tourist destination after 2013

Question 5: Usually what mean of transport you use for your everyday movements?

The fact that 35% of people using cars for transportation, urgently need construction tram line in Volos, which if carried out will reduce much problems such as air pollution and traffic, caused mainly by using cars, according to our investigation, total reaches 55%. Unfortunately, however, an even greater problem for Greek city appears within this research is unemployment, with 43%, after 64 people claimed that this is the biggest problem facing the city in recent years.

53 people (35%) use cars for their daily movements, 30 people (20%) use urban also 30 people (20%) moved with machine, 4 people with taxi (3%), 9 people on a bike (6%), while 24 people moved pedestrians (16%).

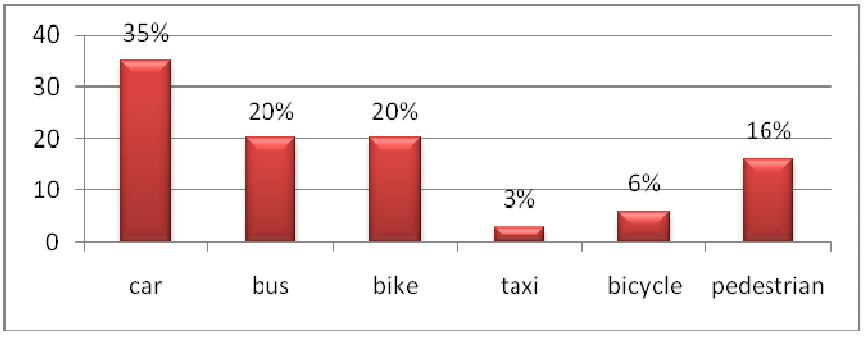

Fig. 7: Percentages of using public transport

Question 6: What is the most important problem facing the city of Volos?

For 38 people (25%), traffic is the most important problem for the city of Volos, 64 people (43%) unemployment 45 people (30%), air pollution, while only 3 people (2%) did not answer.

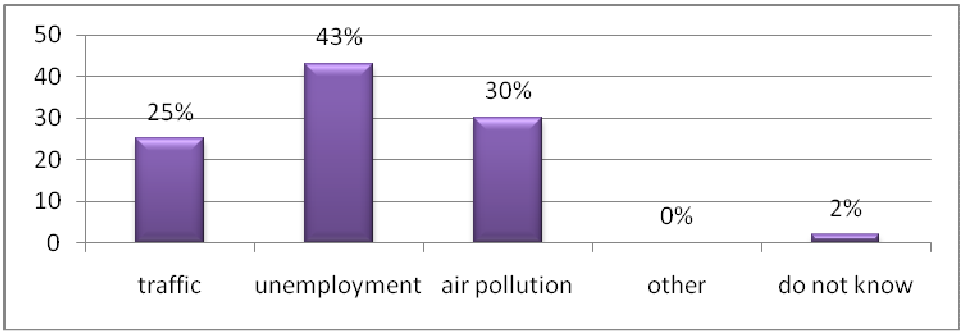

Fig. 8: Percentages of today's most serious problem in Volos

Question 7: Will you used for your transport a bicycle in the city center, if there were correctly formatted cycle tracks and special parking?

Although indicate that people who use bike are just 6% of respondents, we see that the same people supported the use of bicycle, under adequate and safe conditions, at a rate of 73%, which means a great deal about the situation prevailing today in the streets of Volos, who if configured properly and provide security and basic infrastructure, it seems that will be the first choice for Volos residents travel.

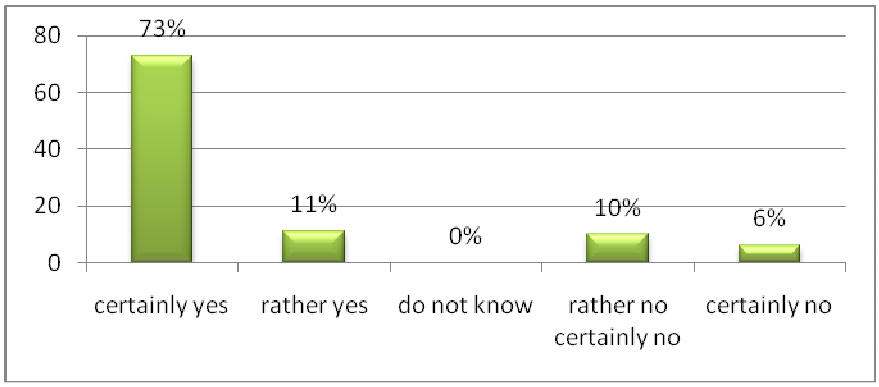

Fig. 9: Percentages of bicycle as a means of travel

Question 8: Will participate as volunteers for the Mediterranean Games in 2013?

With regard to the important subject of volunteers, both for the period of the games of 2013, and setting up a group of volunteers for the city after the games, the results may not be expected, after a total of 70% of people replied negatively in if would volunteer, and only 29% had a positive attitude. In the next question, however, the same people replied positively (60%), and create a group of volunteers after 2013 from local government, while 31% was in this negative.

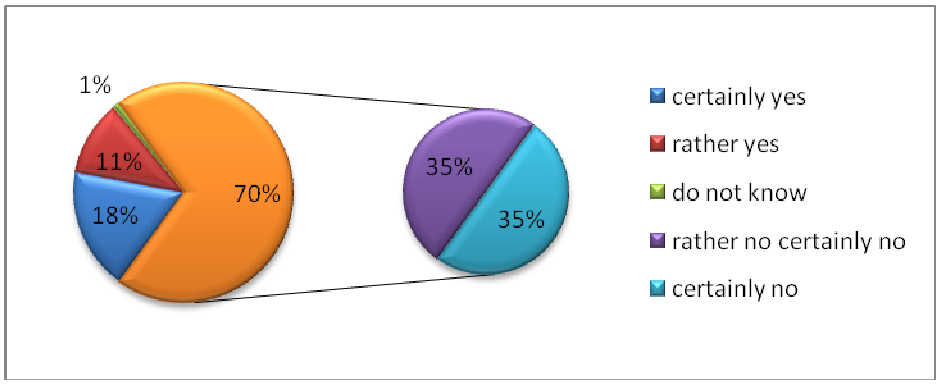

Fig. 10: Percentages of Volunteers for 2013

Question 9: Do you agree or disagree on a proposal of Local Authorities for assembly group of volunteers after the end of the Mediterranean Games?

33% of respondents replied that certainly agrees with this view, the 27% think agrees, the 9% expressed a view, 19% rather disagrees, while 12% certainly disagrees.

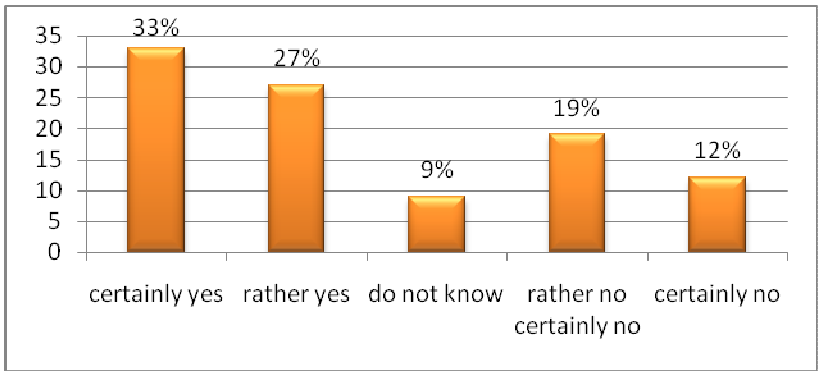

Fig. 11: Percentages of the Group of volunteers for the city after 2013

Question 10: Some of the solutions proposed in the context of the first green Mediterranean Games is the following. In your opinion what is the best solution?

Volos does not have the minimum to demonstrate the Green identity, certainly cannot nor for reforestation, nor for green roofs, rehabilitation or create parks. Nevertheless, we asked citizens for what they believe that is what will give a green solution to Volos and the majority replied the reforestation in 43% as the perfect solution, while important 33%, sees the creation of parks the ideal solution.

The trees was answered by 65 people (43%), as the best solution for green games, 23 people (15%), argued that a better solution is the green roofs, 10 people (7%), the rehabilitation rooms, 50 people (33%), replied the creation of parks, while only two people gave an alternative response.

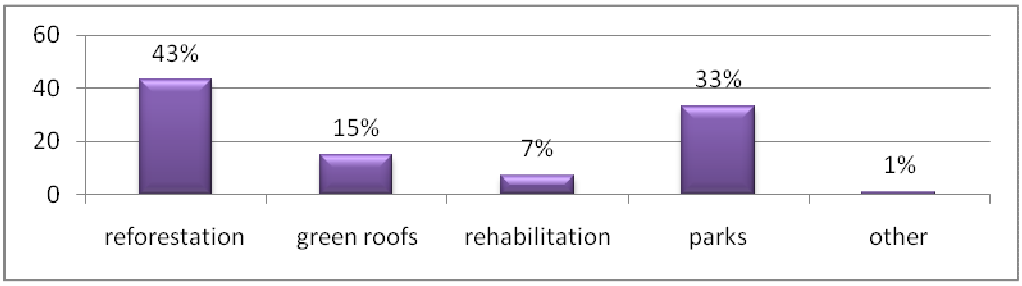

Fig. 12: Percentages of solutions for Green Olympics

Question 11: Do you believe that the organization of the Mediterranean Games of 2013 will be ultimately beneficial, or injurious to the city of Volos?

The last question we would say that is the most important for the whole survey, as any conclusions and opinions raised other questions, the question will prove, 150 respondents, what will be the outcome of so great for the city of Volos. The question was if the organization of 2013 will be ultimately beneficial or negative for the city of Volos. A total of 87% of respondents supported the idea that the Mediterranean Games of 2013, will be a benefit to the city, while the opposite view had just 12%, while found and a person who has not expressed an opinion.

The pie in the following diagram we see that 51% of respondents replied that the organization of 2013 will certainly be beneficial to the town of Volos, 36% answered rather useful, just 1% had no opinion, 8% claimed that the organization is likely to be injurious to the city, and finally the 4% supported the view that the Organization will certainly be injurious to Volos.

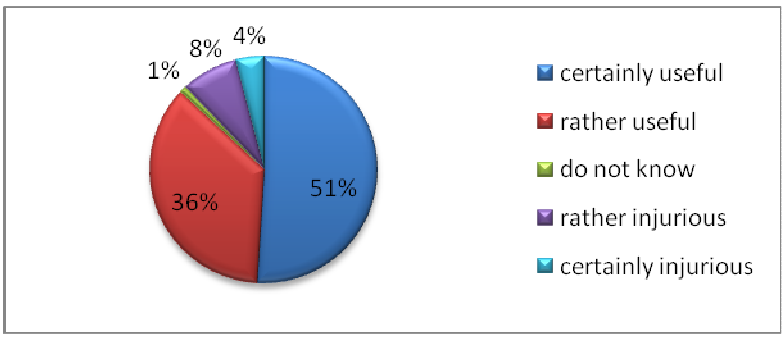

Fig. 13: Percentages of forecast citizens for the organization of 2013

6 CONCLUTIONS

The Mediterranean Games of 2013 will be hosted in the city of Volos. Various infrastructure projects are expected to contribute to the improvement of the quality of life of the local population in addition to facilitating the games. The present study reveals that the local population is not interested in big and expensive events, as much as the improvement of life and the establishment of sustainable living. The major concerns of the population are air pollution and traffic congestion.

Generally, the perception of the people is that the organization of the games will be successful, no matter what difficulties and obstacles will be encountered. However, the results of the study show that people realize the need for rapid progress towards Sustainable Development which takes into account economic, environmental and social needs. On the other hand, according to Local Agenda 21, Sustainable Development poses major challenges in the structures of governance, when moving from a "authoritarian governance" template to a "participatory governance" template, where decisions are taken with the active participation and consent of the local citizens. Under this light, it is of particular importance that the people of Volos are positive towards the organization of the Mediterranean Games and quite optimistic about the positive effects of the games on their city.

7 PROROSALS

Use of the games for the city. Redefine the objectives that are consistent with those of Sustainable Development, in order to speak really green Mediterranean Games, who will follow the principles of sustainability and will pave the way for development through the four key sectors of society, the environment, economy and culture.

Local operators should use both the sporting event and the positive attitude of the inhabitants to rebuild and redesigned the regional development of the wider region, making a new vision for the future, the identity and profile.

Particularly important was the creation of a digital guide includes maps with historical monuments, sports facilities, a list of hotels in the region, ways to move, etc. At the same time, with the help of an application (e.g. Google Earth, each user will have the capability to search for real-time historical monuments, archaeological sites, sports facilities and roads, train and bus stations first aid, etc. It is also necessary to create the presentation some installations or monuments with 3D imaging technology, and will be on line show some points via webcam.

Create historical ways κατά το πρότυπο of Barcelona, but και της Αθήνας (with the opportunity of Olympic Games 2004), όπου ο επισκέπτης θα μπορεί με εύκολο τρόπο να επισκεφτεί και να γνωρίσει τα σημαντικότερα μνημεία, πολιτιστικά γεγονότα κ.ά. της πόλης. Create historical paths in the model of Barcelona, and Athens (on the occasion of the Olympic Games) where the visitor will be able to be visited and to learn the most important monuments, cultural events, etc. of the city.

Good work would be to create a composting unit in Magnesia, which will be necessary for the management of urban waste, livestock and rural area, others and all waste resulting from the thousands of visitors who visit the region. The opportunity for financing by the EU should be used at the moment.

With regard to the natural environment of Volos, should be:

- Increased free spaces and green in Volos.

- Attend the existing green places of Volos.
- Enable citizens and partnerships for the green in Volos.
- Maintain clean the Volos and neighborhood.
- Formatted environmental awareness for how to manage wastes.
- Reduce air pollution and noise.
- Upgraded the aesthetics of the city and its areas
- Strengthen urban mobility and the financial resources
- To deal with traffic problems in the city, taking advantage of the granted European funding. (Alfoz, 1995).

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The Regeneration of Lagos Lagoon Waterfronts for Recreation and Tourism

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1 ABSTRACT

Waterfront properties are major revenue earners in many parts of the world. Apart from high property values they command for the property owners, they provide revenue for the government and serve as a source of enjoyment, recreation and tourism when open to the public. Along the Lagos lagoon, this is currently not the case as the waterfront has degenerated into a slum with non-distinctive housing, mainly shanties at various points, wood preservation, markets and commercial fishing activities. Growing statistics show that waterfronts have huge potentials of financial gains. In the study area this potential lies hugely unexploited and grossly under-utilized thereby wasting the area's natural recreational resources. This research examines the situation along the Lagos lagoon; identify problems causing lack of development of the waterfront for recreation and tourism, and proffer solutions that will enable policy makers in government and the private sector to improve the area. The study identified the problems, causes and recommends urban renewal and landscape architectural interventions to engineer the desired change necessary to transform the area thus making it more amenable to higher property values, maximize the use of the land and encourage recreation / tourism to the existing waterfront. Among the problems identified, as they affect the waterfront, include: very high population density, lack of planning and infrastructure, especially functional water transport, properly designed relaxation and passive leisure areas, lack of security and non availability of on-site recreational/entertainment facilities. The outcome of the research will be of benefit to property owners in the area, architects, landscape architects, resort managers, tourists, visitors, industry practitioners, policy makers and other stakeholders in determining appropriate facilities in order to create very functionally attractive Lagos lagoon waterfronts for recreation and tourism.

1.1 Introduction

The Lagos lagoon is a very important natural resource of Lagos state, Nigeria. It is part of a network of lagoons - Lagos lagoon complex originally known as the Western Nigerian lagoons (Webb, 1958) which comprises several lagoons stretching from the Republic of Benin to Nigeria (Hill & Webb, 1958). Figure 1 shows the extent of the Lagos Lagoon system of which Lagos Lagoon is a part. The Lagos lagoon system comprises a net work of nine lagoons - Yewa, Ologe, Badagry, Iyagbe, Lagos, Kuramo, Epe, Lekki and Marhin. The Lagos lagoon is one of the biggest lagoons in Nigeria and it is the main focus of the study.

The area's water tourism potentials has not been properly harnessed. As a water body subject to tidal waves, it is directly linked to the Atlantic Ocean on the south and technically ends around the Palaver Islands on the east, while the lagoon continues to the Epe lagoon which eventually opens out to the ocean again, further along the Lagos coast.

The communities that make up the Lagos lagoon waterfront are varied and include: Makoko, University of Lagos, Ilaje, Oworonshoki, Ogudu, Bayekun, Agboyin, Moba, Ofin, Ikorodu, Ibeche, Aja, Lekki peninsula, Banana Island and Ikoyi. This is interspaced with uninhabited swampy mangrove vegetation. Also along some of the waterfront edging the Lagos lagoon are shanties built on the water using makeshift materials, as well as wood preservation and sawmill market particularly at the Makoko end that generally deface the waterfront and make it unattractive for water tourism. The famous Third Mainland bridge of Lagos also traverses this lagoon, making it even more important and a key landmark in the Lagos landscape.

Previous research, indicate that water tourism can be a major revenue source, particularly for developing economies like Nigeria (Falade, 1998). This calls for change in the way the existing fringes of the Lagos waterways is currently being used. With proper planning, the area along the Lagos lagoon edge can undergo a renewal that will position the lagoon for better development and subsequently for water tourism development.

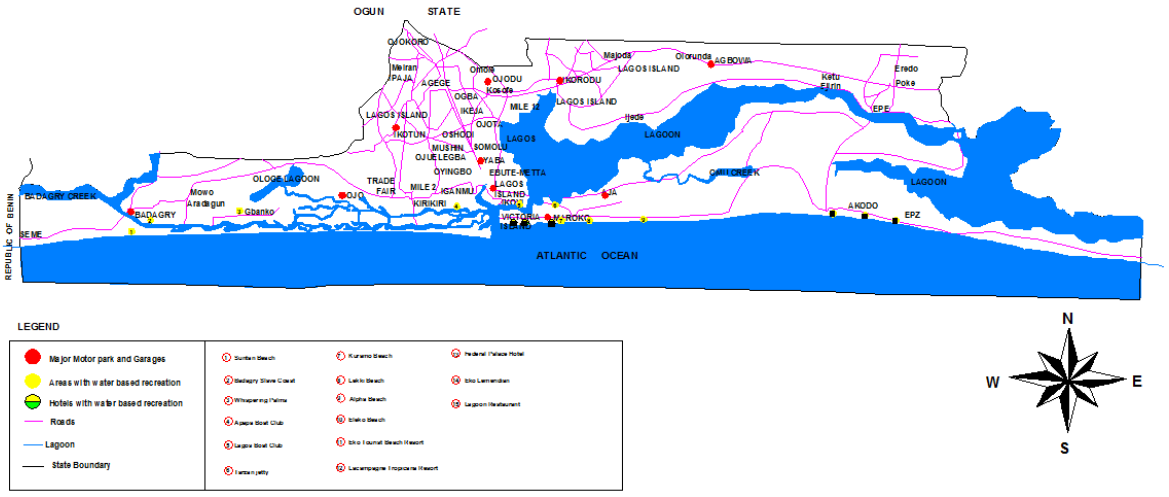

Figure 1: The Lagos Lagoon complex, spanning Republic of Benin on the West, Atlantic Ocean to the South and Ogun State on the North and East of Lagos State, Nigeria.

Background

The coastal town of Lagos, Nigeria was first inhabited before the 15th century AD and grew from a small fishing and farming settlement on an island until the advent of the Portugese in 1472 who gave the Island its present name of Lagos (George, 2009). Even by this time, the existence of the lagoon was acknowledged as "Gadoo" lake on the north side of the original settlement. By 1800, its population was estimated to be about 5,000 (Wilbur Smith & Associates, 1980). During the colonial period, Nigeria was a colony of Britain and Lagos was a major city, eventually becoming its capital until 1991 when the seat of power moved to Abuja. Lagos still remains a major city in Nigeria and the key centre for commercial and economic activities in Nigeria. Over this period, the city has undergone phenomenal growth.

According to George (2009), the city of Lagos grew at a rate of 3.3% per annum between 1901 and 1950, but its growth rate per annum between 1950 and 1963 had risen to 18.6%. By the 1963 census, a population of 1,136,154 was recorded for Metropolitan Lagos. Lagos continued to grow and by 1997 the city had a population of 11.85 million. Lagos metropolis is presently estimated by United Nations to have a population of 18 million. Metropolitan Lagos covers an area of about 1,183km2, out of which 455km2 is water body, wetland and mangrove swamps (George, 2009).

Before independence, the colonial government at that time adopted the Garden City approach in the planting of European Quarters, later GRA's – Government Reserved Areas, with spacious, lush greenery. The GRA's became standard features of many Nigerian cities. In Lagos, this gave credence to such places as Ikoyi and Ikeja GRA. This approach was unfortunately not carried through to the 'African quarters' like Ebute Metta. At post independence, it was only the former European Quarters or GRA's that were planned. Perhaps due to increased migration, various areas comprising the metropolis virtually grew without a plan (Adejumo, 2003). Oduwaye (1998) attributes part of the problem of rapid urbanization to the rapid rate of migration from rural areas to urban areas, among other causes. All this growth and rapid urbanization was not without its problems.

The tremendous pressure brought on by unplanned urbanization has put pressure on land , resulting in urban sprawl and in largely unmet demand for basic urban services and infrastructure such as water, electricity, sanitation, access roads, public transport, effective drainage and waste disposal.

The inevitable result has been the rapid development of slums both on land and along the waterways, including the lagoons where the tidal waves are not so strong as to sweep away the temporary shanties that have been constructed by people who are desperate to live near the city centre but are unable to afford the cost of scarce accommodation. This rapid unplanned growth was characterized by over population of some areas and neglect of other urban areas.

Adejumo (2003) suggested that unplanned developmental activities have continued to alter the metropolitan fringes. The depressed national economy encouraged fringe communities to sell landed properties giving room for the growth of slums. He suggested land acquisition by the government which should extend to the fringes to acquire land as green belts serving as buffers that will contain the sprawl on one hand and delineate the urban edge on the other. This further explains the development of slums and shanties along the fringes of the Lagos lagoon.

Figure 2: Shanties, wood preservation and blighted conditions of the Makoko end of the Lagos lagoon

Various studies have been carried out that confirm the negative effects on the urban environment as a result of unplanned urbanization. Such Studies include Olokesusi (1994) on Lagos, Anozie (1994) on Imo and Fadamiro (2000) studies on Ondo States. The results emphasized that the rapid growth of urban centers in Nigeria generated management problems, such as encroachment of open spaces, inadequate solid waste management, water supply, housing and water pollution. Thus urbanization according to Osiyi (1989) has resulted in uncontrolled use and development of land, creating chaos and blighted conditions in cities. Fadamiro and Atolagbe (2006) attribute this to lack of pursuit of landscape planning, design, and management in promoting land use development in Nigeria.

Key among the problems of unplanned urbanization was that of urban housing. This was further compounded by a lack of firm land in the physical expansion of the city to accommodate several immigrants both local and foreign as Lagos gained more prominence as a Mega city, ranking 6th world mega city by 2000 based on population size.

The problem of poor terrain assails most of Lagos as much of the land is barely 5 metres above sea level; there is therefore the added problem of poor drainage and insufficient firm land upon which to build and install the basic infrastructure necessary for city dwelling. With the government's inability to meet up with the housing demands, much of the urban poor found a solution in the construction of shanties along waterfronts, resulting in many slums defacing the water bodies and causing urban blight.

The Lagos lagoon is home to many of such settlements among which are in Makoko, Iwaya, Ilaje, Oworonshoki, Moba and Agboyin.

2 URBAN REGENEARTION AND ITS EFFECTS

The idea of proposing changes in the area is to encourage urban regeneration that can help revitalize the area and generate efficient use of the existing water body – the lagoon for recreation, tourism and improved housing. Many examples exist where revitalization of rundown waterfronts led to increased benefits for the community and the city in general. One of such is the change in the London suburb Isle of Dogs that was transformed into the immensely successful Dockyards.

In addition to the positive effects of regeneration, the potentials of tourism as a major economic sector are well documented. Tourism is the world's largest industry and continues to grow. Data from the WTTC indicate that total gross expenditures for travel and tourism were $3.2 trillion in 1993 or, approximately six percent of the global GNP. By 2005 the number of tourism related jobs is expected to exceed 350 million. In the 1990s more than 200 million people were directly or indirectly employed in the global tourism industry and 20,000 jobs are created for every 1 million dollars of revenue generated.

3 LITERATURE REVIEW

In his study on the socio-economic impact of tourism, Hall (2003) discovered that tourism has become a significant source of foreign exchange revenue for many countries of the world. Economic gains will result for Lagos if the water tourism potentials of the study area can be accelerated and developed, especially as it is within easy reach of the city core and the economic nerve center of Lagos. When tourism is effective in an area, the local and adjourning community immediately benefit from it in terms of sales of local arts and crafts at higher costs, as well as generating work for the people in that vicinity.

This has been confirmed through previous studies which demonstrate that residents feel tourism helps the economy (Ritchie,1988), that tourism increases the standard of living of host, and that tourism helps the host community and country earn foreign exchange (Ahmed & Krohn, 1992). Also, tourism helps generate employment (Ahmed & Krohn, 1992; Backman & Backman, 1997; Milman & Pizam, 1987), and increase revenue to local business (Backman & Backman, 1997; Sethna & Richmond, 1978) and shopping facilities (Backman & Backman, 1997). This spirals into the economy of the larger society.

Water tourism, which is a type of tourism has its roots in Britain and is equally a major source of income for various countries that have chosen to develop this type of tourism. Coastal tourism, from which water tourism evolved, was initially meant more for recovery from sickness and relief from the stuffy existence in the hinterland that drove the elite to seek a breath of sea breeze by the coasts of Britain. Gradually the towns became favourite holiday spots as industrialisation brought with it faster means of travel, more money which enables the middle-to-low income earners to afford trips to places where the elites had previously held sway.

A range of activities and uses of natural resources occur in waterfront tourism zones some of these include, recreation, fishing and residential living. The attraction of tourism to waterfront regions continues to flourish. This is partially due to the eternal appeal of sun, sea and sand; but also because the destinations offer beauty, aesthetic value, exotic appeal and diverse habitats.

Arising from the coastal tourism is the massive water tourism phenomenon that has evolved mostly in United States of America, The Caribbean islands and parts of Europe – notably Spain, Turkey, Portugal and Greece. This involves a lucrative industry centred on the concept of water enjoyment, involving different types of water features which bring the tourist into direct, more exciting interactions with water, more than ever before.

4 SUMMARY AND RECOMMENDATIONS

There is urgent need for deliberate landscape planning intervention with articulated urban design to check the degradation and halt the destruction of the natural landscape and encourage development of the Lagos lagoon waterfront in a manner that will be in consonance with sustainability. The role of landscape planning in the improvement and sustainability of the existing urban spaces is fundamental.

The study area is presently neglected, deteriorating and should be re-designed to function effectively with natural and artificial landscape elements, such as decorative circulation pavements, continuous walkways, cycle and pedestrian paths, parks, playgrounds, plaza and spaces for community gatherings.

The landscape design aspect may include the planting of trees and shrubs along existing streets, roads and new roads, housing estates, office blocks, business premises and improvement of reclaimed sites where the environment is rehabilitated and natural habitats restored. Socially and economically, the beautification programme is a very important value-adding process, where the improved environment becomes a more inviting living and working environment to locals, developers and investors alike.

Also from a landscape perspective, the following elements will be deployed in the regeneration of the area; tree planting, street lighting, streetscapes, street decoration, provision of public parks and gardens, creation of new roads, upgrade, maintenance and marking of old roads, signage upgrade, waterfront development / revitalization, provision of street furniture, provision of distinct transportation networks, median/boulevard planting provision of pocket parks, introduction of fountains and other water features statures, sculptures and monuments and provision of urban art.

Key in the landscape planning is the use of plants and structural landscape materials which include: groundcovers and flowers, tangible and intangible enrichment items and artificial state of the spaces under study which will be well organised for the best effect.

The regeneration strategy needs to take into cognizance the adjourning land uses in order to effectively accommodate the various activities which are identified as important in the area and compatible with a regenerated lagoon front. Such uses include residential, recreational, commercial, tourism and conservation projects.

If properly harnessed, tourism can be a major asset to the nation in general, and to the host community in particular. Nigeria needs to tap into this source of income especially Lagos as it is a city that is richly endowed with water in its various forms. Water-based tourist destinations in Lagos are grossly under-developed. The architectural potentials and usage of water as a natural recreational resource can be better harnessed in developing effective tourism potentials of Lagos.

The Lagos lagoon is an example of such natural resource which can be redeveloped to harness its potential for water tourism and recreation. This can be done through the urban regeneration of the area and by the redevelopment of the communities and land uses that currently inhabit the water's edges.

Lagos does not have much recreational space. In 1976, 467 hectares urban land was identified as recreation areas in the city (Wilbur Smith Associates 1980). A bulk of these 467 hectares of recreational space fall within the private commercial group. The inadequacy of public recreation open spaces in Lagos indicates that little attention has been given by successive governments to this urban sector. The few public spaces cover a total area of 104 hectares. This was 2% of the 1976 496 hectares identified for leisure and recreation. The ratio was one hectare per 40,000 of the state population where as international average is one hectare per 600 of the population. This show a major need in the city and this need can be amply met in the redesign of the lagoon waterfront.

The urgent need for urban open space and recreational areas is highlighted in the 1997 Messers Arbitrage Consulting Group Study on socio-economic problems of Lagos State including the state of recreation and recreational facilities. This study of Oshodi/Isolo Local Government revealed the lack of public recreational facilities forcing the residents especially children and adolescents to convert any available space including un-built residential plots, streets and school sports ground for active leisure activities. This is a regular sight on any major street in Lagos, particularly in the slums and high density areas.

According to Adejumo (2003), the few playgrounds bequeathed to Lagos by the colonialists have long been changed into other uses. Ikoyi Park which was the premier public park in Nigeria inherited from the colonialists, by the early eighties had been subdivided into residential plots now called Park View Estate. The same fate befell the remains of Kuramo Waters youth campground at Victoria Island and Race Course. Biney zoo - a private initiative and Love Garden Pleasure Park at the Lagos Island have all ceased to exist.

This underscores the need to create adequate recreational spaces that will not only replace them, but also function as star attractions for tourists visiting the metropolis while affording Lagosians a place for leisure and recreation beside the water.

For meaningful results, a holistic sustainable approach should be employed. Considering the various existing land uses in the study area, it is suggested that the area be redeveloped to have waterfront recreational facilities, urban parks, conserved wetlands for tourism, clearly identified fishing and sustainable water transportation and redesigned residential areas both on the water and at the shores.This will require proper coordination between the host communities, architects, landscape architects and town planners in order to articulate a scheme that is holistic in approach – encompassing urban design Landscape planning and mass housing.

Just as unplanned urbanisation brings degradation, so also does unplanned, wrongful, uncontrolled tourism can be detrimental to the community. Thus more effective tourism planning and management strategies may be necessary in order to ensure sustainable and successful tourism development.

There is a delicate balance between the environment and the tourism industry, which depend on each another for survival. The challenge calls for sustainable tourism strategies which control the way the natural resources are managed in tourism destinations as well as managing the impact visitors inflict on the destination's environment and nature. Consequently the redevelopment and urban renewal efforts will need to take a sustainable approach that ensures the continuity and viability of the new scheme.

In the development of an effective water tourism strategy for the Lagos lagoon, it is important to note that tourism is an interdisciplinary field and involves a number of different industries and natural settings.

Planning is essential to stimulate tourism development and its sustainability. Without tourism planning, many unintended consequences may develop, causing tourist and resident dissatisfaction. These include damage to the natural environment, adverse impacts upon the cultural environment, and a decrease in potential economic benefits. The negative experience of many unplanned tourist destinations and the success of local and regional planned destinations demonstrate that tourism development should be based on a planning process that includes a solid assessment of the resources at the destination and their attractiveness potential.

5 CONCLUSION

The urban regeneration process is usually a thorough process if it is to be successful. The paper has reviewed the contributions of various disciplines – landscape architecture, urban design and town planning in arriving at a new plan that can encourage water tourism in an area that is currently deteroriating and has developed into a blight on the Lagos landscape – the Lagos lagoon. The paper therefore recommends the total adherence to the suggested policies for the effective management and sustenance of the urban environment through landscape planning and urban renewal provisions.

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The role of civil actors, private sector, and public organizations in the urban life of open spaces (The Cairo Case)

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1 ABSTRACT

The trialogue process, reflected by the integration and interaction between civil actors, private sector and public organizations in the design of public open spaces is, and will always be, a hot issue in the urban life of many cities, thus raising some challenging questions concerning the role of public spaces and the nature of public life of cities and their inhabitants.
An essential quality of urban public spaces is that they meet the needs of users. Consequently the involvement of citizens in the design of open spaces plays a critical role in the sustainability of such spaces. On the other hand, both the private sector and public organizations are essential for the existence and construction of public open spaces.
The paper will investigate the trialogue addressed between the three sectors, civil actors, the public sectors and the private organizations in the design and management of open spaces with reference to Cairenes' society. The following questions will be raised, where the study will attempt to seek the answers; to what extent is the involvement of the three in the design and management of local public spaces? Does the use and quality of such open spaces differ according to the degree of involvement of each of the three sectors?

2 INTRODUCTION

Public open spaces are considered a cornerstone in the lives of societies and they need to be recognized as such for their beneficial effect on human lives. For many years the public spaces of cities have been the subject of wonder, from the different ways in which public space can be designed and developed (Carr et al, 1992; Tibbalds, 1992), to concerns about privatization of space (Loukaitou-Sideris, 1993; Punter, 1990) and the challenging nature of public space (Zukin, 1995).

3 PROBLEM

The impact of the exploding population in the urban footprint throughout the world, especially in developing mega cities, created a number of problems that largely affect the existence and quality of open spaces. Some of these problems are air and water pollution, housing problems, the legalisation of occupied areas, overcrowded settlements, traffic, congestion and noise. Subsequently, uncontrolled city growth is mounting the strain on public open spaces and putting open spaces in urban cities at risk. As a result recreational spaces are reduced, which consequently lead to the worsening of the social, psychological and physical problems. On the other hand, the management and construction of open spaces faces a number of problems some of which are limited governmental financial support, convincing private sectors' involvement and investment, vandalism, misuse, accessibility …etc.
In summary, problems facing open spaces stem from two major points. First, the limited availability of outdoor space and pollution as a by-product of modern life, while the second is guaranteeing the continuity of such spaces and the quality they give. To overcome the above problems more attention should be paid to open spaces, whether in terms of quantity, quality or availability. The paper argues that such problems could be avoided through the involvement of all parties of interest.

4 AIM

The paper aims to tackle the problems facing public open spaces in terms of existence, accessibility and quality through investigating the role of involvers. Three parties are involved in the appearance and design of open spaces addressed as, public organizations (governmental parties as providers of land), private sector (constructors, investigators and other main finance supporters), and civil actors (users and co-producers of social knowledge). The degree and method of involvement of the three parties and the resulting conflict noticed from such involvement in the design and quality of public open spaces should be addressed. The vital question which poses itself is "what is the exact role of each party in this trialogue to attain "a well managed and successful public open space" which is freely accessed by the public and where users' needs are fulfilled".

In sum, the research aims to highlight the impact of the three parties on the design, management, use and quality of public open spaces.

5 FOCUS OF RESEARCH

The term public open space has many meanings. Throughout the research it is used as a short hand term for any open space which is not covered with buildings and which facilitates free public physical access and is specially intended for recreational use. Such open space includes parks, play areas and incident green spaces, thus excluding grey spaces of roads, pavements, car parks and other hard surfaced areas related to different types of built development and that are not used for a recreational purpose. Madanipour, A. (2003), suggests an accurate definition of public open space based on the observation that public open spaces in cities, almost anywhere and at any time, have been places outside the boundaries of individual or small group control, mediating between private spaces and used for a variety of often overlapping function and symbolic purposes. According to him urban, open public spaces therefore have been multipurpose spaces distinguishable from and mediating between the distinguished territories of households.
The paper is dealing with two sections, the first focuses on the role and importance of urban open spaces in cities, to what extent are they essential and the influence of the three early addressed parties in the life of open spaces, while the second is oriented towards the trialogue taking place between the three parities of interest and its impact on open spaces in Cairo.

6 THE SAKE OF OPEN SPACES

The tradition of providing for public open spaces within an urban environment can be traced back to the industrial revolution, when public parks were recognised as an essential component in the development of the city of London. For much of the 19th and early 20th centuries, the concept of public open space within urban areas was viewed as vital to the health of the residents where crowded conditions, pollution and lack of hygiene were common within the city region. In this era, public open spaces provided leisure, recreation and public health opportunities for residents.
Now-a-days public open space can serve more purposes than before; it is viewed as an important space for social interaction and is contributing to the general well being of a community. Moreover, open space plays an essential role in the environmental quality; it minimizes energy consumption and carbon dioxide production, provides microclimate modification, improves air quality and reduces noise. On the other hand the creation of aesthetically satisfying landscape environments increases community enjoyment of everyday life and adds greater sense of a meaningful bond between residents and their community.

7 THE ROLE OF PUBLIC OPEN SPACE IN THE LIFE OF SOCIETIES

Public open space in the modern urban life of societies is symbolized through parks, plazas, playgrounds, streets and other settings designed for the benefit of the public where public activities take place. They provide a context for the enhancement and reinforcement of natural settings and process and give form to urban communities. They make a significant contribution to the regional economy and economic competitiveness through enhancing the overall quality of life and visual identity of the region. Properly designed and managed public open spaces significantly increase the value of the private capital base. They also promote human to physical and psychological well-being (Grahn and Stigsdotter 2003).

8 THE ROLE OF SOCIETIES IN THE LIFE OF PUBLIC OPEN SPACE

Understanding the role and benefit of civil actors, private sector and public organizations is a means to obtaining an understandable trialogue. Society and individuals derive benefits from open space in a number of direct and indirect ways. Despite the undeniable benefit provided from open spaces to governments, public organizations and civil actors, the share of responsibilities of each is still debatable. Management has, among well known climatic and social aspects, a positive impact on the quality and continuity of open spaces and plays a major role in the way such spaces are used, organised and maintained. A lack of management leads to the deprivation of open spaces. To whom lies the responsibility of not only the design but also the management of open space? Is it the responsibility of civil actors, government or private investors? Are the three parties involved if so, to what extent? And above all what is the task of each party? To find answers to these questions, the role of each one of the three parties should be identified.
The Project for Public Spaces suggests that a successful space has four key qualities: “The space is accessible; people are engaged in activities there; the space is comfortable and has a good image; it is a sociable place, one where people meet each other and take people when they come to visit.” According to

Carr et al. (1992), public spaces should be responsive, that is, designed and managed to serve the needs of their users, thus meeting the needs of users is considered an essential quality of urban public spaces. In addition, a mutual effect exists between civil actors and urban open spaces where the former provides vision and actions and the latter is designed for the sake of former. Furthermore, the involvement of civil actors in the design and management of urban open spaces provides them with a feeling of belongingness, responsibility and sense of place (Jorgensen and Stedman 2006). The interaction between individuals in open spaces creates social cohesion because they provide the basis for bonds (Marshall and Srolle 2004). In brief, the involvement of civil actors guarantees the management and security of such open spaces and plays a major role in reaching a suitable design which satisfies and fulfills participants' various needs. But do civil actors represent a vital participant in financing open space?

Government has always depended on the private sector to support its aspirations; particularly depending on it as a source of revenue and investments (Burdett, R. p. 304). Most governments, especially in developing countries, face many competing public purposes (education, traffic, etc.) that have larger constituencies beside other financial problems whether in managing, maintaining or in enhancing open spaces. Many already existing public spaces in such countries suffer from overuse and insufficient public funding. Such a situation poses an inquiry which is, who will finance the maintenance and management of open spaces to guarantee their long term usefulness and continuity?

According to Garvin, A (1998) trends in open space development and management can be classified to three basic models; first is a "purely public sector approach" where public organizations provide or renovate the open space due to civil actors' pressure. The second model is a "public/private co-venture approach", where public organizations maintain ownership and responsibility of the open space but co-ventures with the private sector for development. Once completed, the open space is under public sector purview, although the private sector may continue to be involved in case of financial aids. Finally the third approach is "a market oriented civic model" as it relies on a long term partnership between the parties. Using mechanisms such as a nonprofit development corporation, the third approach brings together private sector responsiveness to market needs, private donations and revenue-producing functions to provide for the improvement and management of public open space. Hence, the venture between the two is for the sake of civil actors as participants.

9 THE CAIRO CASE

Cairo's population exceeds 6 million. The city suffers from high levels of polution and traffic, where inhabitants' share of public open spaces (0.94 m2) is negligible compared to the minimum standard (32m2). Funding public open spaces in a country like Egypt represents a major problem where priority of governmental funding is oriented to public intention that has larger demands as education, traffic, housing,….etc.

Public open spaces in Cairo are owned, constructed and managed by the government, most of which serve the middle and lower classes. As a result many of Cairo's open spaces are in dire need of repair and rejuvenation where not only money represents a major problem but also managing iy. The study argues that to overcome such problems, not only should funds be raised for the sake of open space, but also a trialogue between public/private/civil actors should be encouraged.

In Cairo, one of the rare successful examples of a trialogue taking place between the three parties is Al Azhar Park. According to the Project of Public Spaces (PPS), Al Azhar Park is listed among the 60 of the great places. The park's aim is to upgrade the site and shift it from a neglected and mistreated condition to a considered resource for the adjacent neighborhoods and the whole metropolis. The park is designed for the sake of the civil actors targeting their needs, where the main purpose of the park is to "launch a combined physical and social rehabilitation process in the neighboring area, the Darb al-Ahmar district". The construction of the park resulted from joint-efforts between governmental parties (as supplier of the land and facilitators for the agreements) and private sector (the Agha-Khan Trust in corporation with dedicated partners as the Ford Foundation and Swiss-Egyptian Development Fund) to support the ongoing rehabilitation process. The foremost task of public organization in the management of the space adheres to the standards. On the other hand, private sector plays a major role in guaranteeing the continuity of the park through their finance support and mutual benefiting from the space grounding it with a long-term assurance to public use. It was involved through the enclosure of income-generating services within the park, such as the hilltop restaurant and the lake-side café. Their existence facilitated the maintenance and enhancement of the Park to depend on an additional source of income (other than the entry tickets) and to become self-sustainable. The park is an award in the social, aesthetic and environmental scheme of Cairo. Proper maintenance, excellent management policies and assured financial support have made the Azhar park a

model to be followed. The case of Al Azhar Park raises a question of how are other public open spaces managed and designed in Cairo?

9.1 Scope

The paper is directed to investigate the effect of the interacting process taking place between the three parties on Cairo's public open spaces. Three types of public open spaces in the district of Nasr City are selected for such a purpose. Located to the east of Cairo, Nasr City was launched in the 60s as an extension to neighboring suburb of Heliopolis. Occupying nearly 250 km2 of Cairo, Nasr city was established to modernize and expand Cairo. It is known for its well designed modern road system, grid street system and well distributed public open spaces. An area of 1.57 km2 was selected in the 7th zone of the city as it embodies various samples of the three scenarios addressed in the study (fig. (1))

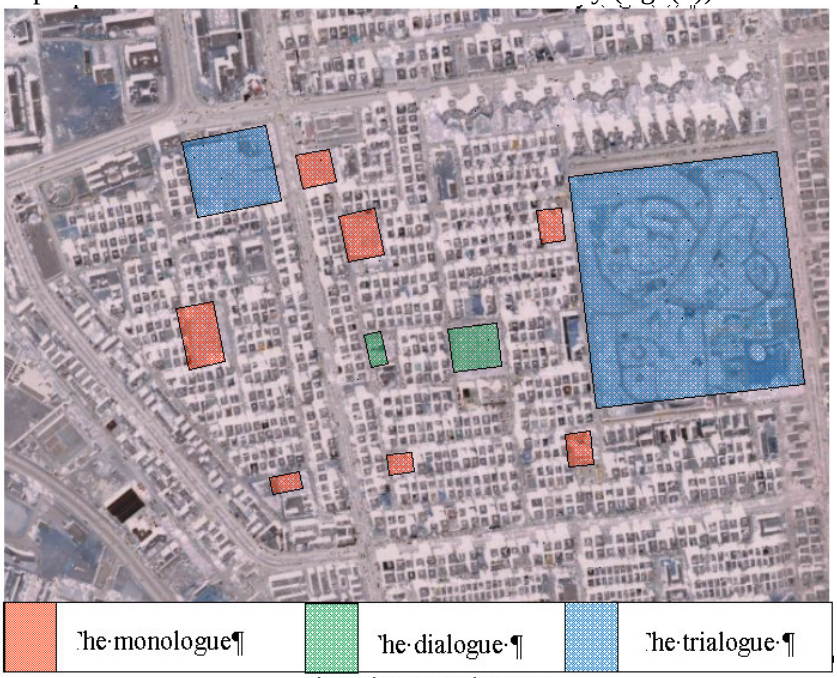

Fig.·1:·the·case·study·area¶

9.2 Materials and methods

The research work involved carrying out a quick interview, a closed ended questionnaire and an observation. The interview addresses the parties responsible of management and funding. Residents and users were given a questionnaire and were asked about their reasons for using or not using the open space. They were also asked to evaluate the quality of the open space through its components. Responses formats were closed in ranking scale from 0 to 5 where 0 stands for does not exist to excellent condition. The observation was carried out to support the collected data.

In sum the analysis of the study will be limited to the following issues:

Quality of space: What is the condition of the landscape elements? What are the types and variety of landscape elements? Is the space freely accessible?

Motives for use: Why do people visit the area? Why don't residents use the area?

Management and sustainability of space: Who manage the open space? Who pays for the up keeping of the open space and its renovation?

The paper has a descriptive character and no confirmatory nor predictor aims were set. Basic descriptive statistics have been applied to explore the end product of the interacting process taking place between the three parties and the type and quality of open space resulted from such interaction.

9.3 Results

In total, 250 questionnaired were distributed, where (61.6%) returned. The monologue approach results from the domination of the public organization on the design, management and control of public open spaces. They represent the one and only player in this scenario, causing a financial stress. The main target beyond such spaces is to create a green area within the urban fabric used for the public but constructed and managed by local districts. This situation is very common and such open spaces are distributed throughout Nasr City.

The observation and the analysis of the 46 collected responses of the questionnaire format revealed that public open spaces which have total governmental control not only need repair but are also characterized by their poor appearance. The basic greenery is the only characteristics of such spaces. No recreational facilities are embodied. Although no fees are levied for the entry of most spaces, no activities or participants were using the spaces, but few residents were jogging on the outskirts of the space.
The dialogue approach takes place between the public organisations and civil actors. The absence of the private sectors lead to a number of incidents that need to be clarified, one of which is prohibiting the access and use of the public through fencing such spaces where they are only enjoyed to be looked at. Civil actors are responsible of the construction and maintenance with the provision and approval of public organization. The main reason of their involvment is to prevent vandalism. It was notified through the 44 responses in addition to the observation that the quality of landscape elements are good and better maintained than the previous scenario. Most of these spaces are fenced for the fear of misuse and few residents were jogging by the out borders of the open space. At the most basic level urban public spaces must be public; where everyone can enter and should be welcomed, which is missing as a result of this dialogue.
On the other hand, the trialogue exisitng between the three parties transforms the public open space to a profitable space, where every single service is not for free. Public organization supervises and manages the space while the involvement of the private sector is for the sake of the investment and self sustainablity of the area. The Beautification of Cairo Organization is responsible of the management of such open sapces. Entrance tickets in addition to fees provided from commercial facilities within the open space cover the management and maintenance charges required for the sustainability of the place. It was found out from 70 collected responses and the observation that these open sapces are very good evaluated in terms of quality and variety. They are fenced and charged. Various actvities took place within the space and participants were observed jogging and walking by their boarders. The only noticed complain is that every single service or facitity is charged.

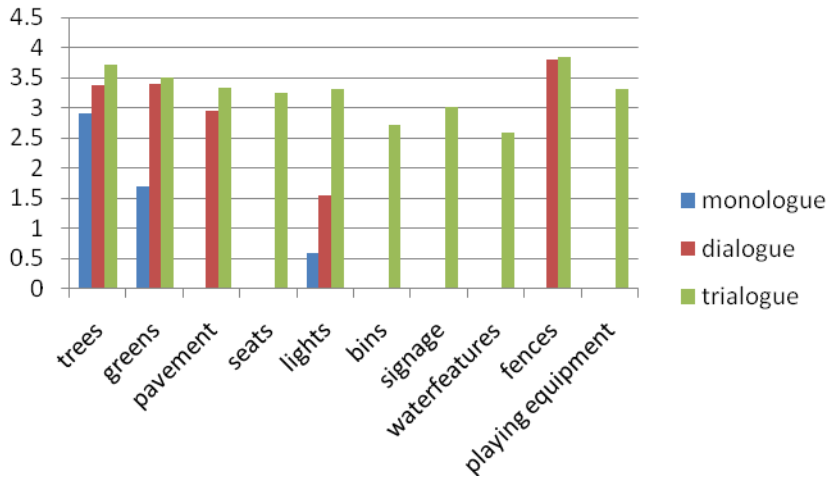

Fig. 2: the evaluation of the three open spaces

In sum, the dialogue between any two parties is better than the monologue but the trialogue is the best. Open spaces resulted from a dialogue process are not a full success in spite of their great role in knitting together the frayed urban fabric. The absence of one of the parties largely affects the success, existence and management of public open spaces, (figure (2)).
Moreover the same technique was applied to the azhar park, where 100 questionnaire formats were distributed resulting the return of 68 responses. The outcome result of the analysis when compared to the above results showed a relatively small gap between the park and the open spaces reflecting the triaalogue taking place in Nasr city. On the other hand, a huge gap was noticed between the trialogue and both the monologue and dialogue specially in terms of furniture and hardscape, figure (3).

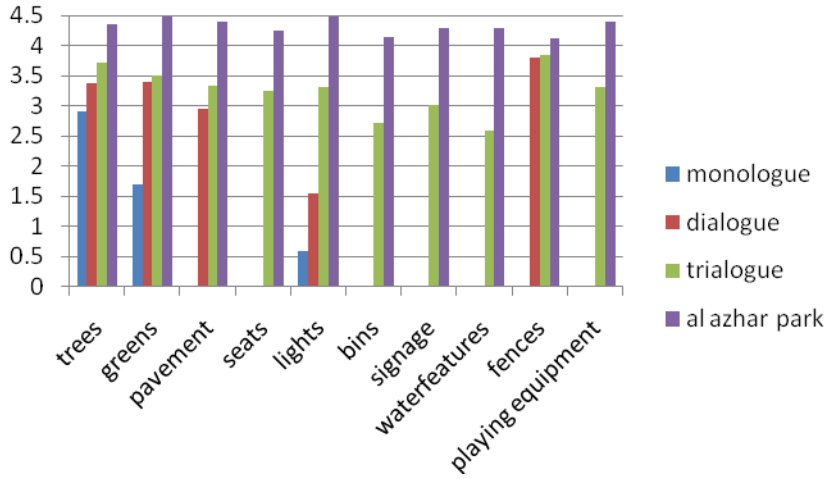

Fig. 3: the evaluation of the three open spaces in comparison to Al Azhar Park

10 CONCLUSION

Communication and encouragement from public organization to both private sectors and civil actors represent important pillars of urban planning. The keystone of the success of al Azhar Park stems from the trialogue between the three parties. The trialogue approach, despite its importance, is not a common approach in Cairo, though so far it has proven to be a success. Thus the paper calls for the construction of more public open spaces based on such approach to overcome the above stated problems resulted from the other two approaches.

As the paper demonstrates, private, civil and public sector partners provide better financing, marketing and management to public open space when worked together. The total control of only one party on public space changes the definition and experience of public open spaces. On the other hand, the absence of one of them leads to a failure in the contribution of public open spaces to communities. The period when land, offered by the government, would lead to the creation of a city-envisioned and successful public open space is gone. Public open space creation and redevelopment involve putting together the efforts of civil actors, private sector and public organizations within a planning program approved by the latter.

Each party has a critical role to play to help in the success of the trialogue. Governments should encourage civil actors' commitment through using community meetings and individual interviews to lead civil actors through the visioning process. This will not only overcome the problem of 'fenced public open spaces' but also will encourage good use of such spaces and support bonds between citizens and their communities. Moreover, governments should also encourage private sectors to be a fund source in public open space through offering various facilitators e.g. reducing taxes. Private sectors should in turn be more flexible and seek to invest in public open spaces. Civil actors must cooperate with their public organization and have more trust in them.

Due to the small size of the sample analysed and the preliminary statistics carried out, no general conclusions can be deduced about the evaluation of public open spaces in general. However some conclusive remarks can be made. Thus, the paper cannot tell what specific techniques should be used to create a successful public space, however, it shows that the success of such space depends on a combination of aspects; broad community cooperation, motivated financing and inspired management. Their involvement provides a sense of ownership which contributes to people's feelings of social, psychological and spiritual well-being. Moreover, their free use of most services maintains their belongingness to the place. In other words a comprehensive trialogue exists whenever contributors are targeting one goal; to obtain a successful, sustainable public open space. Shared goals between the three parties in this comprehensive trialogue largely guarantee the continuity of successful public open space and can supply a reference determinant for planners to visualize more sustainable city approach.

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reviewed paper

The u-City Index: Integrated planplementation of future ubiquitous cities

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1 ABSTRACT

Evolution of Information and Communication Technologies (ICT) has affected cities, government, and all type of organizations. Their adaptation is necessary for becoming competitive in a networked world. However, the pace of ICT evolution is faster than the speed of adaptation to these changes, and this difference (organizational lag) causes problems to civil servants and managers at all levels, customers and citizens (digital divide). The complexity and dynamism of city dimensions adds uncertainty and difficulty in understanding how to deal with diverse urban problems. This is a dilemma that city managers have faced since the 1990's with the rise of the Internet and that will become more complex with the rise of ubiquitous computing: u-Cities. Therefore this paper analyses issues surrounding the development of digital cities and the future u-City concept and proposes the requirements of an integrative framework, the u-City Index, for long term planning, implementation and monitoring. Grounded theory is used as main approach for gathering, analyzing and categorizing academic articles and reports to identify the requirements and form a propositional framework based on literature and previous empirical research. Moreover, international research background (500 ICT initiatives and projects), helped with additional insights on understanding and structuring digital cities and u-cities, their organizations and ICT initiatives. The study moves away from Jane Fountain (2001) technology enactment framework and extends it to a multi-organisation, multi-functional and multidimensional perspective. Additionally, the requirements will help in defining a model or framework that can be used as a tool for benchmarking by city managers and policy makers.

2 INTRODUCTION

2.1 Strategic importance of the u-City Index

Complex issues are involved in every city. This entity is dynamic and involves economic, cultural, social, political, environmental and technological areas. Moreover, in the last decades of the XXth century, with the appearance of the always evolving Information and Communication Technologies (ICT), uncertainty becomes another challenge that Society has to face and embrace. Civil servants, managers, customers, and citizens have been learning the best ways of using ICT in order to bring diverse types of benefits to Society, for example, the most common, increasing productivity, economic development and as a result wealth. However, success of ICT initiatives has been a challenge, and most of the time they don't achieve their promises resulting in a phenomena named productivity paradox. Organisations spend more time, effort and resources than the clear benefits expected they suppose to obtain. ICT doesn't help much either because initiatives that are innovative, useful or productive one year, the next year become obsolete or not trendy. Therefore is difficult understanding the city complexity when ICT has become too uncertain because its constant evolution as a result of unstoppable innovation. Without the variable of ICT, a city can be studied and managed strategically according to individual areas separately. Nevertheless, the more increasing use of ICT by all organisations and individuals within a city means that a more integrated way of understanding is necessary in order to avoid the productivity paradox. With the raise of computers, then the Internet, the need of integrated models was evident in order to make government departments work together in providing services. Now, with the raise of ubiquitous computing technologies (UCT), it is a paramount the use of integrated models as not only departments but also different organisations within the city will be involved in the delivery of services and products either in company towns -cities created as a new product and business model offering ubiquitous computing services- but more challengingly in old or contemporaneous cities. This paper explores the different concepts, including ICT, cities and their organisations that are important for the creation of the u-City Index which can help in the strategic management of a city using ICT and UCT. This conceptual study covers a range of previous literature and analyses its strengths and limitations when applying these concepts to Digital Cities and u-Cities. In this paper, u-Cities (Park, 2007; Jung et al, 2007; Misuraca, 2009; Anttiroiko, 2009) are considered a natural extension and evolution of Digital Cities. Therefore, u-Cities are analysed from a Digital City perspective when embedded within the fabric of old or current cities. Considering institutional and organisational views this approach to studying Digital Cities can also apply to company towns as the complexity in planning and implementation of ubiquitous initiatives is less than in current cities. The contribution of this paper is based on bringing another perspective to the development of u-Cities where urban planners can foresee future challenges if the next step of u-Cities is

focused on an integration into the context and infrastructure of current cities and not only remaining as company towns.
First, it looks into ICT evolution and its effects on Society, people and organisation. In this part, this paper explores the impact of technology and ICT on different human generations and their response over time. Also it looks at the effect of ICT on organisations and the concept of productivity paradigm. This approach is necessary for understanding the way "digital immigrants" have been developing products and services for "digital natives". The second part focuses on the evolution of the city concept, the different approaches used in studying it and for performing strategic management, including planning, implementation and measurement in a city or a city-region and not only local government. This section lays out the elements necessary for strategic management as well and the different types of organisations within a city. The third part researches on the evolution of organisational issues within a city and its relation with strategic management including recent trends. It also seeks understanding on integrated assessment models and tools that can help in understanding and managing the city. The last part of this section brings concepts from section one (point 3), two (point 4) and three (point 5) for proposing and defining the requirements for strategic management of the u-Cities of the future and the characteristics that the u-City Index should have. It also discusses the shortcoming of this approach and explains futures important areas of research at organisational level.

3 ICT EVOLUTION

3.1 Drivers behind technology innovation: ICT

Society evolution has been heavily influenced by technology innovation since the Industrial Revolution. As Perez (2001, 2002a, 2002b) explains, six waves of technology have surged and they have changed the way people live by creating new products and providing new services. Technology research uses the previous waves gradually and incrementally in order to rise, mature and decline. And in this cycle that lasts around 50 years, individuals, organisations, institutions and businesses adapt their processes to the new technology. For example, the current wave of technology revolution, ICT, has modified the way people and organisations interact, either offline, online, or in an asynchronous or synchronous ways connecting more people and increasing the transactions between them.
Each wave of technology has achieved a golden age of wide prosperity. However, it is necessary the provision of resources and technical support to the community, businesses, government and institutions, in order to tackle directly the issue of improving the local level of living.

3.2 Impact of ICT on Society

Users have embraced ICT with enthusiasm and from being a few thousands in 1995, they have increased to around 1800 millions people, around 25% of the World population, in 2010 (Miniwatts Marketing Group, 2009). The Internet has been increasingly embedded in the operation of businesses, universities, research centres, NGO's and government, therefore, users have been able to participate in different activities that have changed their level of interactivity rapidly over time, for example, one-dimensional publishing of information or reception of sales requests by email in 1997 to e-commerce or tri-dimensional augmented reality in 2010 or even the future everyware (Greenfield, 2006). Another example, online communities, have used different types of software technology that have evolved from mail-lists and discussion forums, to dynamic portals, weblogs, chats, instant messaging, video conferencing, mobile texting, tweeter micro-blogging, Virtual Worlds and Google's waves. Also access devices have also evolved from the first desktop computer in the 80's to super fast, portable and multimedia enhanced devices including laptops, handhelds, i-pods, mobile telephones, tablets and computers available in Internet kiosks, cyber cafes, public libraries or within any private or public organisation. Therefore, it is not difficult to envisage the effect of ICT on our Society either in economic, social, cultural, political, or environmental terms. Academics have studied the beginning of the Internet using a technological determinism approach, however, an opposite perspective like the social strategic choice model, has been used for explaining the reasons behind the use and diffusion of these ICT innovations as well.

3.2.1 Generations

Society moulds technology according to its needs as people decide. Nevertheless, the reasons behind these decisions are based on people's personality which is developed because human generations share a place in history and have events, images, and experiences in common. Members of a generation are profoundly affected by the personality of their peers or generation as Zemke et al (1999) argue. Technological

innovations like ICT, available as a generation matures, influence their behaviour, attitudes, and expectations because people internalise them for shaping information access and use, and ways of communicating (Oblinger and Oblinger, 2005). Thus, the understanding of future usage of technology and also decision making, needs to address the differences in human behaviour and nature derived from an evolving technology that is upgraded by each generation. Figure 1 shows the influence of technology in different past, present and future human generations.

3.2.2 Productivity paradox

Organisations have allocated big budgets for ICT, however, these investments have not obtained the benefits expected. Luftman in Vehovar and Lesjak (2007) has reported that one-third of ICT investments are wasted with no real return. In addition, there are many challenges when measuring ICT productivity within an organisation because the novelty of this type of technology. Sigala (2003) studies the ICT productivity paradox by assessing the ICT productivity impact that overcomes shortcomings such as measurement errors, redistributions of impacts, or ICT mismanagement. The author found that the introduction of ICT into poorly run firms does not increase productivity whereas the the ICT introduction into well-run firms pays-off. The reason of this success or failure is linked to the exploitation of ICT network/integration, informational and transformational capabilities and aligned with business strategy and operations. Therefore there are other factors including not only technical but also organisational and integration capabilities that needs to be considered when planning and implementing an ICT initiative in any organisation, and therefore in digital and u-Cities.

	Matures	Baby Boomers	Generation X	Net Generation	U Generation, Ami NanoBoomers	Grid Generation
Birth Dates	1900-1946	1946-1964	1965-1982	1982-1991	1991-2015	2015-?
Description	Greatest generation	Me generation	Latchkey generation	Millenials	Ambience Intelligence generation	Quantum generation
Attributes	Command and control	Optimistic, Workaholic	Independent, Skeptical	Hopeful, Determined, Digital immigrant	Highly educated, Mozart effect, Optimistic about their future, Confident, Conformed but not conformist, Peter Pan effect, Tech-dependents, Digital natives, Media-content creators	?
Likes	Respect for authority, Family, Community involvement	Responsibility, Work ethic, Can-do attitude	Freedom, Multitasking, Work-life balance	Public activism, Latest technology, Parents	Social media, Home, Techno-leisure, Ultra-connected cities, Environment and social responsibility, Brands, Living and socializing online, Seamlessness, Trust	?
Dislikes	Waste, Technology	Laziness, Turning 50	Red-tape, Hype	Anything slow, Negativity	Lies, obscurity, falsehood	?
Technology	Nylon, Acrylics, Cars, Mechanical calculators, Dial telephones, 78 rpm records	Mainframe computers, Touch-tone telephone, 33-45 rpm records	Personal computers, CD´s, E-mail	Multifunctional devices, MP3´s, Mobile telephone, PDA´s, WWW, Multimedia, Communication-centric, Internet 1D (push)	E-appliances, On demand, Video calling, VoIP, Interoperability, Nano medicine, Ubiquitous networking, Internet 2D (share), Internet 3D (live)	Grid, Virtual Reality, Aura, Teleimmersion, Augmented reality, Photon computer, Internet 5S (feel)

Figure 1. Technology and generations. Based on : Tapscott (1999), Hanson and Hanson (2003), Hempel (2005), Oblinger and Oblinger (2005), Cahil et al (2001)

4 CITY EVOLUTION

Different ways of understanding the city, and using this knowledge for further development of it, have been used since the first village was built in ancient times.

4.1 The study of the city

Especially over the 19th century, the development of towns and cities, with the implementation of technology after the Industrial Revolution (Hall, 1992), has been influenced by the appearance of more specific theories including general systems (Low, 1982; Erkut, 1997; Taylor, 1998; Ritzer, 2000; Juniper, 2002; Coelho, and Ruth, 2006), urban systems (Marshall and Smith, 1978; Walton, 1979; Newton, 1984; Mitchell-Weaver, 1991; Boix and Trullen, 2007;), organic theories (Auster, 1990; Revetz, 2000; Rotmans and Van Asselt, 2000) or new approaches (Van Winden, 2003; 2005) in the first decade of the 21st century, and some of them have been influenced by the sustainable development agenda. The appearance of urban intelligent management (Stubbs et al, 2000) and regional systemic competitiveness (Malecki, 2007) as new advanced ways of city management have become also, at the same time, a great challenge for the city.

The study of the city has been influenced and dominated mainly by geographers or economists who look to bring in their quantitative scientific approach sometimes using single cases. However, empiricism presents many flaws because the difficulty in collecting accurate and direct data (Boix et al, 2007; van Winden and Woets, 2005), inappropriate design, or without following accurate and proven methodologies. Also, researchers analyse causes and effects isolated from other dynamic city issues. Therefore, despite all these works being theoretically and empirically interesting, this body of work taken together cannot be used to generalise as these studies lack of coherence (Wolman, 2008).

4.1.1 ICT and the city

The different policies and strategies that cities implement through local authorities and private organisations are important to increase the use of ICT's. Since 1990's, research on the different ICT's effects on cities has been carried out. Internet has evolved from being a letter-based system of communication for academic and military services to a multimedia platform that allows organisations, citizens and government to make multiple transactions independent of time and space. Studies show that implementation of citywide ICT projects has been done independently and without considering interactions with other citywide ICT systems. As a result there is a lack of coordination and therefore increased cost or failure of initiatives. Because an integrative approach on the development of ICT practices in cities doesn't exist and academic research on this topic is almost non-existent, then this becomes an area of great potential for research.

Different approaches have been used for studying the urban and ICT phenomena including sociology (Castells, 2001), urban studies (Mitchell, 1999), technical (Ishida, 2000), organisational and measurement. In the case of Digital Cities conceptualization, the focus has been on the action based approach (what industries should be supported to promote and foster urban competitiveness?), visionary approach (how the digital city future should be achieved?), taxonomic approach (what organisations or elements should the digital city have or embrace?), infrastructure approach (what ICT component should a digital city include?), virtual representation approach (what type of non-physical representation should the digital city have?), information landscape approach (what type content or information should the digital city produce?), and measurement approach (how the digital city should be monitored, measured, benchmarked and assessed? and how much information of the digital city needs analysis and collection?). Most of these approaches also apply to u-Cities (Foth, 2009) as they extend the concept Digital Cities. However, it is important to point out the differences. For example, u-Cities have been developed in the first decade of the XXIst century as company towns, entirely new. Digital Cities in the other hand have been embedded in most of the cases in the fabric of an old or current city. This is one of the challenges that urban planners need to foresee if the next step of u-Cities is their integration into the context and infrastructure of current cities. It is very different creating a new city as a product and with a fit-to-purpose business model than updating or raising an old city to these new standards, especially because this change involves a lot of complex institutional and organisational issues that even Digital Cities are still facing.

In the past, cities have been shaped by water channels, roads, or other important infrastructure (Graham and Marvin, 1996). Nowadays, ICT drives the transformation of the city partially or fully by bringing in new strategic dimensions around the technology benefits, for example, cities aspire to become a Electronic City, Digital City, Knowledge City, Innovative City, Intelligent City (Neves, 2009) or u-City (Greenfield, 2006).

4.2 Approaches to strategic management of the city

As this papers mentioned above, uncertainty and constant innovation are characteristics of the ICT wave of technology. Planning, implementation and measurement of ICT initiatives (Asgarkhani, 2006), either of products or services, and for becoming more competitive in a global market, has a long trajectory in individual companies. Therefore, the strategic management of the city needs to consider tools, techniques and methodologies that can be adapted from the private sector to public, non-for-profit and government organisations but with the challenge that they need to integrate, and be multidimensional, multifunctional and multi organisation in order to avoid the productivity paradox and failure of ICT initiatives from Digital Cities or u-Cities. In order to understand the importance of strategic management of ICT in a city, it is necessary understand the effects of failure (Misuraca, 2009), competitiveness (Heracleous, 2003) and the intertwined factors such as coherent integration of ICT, people, and processes (Gupta, 2006; University of East London, 2006)

4.2.1 Planning the long term future of the city

Planning in cities has been through different phases including simple sequential planning, rational planning, disjointed incrementalism, master plans, local development plans, collaborative planning, and recently planning support systems (Vytautas, 2004), online public participation (Yigitcanlar et al, 2003) or recently throughout participatory urbanism (Greenfield and Shepard, 2007; Myungjun and Soon-Tak, 2010). In most of the cases, this activity is lead by local government; however, these plans have been focused in the short or middle term mostly. Since 1990's cities have started using new styles for strategic management (Taylor, 1997), for example, foresight techniques for creating their future throughout long term planning (Bredernoord, 1997) and in order to achieve a competitive positioning in the global network of cities by performing a more integrated urban planning. Strategic conversation is one of the most valuable outcomes when developing city scenarios as it involves the participation of diverse actors, and also the analysis of multi dimensions, multi functions and multi organisations (Song et al, 2006); however, despite the value of this technique, very little has been researched on the important factors for transforming foresight into short and middle term plans, operational strategies, actions and using a broad number of measurements in cities.
Heracleous (1998) explains that a dialectical view of strategic thinking and strategic planning, according to two main positions on the proper meaning and interrelationship between the ideas of Henry Mintzberg and Michael Porter, should be considered in strategic management. He says that Mintzberg believes that strategic thinking and planning involve distinct thought processes, the former being creative and the latter analytical; whereas he mentioned that Porter believes that strategic thinking is achieved by utilising analytical tools. Prevalence of the analytical is detected in current strategic management of ICT initiatives implemented by government. Heracleous points out that Porter drew attention to the need to understand both the cross-sectional problem (the causes of superior performance at a given point of time), and the longitudinal problem (the dynamic process by which strategies are arrived at). Porter's contributions have tended to focus on the cross-sectional (implementation) rather than the longitudinal problem (long term planning), and in the other hand, Mitzberg's contributions have tended to focus on the longitudinal rather than the cross-sectional problem.
Considering thoughts from Mitzberg and Porter, a useful strategy tool, for analysing the present and foresee the future could have the look as shown in figure 2.

4.2.2 Implementing short and middle term plans of the city

After defining city plans, the next important step is their implementation that is achieved throughout the creation of initiatives or projects and supported with organisational capability in the form of governance, resources and actors (Waring and Wainwright, 2002; Peansupap and Walker, 2005; Anumba et al, 2006; Gajendran and Brewer, 2007; Vehovar and Lesjak, 2007); therefore, skills (Hwang, 2003), training and attitudes are important factors, and in the case of ICT, age plays also an important role on the productivity of these projects as older employees need to be retrained (Spacey et al, 2003; De Koning and Gelderblom, 2006). Knowledge and experience on ICT are vital for understanding the organisation ICT readiness, having awareness of the technology and its maturity, and the potential benefits of integration with other technologies, understanding of the business processes, managing the competitive advantage due ICT in the business environment and defining budget. ICT implementation is about people related issues of effective change management, knowledge transfer and leadership by a champion and adoption team to sell benefits and support users (Peansupap and Walker, 2006).

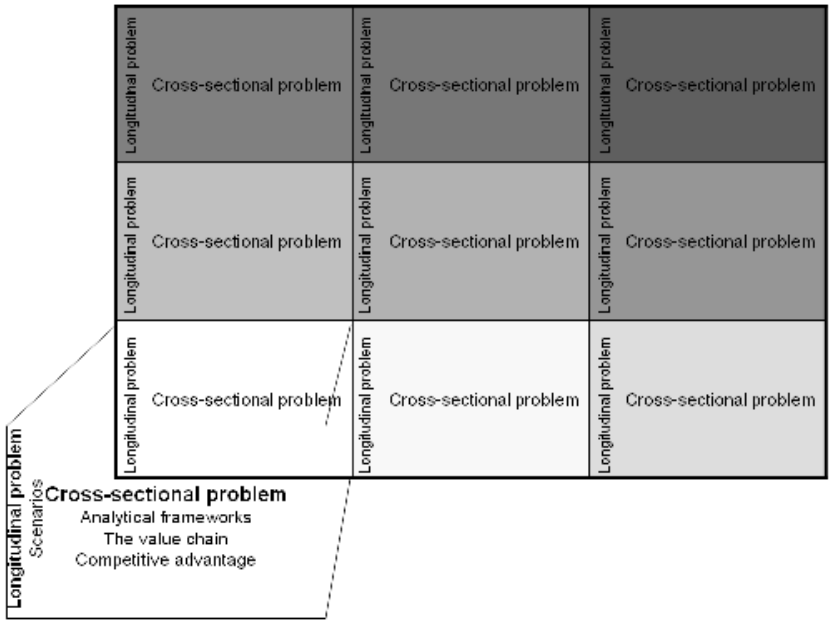

Figure 2. Tool for reducing uncertainty in strategy and policy

There are different organisational models (Winden, 2005; Klaasen et al, 2007; Weerakkody et al, 2007) for implementing ICT plans in cities including inter-city or regional networks models similar to the e-City Network in Scotland, intra-city network models as the Digital Birmingham partnership in England or Barcelona Informacio in Catalunya, single-organisation models as used by Maroussi City Council (Ergazakis et al, 2007) in Greece or other different e-government initiatives (Deakins and Dillon, 2002; Gent, 2003; Melitski, 2003; Davison et al, 2005; Ebrahim and Irani, 2005; Yoon and Chae, 2005; Beynon-Davies, 2007; Holzer and Kim, 2007) which are frequently developed by local authorities but under request and budget of a central government demands office (Weerakkody et al, 2007). In the case of ICT initiatives, standard methodologies like PRINCE are widely used by local authorities in the UK. The success of an implementation depends not only on avoiding technological lag, but more importantly reducing organisational lag in every organisation involved in the development of the Digital City or u-City.
every organisation involved in the development of the Digital City or u-City.

4.2.3 Measurement of the city

Vehovar and Lesjak (2007) argue that objective measures of ICT investments (cost-benefit analysis, returns on investment, and balanced score cards) are still not very well developed and there are inconsistencies in their methodological issues, and also they are affected by the increased quality of new products/services, time lags, organisational changes, skills and education measures, innovation-related activities, age and size of the organisation, sector and international position. In addition, only one-fifth of companies, for example, apply some of these formal approaches to evaluate their ICT investments. The author analysed 500 ICT city initiatives between 2001 and 2004, and found that international, national, local institutions and city organisations, have suggested hundred of indicators for measuring ICT including usage, infrastructure, economic impact, environmental benefits, regeneration power, improvement in quality of life, crime reduction, cost and time reduction of public services, innovation, social and cultural matters amongst others. However, very few of these organisations have succeeded in providing comparable data over time and across different cities, regions or countries and considering the entire range of devices and software of the ICT industry. Also, it is important to point out that many of the results in rankings, benchmarking exercises, or awards, suffer inconsistencies, lack of clarity in methodologies and exist subjectivity in definition of ICT concepts. In many occasions the influences on measurement systems are result of political hidden agendas.

4.3 Organisations of the city

In order to study the city with integrated tools, it is necessary identifying the clusters of organisation existing within the city and normally used by the city decision makers. Mino (2001) classifies digital cities projects according to vertical sectors including urban transport, environment, education, healthcare, administration, tourism and inter-sector integration of services. In his study, Mino states challenges and roles that local authorities might take when dealing with ICT. For example, managing technical complexity of integration,

managing organisational complexity (re-engineering of public administration and processes required to introduce ICT), defining the appropriate policy and regulations to guarantee affordable and equitable services, and promoting organisational change with tight controls on public expenditure and demonstrating ICT benefits to all relevant actors. He also defines three main areas of application of digital cities, namely, economic development or regeneration, social cohesion and quality of life, and administration of the city and management of IS infrastructure. Wong et al (2007) considers different concepts of e-governance, e-democracy and e-community, and matters of e-government organisations as well. Urban competitiveness is also linked to ICT and influenced by the strategic management of ICT infrastructure (Drewe, 2006; Van Winden and Woets, 2003; Van Winden, 2003; Yoon and Chae, 2005). E-Government is also considered as an important dimension within a city (Deakins and Dillon, 2002; Melitski, 2003; Holzer and Kim, 2007).

5 ORGANISATIONAL EVOLUTION WITHIN THE CITY

5.1 From single to multiple organisations relations

Organisations within the city have a long history of doing projects independently, however, with the rise of the Information Society they have to relate to other organisations or institutions in order to innovate and use ICT more productively. Therefore, ICT becomes a driver of innovation within urban institutions and organisations in order to solve challenging problems (Johnson, 2008), and adopt a new category of policy and new style of policy development that engage in regional foresight exercises for identifying assets, undertaking collaborative processes of planning, implementation of change, and encouraging mindsets and different ways of developing ICT innovation in cities and regions (Athey et al, 2008) to foster growth (Wolfe and Bramwell, 2008).

According to Swanson (1994), Information Systems innovation means that the new ICT technology is effectively meshed with organisation design, process, strategy, and external relationships throughout the enterprise. The importance of Information Systems innovation is based on the increasing internal and external processes of computerisation within businesses, or city organisations. Mulgan and Albury (2003;2005) analyses the importance of innovation in the public sector by summarising five main types of innovation related to provision and delivery of public services and also barriers. External factors that local government managers need to pay attention are the new political environment (national government), public dissatisfaction with the quality of service, availability of IT and professional help. These are key factors that influence the early adoption of Information Systems. The internal factors involve defining local champions and increasing technological awareness in order to benefit from resource mobilisation and both are relevant in the full adoption of the innovation (Watad, 1999; Mustonen-Ollila and Lyytinen, 2004). Diverse theory and models can be used for analysing ICT innovations, including the Technology Acceptance model, Marcus's Theoretical model of adoption, Diffusion of Innovation theory and other factors (Bates et al, 2007).

Fountain (2001) introduces her theory of technology enactment and argues that organisations (norm and control institutionalised by social networks and commitments) are not using the full capability of their information systems neither leverage their strategic potential because organisational actors are not aware of the potential of their technological systems or they give priority to personal interests instead of objectively seeking to exploit the technological capability fully. For this reason, the Internet and decisions regarding its use in organisations by non-technical decision-makers, is a clear example of decision-making under uncertainty due the uncertainty of technology evolution but also because the cognitive, cultural, social, rational and political logics. Schellong (2007) extended Fountain's framework by including citizens, businesses and communication, and relations between the different actors and objectives. Norris (2003) argues that in order to study IT and government, it is necessary look at innovation in organisations and socio-technical systems theory before considering Fountain's technology enactment theory. He emphasizes socio-technical systems theory because the adoption, use, and management of ICT by governmental organisations and the effects of ICT on these organisations can be examined and understood from a systems perspective.

5.1.1 Integrated assessment

Rotmans and Van Asselt (2001a) state that Integrated Assessments (IA) are useful for analysis of real world complex problems operating at different levels in time and space, and with high uncertain stakes. Rotmas and van Asselt (2000) study ways of managing evolving cities and propose an integrated approach for sustainable city planning. They use an interdisciplinary angle versus the traditional economic approach to city planning. Their dynamic model information system is focused on strategy operation and for this they use an integrated city planning tool and a participatory process. The tool helps in measuring current and future city development while considering the complex dynamics of cities. Therefore they integrate physical

infrastructure (spatial planning, housing, transport, urban water systems, waste and food, ICT), socio-cultural infrastructure, city economy and its environment. Moreover, the tool makes explicit all flows in and out within an imaginary city in relation to the existing stocks (interrelated reservoirs).

During the first decade of the XXIth century diverse integrated self-assessment tools, guidelines and models for ICT strategic management have been developed by varied city and non-city related organisations. This group of management devices include the e-City Index (University of St Andrews), KnowCis (National Technological University of Athens), Digital Local Agenda (UNITAR), Council of the Future (SOCITM), Manual para el desarrollo de las Ciudades Digitales en Iberoamérica (AHCIET), Community Accelerator (Intelligent Community Forum), The e-Government Handbook for Developing Countries (InfoDev World Bank) ; however, despite the good intentions in bringing direction to cities, these tools have a lot of deficiencies as most of them focus on short and middle term implementation; therefore, they lack of strategic view of cities for the long term. Other of these tools lack of operational standardisation and are presented with a heavy technical language or without enough broadness to embrace all types of cities, allow city comparisons or more frequently focused on e-government (Yang and Rho, 2007) only. Also they are time consuming as they seek a great level of quantitative detail, are very costly, don't enhance strategic conversation in many cases, or lack of follow up actions in others and don't provide a straight forward guidance that non-technical decision makers can rely on or use easily for integration in the process of city development, for example, of civil servants, managers and directors of any city organisation; therefore if used individually, these tools are missing the strategic and operational aspects necessary for long term investments in a city. However, also complementarities exist between some of these tools as the deficiencies of one are complemented by the features of the other and vice versa.

5.1.2 The u-City Index

After analysing ICT, city and organisational issues, this paper brings these concepts and proposes a list of requirements that the u-City Index should have in order to be relevant for managers of the future ubiquitous cities from a strategic planning, implementation and measurement, or integrated planplementation perspective. With these requirements different strong strategic management devices can be developed for helping in improving the success of Digital Cities and u-Cities.

<table>
<tr><td colspan="2">ICT view

It considers ICT and UCT uncertainty and mastery of innovation.
It focuses on company towns and current cities.

It helps in avoiding the productivity paradox.</td></tr>
<tr><td>iew

• It is multi dimensional – applied across different areas including waste, transport, carbon emissions, economic development, culture, health amongst others.
• It is multi functional – applied to the value chain of city organisations.
• It is multi organisational – applied across different organisations including local council, universities, schools, hospitals, police, businesses, and others.
• It is contextualised - supporting the integration and alignment with local or regional strategy and operations.
• It integrates long term planning and implementation.
• It envisages different futures.
• It doesn't add more work to city managers.
• It facilitates strategic conversation amongst city organisations and actors.

• It has a simple measurement and benchmarking system supported by evidences.</td><td>Organisational view

• It guides innovation in city organisations.
• It is a proxy or complementary to other existing strategic management devices used for innovation.
• It can be used for research and comparisons over time and between cities, and city organisations.

• It considers the context, organisational and institutional challenges of city organisations.</td></tr>
</table>

Figure 3. Requirements for an integrated planplementation of future ubiquitous cities

Limitations of a city integrative approach could come from a restrictive policy and laws on privacy (Castells and Cardoso, 2005) that affect the integration of citywide projects. As this perspective differs from the current approaches to city planning, therefore will need to be improved constantly throughout empirical and focused research in order to cover all the aspects that affect a city, its organisations and citizens. A model

that reflects the requirements is needed for evaluating this new approach to city planning. This model will also have to be validated by city managers and academics.
Further research is needed considerably in the area of Digital Cities and u-Cities. After defining the framework or model of the u-City Index, a research on the impact of age and ICT knowledge and experience will open the enquiry to this new approach to understanding and managing cities. Also research has to focus on the usage of integrated assessment tools for identifying organisational or institutional factors, independently of the type of tool used, as Fountain (2001) suggested and that affect decision making.

6 CONCLUSION

This paper identified contributions from ICT, city and organisational studies for defining the requirements of the u-City Index, a model or framework for helping managers and civil servants in the strategic management of Digital Cities and the future u-Cities that can be developed in company towns but also current cities. By understanding issues of past, present and future city planning and also the nature of ICT, and its effects on innovation of organisations, this paper provides an insight on the complexity of managing cities, Digital Cities and u-Cities. At the same time, it identifies the important factors for reducing uncertainty and improving success of ICT initiatives considering the city as a unit that is multi functional, multi organisational, and multi dimensional. This conceptual study deep the understanding of application of integrated assessment tools by cities, an area that has not been researched profoundly by the academy.

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Towards True Underground Infrastructure Surface Documentation

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1 ABSTRACT

Underground infrastructure becomes more and more important in urban development. Building and maintaining tunnels typically involves three phases: construction, monitoring and repair. Throughout all three phases engineers increasingly demand a visually and geometrically exact digital representation of a tunnel surface involving both high resolution imagery and laser scan data. These requirements pose a challenge to all phases of the visualization pipeline.

After retrieving geo-referenced geometric and image data with a surface resolution in the range of 1mm and better, novel processing and mapping techniques are applied to enable a fast and efficient rendering while preserving high sensor data quality.

Visualization of such data requires the handling of huge amounts of 3D Points, high-resolution textures and additional graphical elements that explain the context of the displayed data. Without additional processing the sum of this data exceeds the capacities of both the graphics card and the main memory.

The paper describes how a tunnel of several kilometers length is digitalized by range laser scanners and cameras, processed into an efficient data structure and finally integrated into a fully interactive 3D visualization combining multiple data sources for real-time display and interpretation.

2 INTRODUCTION

The quality assessment and - control of roads, tunnels, railroad tracks, water channels, airport runways and other linear structures has been an issue ever since such structures were in use. The documentation of surface defects in terms of location, physical and geometrical properties, amount of damage, and visual appearance is not only important for safety reasons. Frequent maintenance relies on the detection of potentially hazardous defects to initiate focused correction measures at an early state to save costs due to small interventions, keep the risk level low, and avoid unexpected closures of traffic lines.

First means of inspection were based on the human visual system, assisted by mechanical measurement devices, chemical and physical tests on manually selected points of interest, and the installation of simple geodetic monitoring devices. Hand- drawings and notes were used for localization and context description of defects, followed by photographic documentation. The history of changes became important when a unified quality management came into existence.

Nowadays high-resolution vision sensors are available to map the surface of linear structures. Laser scanners, digital cameras, mobile platforms that host sophisticated suites of such devices in combination with navigation abilities, and the relating on-site Hardware and Software data acquisition means collect consistent sets of geo-coded 3D structure and texture information. A solution to the challenge of maintaining the huge amounts of data involved, while providing an ergonomic and user-friendly access to the relevant stages of information is content of this paper.

3 RELEVANT WORK

The measurement and visual surface inspection of linear structures using passive and active vision sensors started to be a well established application area of digital vision metrology about 10 years ago. Several systems for linear structure surveying, in particular tunnels, are on the market with different approaches and sensor configurations, most of them using laser scanners in frame scan (Amberg 2010, Fröhlich 2004), or line scan mode (Spacetec 2010). Road profiling with a resolution of several cm has been covered by mobile mapping approaches using Inertial Measurement Unit (IMU) and Global Positioning System (GPS), for example with the MoSES (Gräfe 2004) system which also applies digital cameras, or the Austrian road condition monitoring device RoadStar (Arsenal 2010). With the Dibit system (Dibit 2010) a first

photogrammetry-based solution for tunnel excavation monitoring was presented in 1999. This application segment is also covered by an Austrian provider using static laser scanning (Geoconsult 2010). For geologic excavation documentation the high spatial and radiometric resolution of digital stereo images has been well established (Gaich 2004).

The combination of laser scanning and high-resolution digital images underwent some recent research (Abmayr 2004, Ulrich 2003). A combination between laser scanning and digital camera (Paar 2005) turned out to be robust in the tunnel case. In the first stages of application the measurement of tunnel surfaces during different construction phases (excavation, shotcrete, segments of TBM-Tunnel Boring Machines, final lining) was emphasized. With growing textural surface resolution the technology is also suited for the inspection and the inventing of existing tunnels and it is even able to support the remote mapping of cracks (Paar 2006).

Although great strides have been done during the last years in bringing visualization to the attention of the engineering community, it has not yet been universally accepted as a tool for typical engineering tasks. Visualization of linear structures such as tunnels represents a great opportunity to remedy this lack, and apply some of the recent visualization techniques of multi-dimensional data (Aigner 2007) to a technical problem. One of the main features of structure visualization is the time-dependent nature of the data (i.e. there are multiple data sets from the same structure, representing different snapshots of its state). Although some of the work on time dependent data (Kosara 2004, Piringer 2005) can be applied to this task, it has to be adapted, since in previous research time is mostly represented by a continuous dimension, as opposed to the discrete nature of the time-dimension in the problem at hand. Nevertheless some of the techniques for handling large data can be applied and extended in order to deal with the huge amount of data provided by structure scanning.

Since it was possible to acquire and export data in an ordered fashion the data at hand can be processed similar to a height map. Since graphics cards of the last two generations offer a high triangle throughput a simple multiresolution level of detail rendering approach was chosen as described in Lübke (2001, p.187). Since laser scan data is point based one could also consider a system similar to QSplat (Rusinkiewicz 2000).

QSplat assumes arbitrary points and does not consider the advantage of ordered point sets, it offers however a sophisticated data management approach to deal with large point sets.

As it will be discussed in later sections specific data requires to be rendered as polygonal lines in 3d space. Shader based approaches as discussed in Akenine-Möller (2008, p.528) have been considered, but neglected since they might be difficult to integrate and combine with the other rendering. Volumetric lines (Nvidia 2010) did not yield convincing results due to artifacts. In the end a simple and fast polygonal approach was chosen as it is described in more detail in section 5.

4 DATA ACQUISITION & PROCESSING

4.1 Data Acquisition

The data acquisition system is based on state-of-art vision sensors (e.g. laser scanners, digital cameras). The whole system is moved through the tunnel by means of a mobile platform (Figure 1). Data acquisition takes place either on certain positions (stop-and-go mode, using spherical laser scans) or continuously moving (dynamic mode, using a stream of laser lines). It typically produces data consisting of rectangular arrays of scan points, and a number of images that overlap this scan area. A number of such – ideally overlapping – 3D and texture data sets represent a tunnel.

Figure 1: Data acquisition platform equipped with laser scanner and camera (left, center), tunnel site(right)

In order to facilitate merging of several scans the global orientation of the system must be known. It is determined either by exterior measurement using a radio-controlled theodolite, by vision data acquisition of known targets (Kaltenböck, 2004) or by using odometry in combination with an inertial navigation system (INS). The individual sensors are oriented relatively to each other in a pre-calibration step. The orientation between different vision sensors on the same sensor platform is further refined by texture matching on measurement data level (Paar et al., 2005).

4.2 Processing Workflow Sketch

Passive and active vision sensor data (e.g. Camera images and laser scans) are processed independently from each other as far as possible, since one camera image generally can overlap several laser scans and vice versa. Further, pre-processing of the measurement data is kept to a minimum to avoid artifacts or texture blurring. This leads to a workflow as depicted in Figure 2. The mapping of the laser data on the tunnel surface uses a parameterized tunnel model and a regular grid as a digital surface model on top of it (Bauer & Paar, 1997). Co-registration of adjacent measurements takes place using textured point cloud matching (Pottmann et al, 1995).

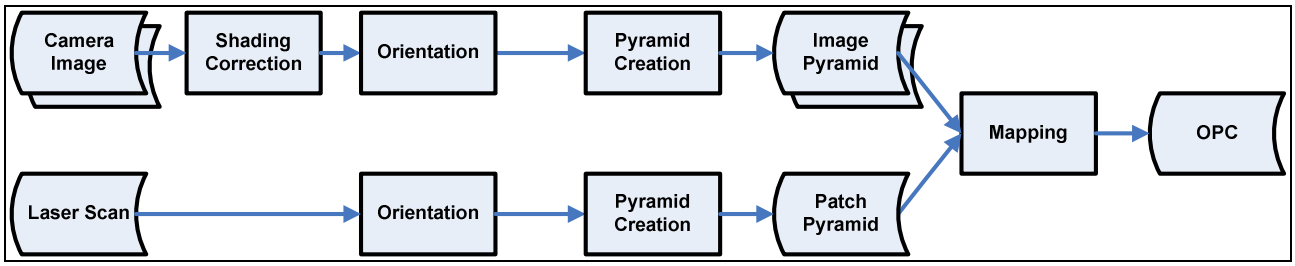

Figure 2: Processing workflow, resulting in an Ordered Point Cloud (OPC)

4.3 Visualization Data Preparation

The data acquisition system produces huge amounts of data for a tunnel of several kilometers length. Assuming a texture resolution of about 1 mm and a geometric resolution of about 1 cm, close to 200 GB of raw data for a tunnel of one km length are to be expected. To facilitate fast and efficient rendering of such data amounts with affordable hardware, the measurement data is converted into a data structure which allows the renderer to be dynamically fed with manageable data and supports multiple levels-of-detail (LoD).

The so-called Ordered Point Cloud (OPC) consists of a multiresolution structure both for the 3D surface and the texture represented as individual grids. For the following rendering it allows the access to the processed data in various resolution levels, thus ensuring the efficient usability of LoD concepts.

5 VISUALIZATION

The demands to a visualization system grow with increasing resolution. As soon as the data quality at the end of the processing pipeline exceeds the ability of paper plots (as used in standard construction and quality engineering processes), the user needs to get access to the data by a real-time rendering system, providing an

"immersive" view on one or more computer screens, compared to the situation of physically moving around in the displayed environment. Arbitrarily changing the distance and viewing position allows a quick orientation and the effective microscopic investigation of artifacts almost at the same time.

After data acquisition and pre-processing several challenges are therefore posed to the visualization stage which can be divided into the following three categories:

- Handling and rendering data that exceeds the size of the main memory or the graphics card's memory, respectively
- Simultaneously visualizing data of various forms without creating visual clutter
- Interacting with data in a manner desired by the future users of the described application

In the following these three challenges are dealt with in detail.

5.1 Rendering Massive Amounts of Data

Considering a tunnel of several kilometers length and the resulting processing resolutions described in 4.3 the exported OPC data may easily exceed the limits of customer end system resources. Further, tunnels often consist of multiple tubes and the end-user might want to compare multiple phases, so the memory consumption may easily increase.

A computer graphics-based solution designed to navigate through large data sets at interactive frame rates typically facilitates two strategies: An out-of-core (OOC) data management and a LoD rendering algorithm, which are responsible for not running out of main memory and efficiently stream and display data. To navigate through the scene, the user moves the so called camera by changing its position and / or viewport.

5.1.1 Out-Of-Core Data Management

The first step of an OOC strategy is to decide which subset of the whole data is crucial to support the current view and therefore is to be streamed from the hard drive to main memory. In our case this is decided for each OPC based on the distance to the camera position and the closest point on an OPC's bounding box. For instance, being inside the tunnel there is no need to load OPCs outside of a radius of 300 meters. Further OPCs outside the viewing frustum, i.e. behind the viewer or outside of the peripheral sight, are ignored.

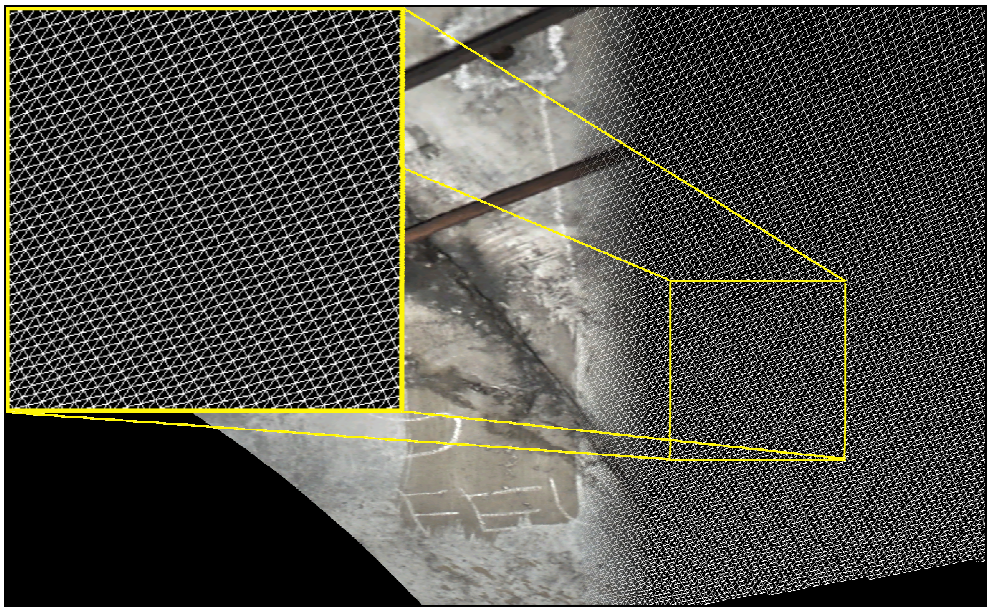

Figure 3: Illustration of capture density – point grid with 0.7 cm average distance between two points

When constantly streaming more data, while navigating through the tunnel the viewed data still might exceed the system's main memory at some point. Consequently the OOC algorithm has to remove OPCs which have become irrelevant. Rendered OPCs are constantly enqueued in a least recently used (LRU) manner, which keeps its element ordered by age. In regular intervals all OPCs exceeding a certain age are removed from the system memory.

Assuming a constant viewing distance, and that the OPCs in a data set are exported at about the same length the number of OPCs processed at once is constant. At this point the user might adjust the distance constraint to meet the desired balance between performance and sight.

5.1.2 Level of Detail Rendering

According to Luebke (2001 p.10) LoD rendering dynamically selects the most appropriate level of detail to support the current view. The previously discussed OPC hierarchy consists of multiple resolution levels, where each level spatially encloses its child levels.

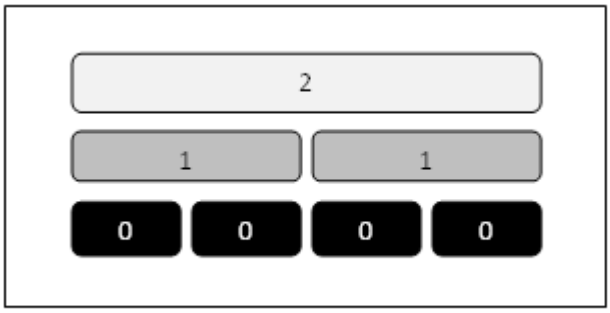

Figure 4: Multiresolution hierarchy

Since the hierarchy is created in a bottom up fashion the level 0 at the bottom contains the highest detail (original scan resolution). Considering a 3 level hierarchy level 1 is a simplification of level 0, whereas level 2 is a simplification of level 1 as depicted in Figure 4.

Keeping in mind that all levels consist of an ordered sequence of points an OPC can be thought of as a pyramid of multiple grids. Except of residing on the tunnels curved surface the given data itself does not show any significant difference to height maps or terrain data as seen in Luebke (2001, p.186). Applying a straight-forward view-dependent terrain LoD algorithm carefully combines various LoDs according to the camera's position and viewport, i.e. scan data at a distance of 200m is barely visible so there is no need to render it at full detail whereas data directly in front of the viewer is desired to present itself at full detail.

Due to the nature of the data structure all LoDs on the path to the desired level are streamed and rendered subsequently, which results in a gradual refinement of the visible surface data. Although Figure 5a shows a significant simplification at the end of the tunnel this lack of detail is barely perceivable in Figure 5b. The image artefacts might be further reduced by applying anisotropic filtering directly offered by the graphics hardware, but this might impose a considerable performance penalty on lower-end and medium- priced graphics cards.

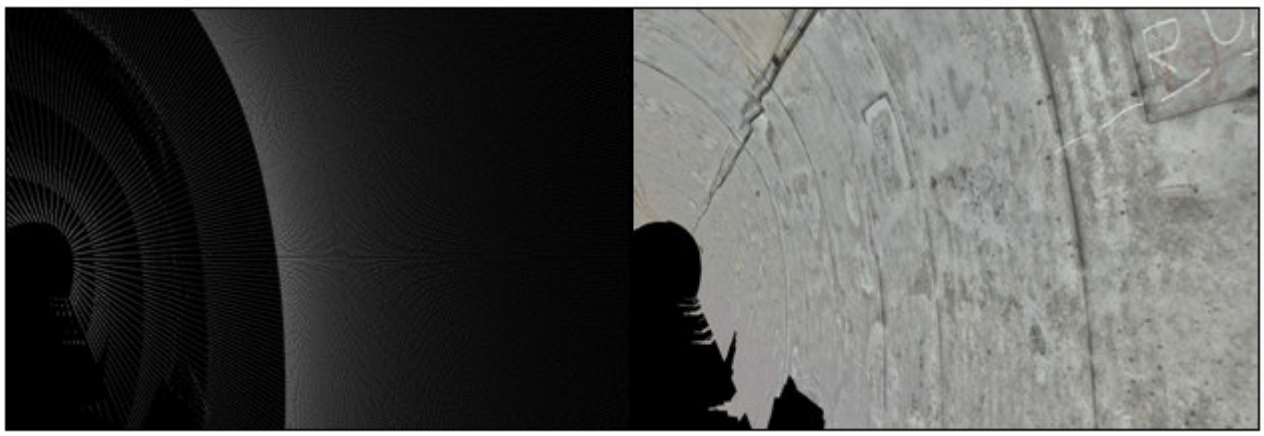

Figure 5: Different levels of detail shown in point (a) and solid mode (b)

Which LoD is ought to be displayed at which distance depends on the users current aims so their association is chosen semi-automatically. Distances are calculated by a quadratic function taking the real world scan resolution into account. Coefficients can be adjusted through a simple slider to find a good balance between speed and quality.

5.1.3 Rendering and Intersection Optimizations

As depicted in Figure 3 positions are arranged in order as a 2 dimensional grid. This attribute allows creating a triangulated mesh by computing index arrays at runtime. Since the data exporter strives for creating patches of the same size the index arrays are identical for most of the grids and can be cached.

To optimize upload times of index arrays to the graphics card triangle strip indices are used as suggested in Akenine-Möller (2008, p.549-552). Their size is reduced to about a third in comparison to triangle list indices.

Although the layout of the OPC data structure is identical to the typical structure of terrain data the curvature of the tunnel poses a significant challenge to the distance computation. Where it is sufficient for terrain rendering to compute the distance between the viewer and the bounds of a certain level in the hierarchy this method turned out to be too inaccurate for a curved surface. Therefore a kd-tree data structure is created for the highest level in an OPC hierarchy. The key advantage of a kd-tree is to greatly speed up ray / triangle intersections. By shooting random rays into the viewing direction the viewed surface is intersected with spoken-of rays and yields far more accurate distance to the surface itself.

5.2 System Exploitation Use Cases

So far the described rendering application solely dealt with the presentation of acquired real world data at high visual fidelity while not exceeding the system's resources and maintaining interactive framerates. At this point data from other sources is introduced to create a mixed reality allowing the user to draw new conclusions by putting them into context. This step marks the transition from a presentation to actual visualization. In the following the different elements and integration will be discussed such as database objects, deviations, axes and marker planes.

5.2.1 Line Based Objects

With a certain tunnel a set of polygonal objects is associated. Such a polygon is described by its positions as a list of line segments, its color and a flag defining whether it is closed or not. Since these objects emerge from CAD (Computer Aided Design) programs they are also desired to be represented in the scene as lines. These polygons are typically used to indicate niches, cables, hatches and especially cracks (semi-automatically mapped (Paar et al, 2006)) and damaged spots on the tunnel surface.

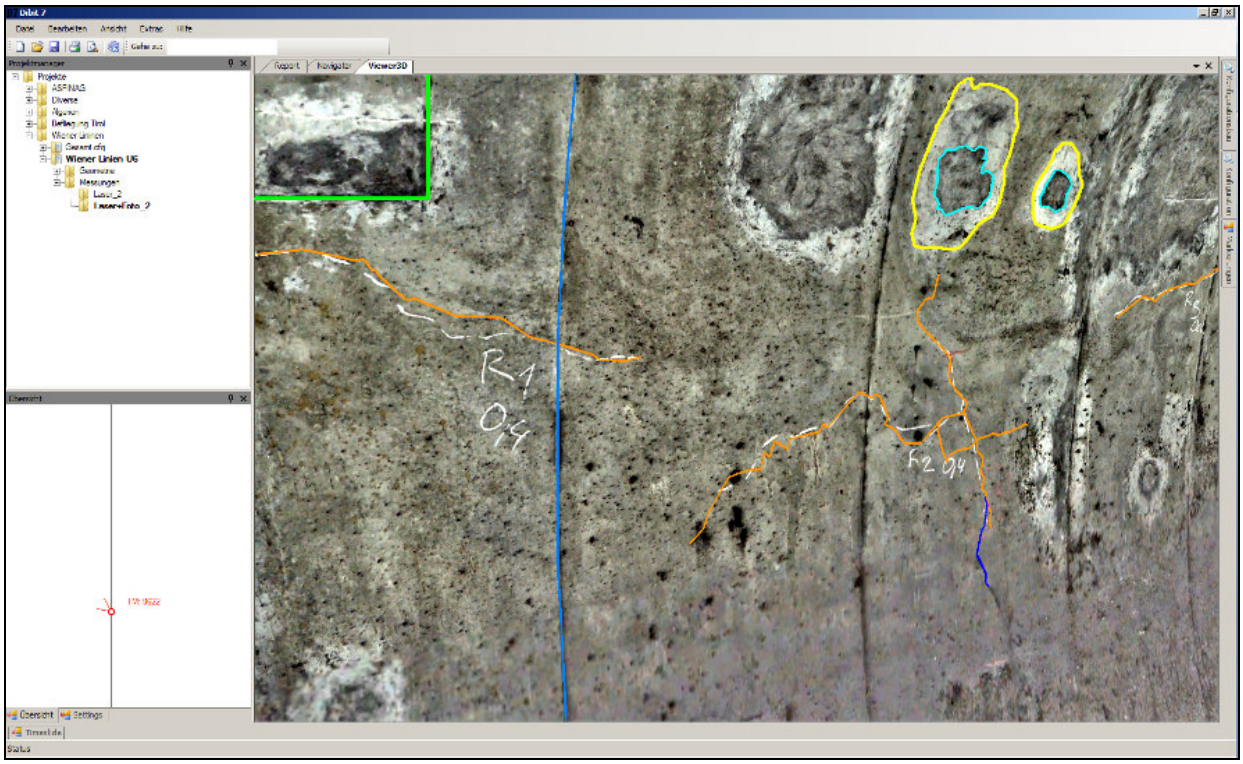

Figure 6: Cracks and surface defects of different classifications / Viewer embedded in Dibit7 framework with project tree and viewer map to the left

Although the used graphics API DirectX offers line rendering, lines can only be displayed at a width of one pixel and are not hardware accelerated by customer-end graphics cards. To overcome these limitations each line segment is rendered as a triangulated cylinder with its vertices displaced by the vertex shader. The displacement factor is modulated by distance so the lines always occupy the approximately same width in pixels on screen. By introducing a scale factor the line width may also be adjusted in real-time by the user.

5.2.2 Dynamic and Static Planes

To indicate a tunnel's profile at a specific station of the tunnel axis a plane orthogonal to the axis is constructed. Planes are represented by a semi - transparent quad (i.e. a small elementary patch, defined by 4 3D points accurately or approximately lying on the same plane) of given size and color. Since the graphics card blends the solid tunnel geometry with the protruding semi - transparent quad the course of the profile can be seen as a change in color tone (see Figure 7).

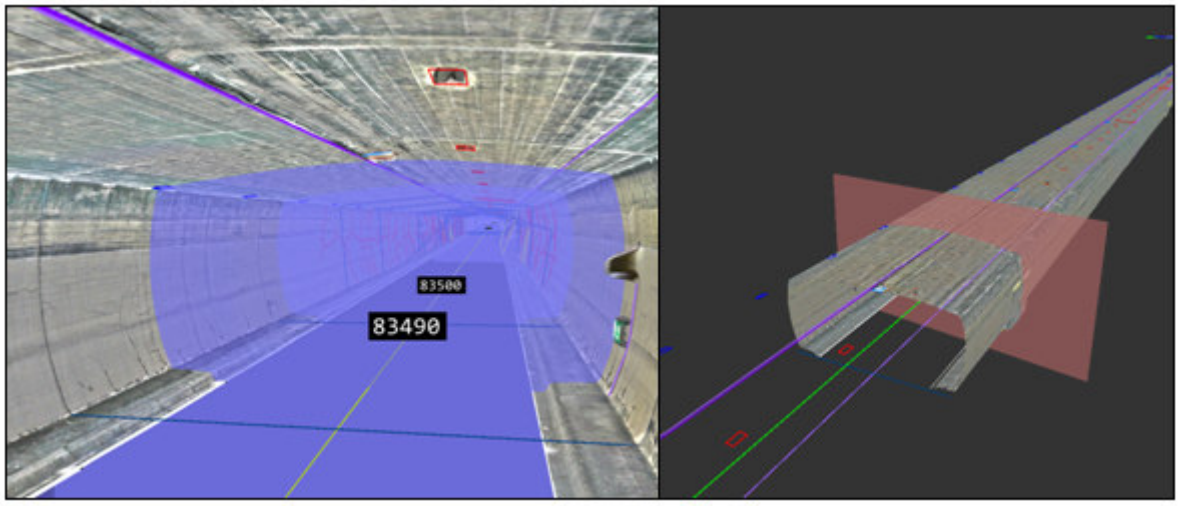

Figure 7: Static planes and billboards on the left (axis, cracks and cables as poly-lines), dynamic axis aligned plane on the right

A list of static planes is sent to the renderer defined by a position and a normal vector, whereas the dynamic plane is computed in real-time while navigating along the tunnel axis. To assure correct blending, solid surfaces have to be rendered before transparent ones. Since it is necessary to display more than one plane at once the respective transparent quads have to be rendered in a view-dependent order, otherwise blending artifacts may occur. The user may also specify a maximum number of planes to be rendered, to avoid visual clutter.

5.2.3 Data Maps

So far an OPC was rendered as triangulated geometry with its associated image. More generally the texture can be referred to as a map. The attached coordinate file defines which portion of the map applies to the respective vertex. Consequently various data map pyramids can be associated with an OPC. Encoding data in an image allows the patch and the data to be in different resolutions. Values are interpolated through the graphics card by using the mapping coordinates.

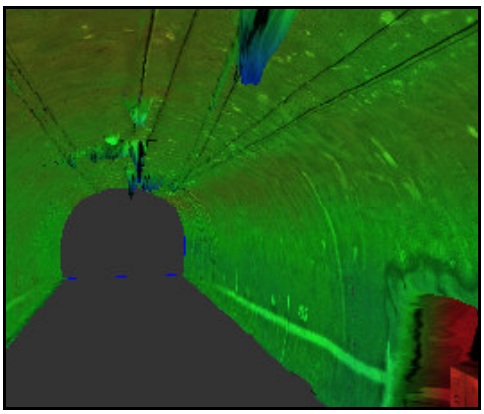

Figure 8: False color rendering of deviations

At the moment only deviation maps are taken into account. The scalar values in these maps represent the geometry's absolute deviation from a given norm geometry. After clamping the values at certain deviation levels they can be used to index into a color map resulting in a false color visualization of deviations as it can be seen in Figure 8.

5.2.4 Transparent Surfaces

Certain use cases might require the rendering of two phases of a tunnel on top of each other where one of them is rendered transparent. At the current stage of the application this mode is utilized to perform a visual structural clearance intersection. Therefore a triangulated mesh is extrapolated from structural clearance profiles along the axis by the exporter. Rendering the structural clearance mesh transparent over the solid tunnel geometry indicates an intersection between surfaces as a change in color (see Figure 9.).

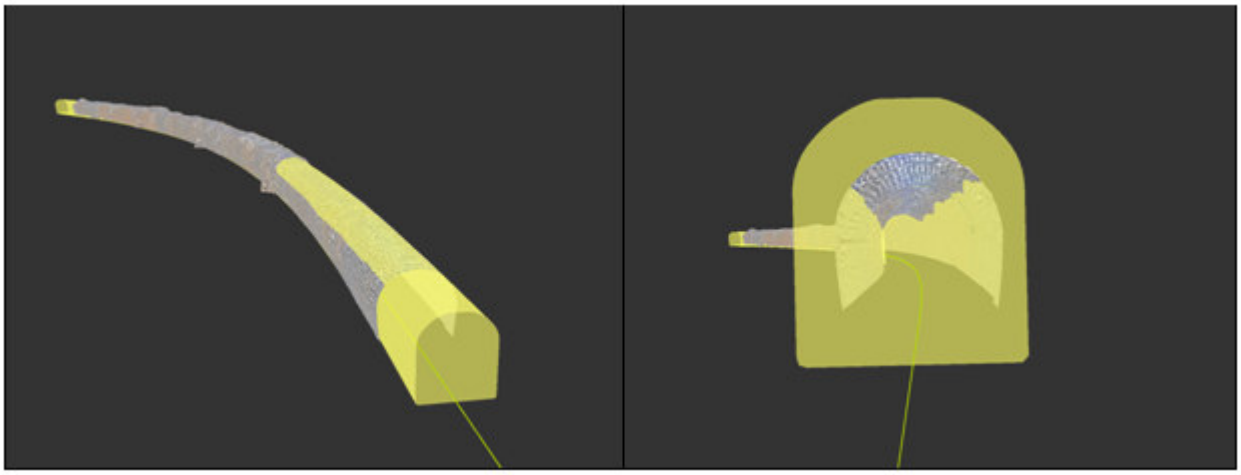

Figure 9: Transparent surface rendered on top of solid surface

This approach is similar to transparent planes in 5.2.2, however the more complex form of the transparent surface requires a view-dependent sorting of every single triangle. Therefore a binary space partition (BSP) tree is created as a pre processing step, which allows accessing all triangles in the sequence they are seen in.

5.3 Passive Interaction with Data

Beyond rendering data, in the given scenario of quality engineering and inspection a specific interaction with the data is required. At this point of the application only passive interaction with data will be discussed since no manipulation of the data occurs. In the following some typical aspects of interaction are covered.

5.3.1 Axis Navigation

When navigating through a tunnel it is often desired to focus the user's movement to remain along the tunnel axis instead of free-fly navigation through the scene. The tunnel axis is discretized by a polygon, thus by applying straight forward mathematic concepts any positions and viewing vectors along the axis can be computed. Offsets in x and y dimensions in respect to the course of the axis allow to navigate along paths parallel to it.

5.3.2 Time aware Rendering, Switchable Nodes & Markup Colors

When displaying numerous data sets and different forms of data it is useful to mask objects or highlight them in a certain color. The user may mask certain construction phases or whole building projects to avoid visual clutter or to increase loading and rendering performance.

Since OPCs contain a timestamp it is possible to use a time frame as mask criteria. The boundaries of the time frame can be adjusted in real time so it illustrates the growing of the tunnel over time. Including the latest working tunnel face for a given time frame conveys an even more convincing visualization of the tunnel driving during construction.

6 CONCLUSION

Using lasers scanners and other vision sensors is a rather young approach to conduct surface documentation of urban infrastructure installations. The acceptance of 3D visualization systems is still limited among potential users but steadily growing.

The presented visualization is part of the newest version of a commercial software lineage. Since previous versions only offered limited 3D rendering capabilities the visualization of and interaction with the acquired data were brought a considerable step forward. At this point the discussed features represent a basic subset by providing efficient rendering of large data sets, concise visualization of additional information and intuitive interaction, including movement.

Although the presented results look promising the application lacks two features, which may be considered as crucial for the acceptance among the tunnel construction community: Measurement and manipulation or creation of new data.

Improved measurement may include the computation of the volume between virtually designed tunnel geometry and a real-world scanned rough excavation. Consequently it is possible to calculate the amount of concrete needed to pave the tunnel surface. Further simple measurements such as direct and on the surface distances have to be included.

Integration of previous modules would offer great improvements in usability, such as performing the semi-automatic crack detection while navigating through the scene.

In this way the ability of a real-time graphical representation of as-built underground scenes and attached visualization of relevant additional information has reached the maturity to sustainably replace paper print-outs and the necessity to ensure on-site expert presence. This represents a considerable step forward in Urban planning, safety management and the objective and repeatable monitoring & maintenance of public transport installations.

7 ACKNOWLEDGEMENTS

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Überörtliche Verkehrsentflechtung in Zentralkärnten – Realitätsdruck versus Machbarkeitsstudien im Rückblick

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1 KURZFASSUNG

Experten der Raumforschung nehmen sich selten Zeit, namhafte gescheiterte Gutachten retrospektiv zu bewerten und zur Genese der politischen Abänderung Stellung zu beziehen, obgleich solche Kenntnisse auch für aktualräumliche Evaluierungen nicht uninteressant sind. Eine diesbezügliche Recherche ist umso reizvoller, wenn es sich dabei um namhafte ehemalige Spitzenraumplaner Österreichs handelt (u.a. Hermann Schlegl, Walter Strzygowski, Rudolf Wurzer). Eine „Twin-City-Region Villach – Klagenfurt", die in einen touristischen Spitzenraum Österreichs hinein reicht und über diesen möglichst gut verbunden sein will, andererseits von einem hochrangigem europäischen Güterverkehrs-Korridor (A2 bzw. Balic-Adriatic-Axis) möglichst verschont bleiben möchte, stellt Raumplaner vor eine Quadratur des Kreises. Heute wünscht sich die Klagenfurter Bevölkerung für die „Neue Südbahn" (Koralmbahn-Pontebbana-Lückenschluss) einen Eisenbahn-Bypass ähnlich den Vorstellungen eines Hermann Schlegl. Eine Finanzierung sprengte heute jedoch jeden Rahmen. Dasselbe Schicksal ereilte das hervorragende Raumplanungs-Gutachten von Rudolf Wurzer, der als weit über die Grenzen Österreichs bekannter Raumplaner auch Stadtrat von Wien werden konnte. Wurzer hat auch gemeinsam mit Walter Strzygowski aus nachhaltig geländeklimatisch-fahrökologischen, baukostenintensiven und nachhaltig-energetischen Gründen (wegen der enormen Scheitelhöhe von 1060 m) die Pack-Trasse abgelehnt und einen nur 19 km langen Korridor über Slowenien gefordert (470m-Scheitel der Radlpass-Trasse im damals „Blockfreien Staat Jugoslawien"). Damit wäre auch die kostenintensive Trasse der Griffener Berge umgangen, das strukturschwache gemischtsprachige Jauntal aufgewertet und der Schwerverkehr über ein vorrangiges Industrie- und Gewerbegebiet (Klagenfurt Südost, Ferlach) nach Italien geleitet worden. Es zeigt sich insgesamt, dass die Entscheidungsträger möglichst schnelle Verwirklichungen und damit schnelle Beschäftigungs-Effekte als Realitätsdruck-Argumentationen benützten und damit aufwändige Gutachten von namhaften Raumforschern umgingen.

2 DIE SPEZIELLE LANDESNATUR UND WIRTSCHAFTSGESCHICHTE KÄRNTENS ALS HERAUSFORDERUNG FÜR DIE ÜBERÖRTLICHEN RAUMPLANUNG

Kärnten hat im Unterschied zu anderen Bundesländern ähnlich Tirol keinen Anteil am Alpenvorland und zusätzlich durch die reliefgeographische Scheitellinien-Umgrenzung eine natürliche Abgrenzung zu seinen Nachbarn. Viktor Paschinger (1937) sprach von einem natürlichen inneralpinen Festungscharakter, der jedoch durch natürliche Pforten in Form von Talwasserscheiden (Kanaltal, Südliche Längstalfurche über das Pustertal) und vergleichsweise niedrigen Pässen (Wurzen, Katschberg, Turrach, Flattnitz, Neumarkter Sattel, Perchauer Sattel, Obdacher Sattel) dennoch eine inneralpine Durchwegigkeit erlaubt, die sich Schweizer Kantone wohl auch gewünscht hätten. Daraus resultiert die strategische Bedeutung des Klagenfurter Beckens. Nicht ohne Grund bekam Klagenfurt die mächtigste inneralpine renaissancezeitliche Stadtbefestigungsanlage der Alpen (einschließlich Lendkanal zur Stadtgraben-Stauhaltung vom Wörthersee), gleichzeitig die größte und geschlossenste renaissancezeitliche Stadterweiterung aller Alpenstädte. Villach hätte mit seiner optimalen Verkehrsgunstlage auch diese Position einnehmen können, als bambergischer Besitz (bis 1759) war dies aus der besitzrechtlichen Geschichte heraus jedoch nicht möglich. Im Besitz zweier Diagonalachsen (Tauernweg Salzburg – Laibach, Schräger Durchgang Venedig – Wien) und einem durch die Drau-Flussschifffahrt ab Spittal unterstützten Ungarnweg (Sterzing – Marburg) war das präindustrielle Kärnten im Transportwesen trotz Gebirgsumrahmung kein benachteiligter Raum.

Erst die Industrialisierung brachte Kärnten (auch dem Land Salzburg) einen entscheidenden Nachteil. Zur Zeit der ersten Volkszählung 1869 musste Kärnten neben Salzburg noch immer als reines Agrarland definiert werden. In keinem einzigen Kreis konnten im Unterschied zum alpinen Oberösterreich, der steirischen Mur-Mürz-Furche und Oberkrain von 1000 Personen mehr als 150 im sekundären Bereich beschäftigt werden. Obwohl in der Ära des Südbahnbaues die Padania zu Österreich gehörte (u.a. Investition der „Ponte Translagunare" von Venedig als damalig größte Meeresbrücke der Welt, eröffnet 1854), war damit wirtschaftlich vorherbestimmt, dass bei etwa gleicher Wegstrecke trotz baugeologisch schwieriger

Karststrecke eine Variante über Kärnten und dem Kanaltal nicht in Frage kam. Die Eisenbahn war das einzige Verkehrsmittel Österreichs, das auf die Entwicklung der Industrie einen nennenswerten Einfluss ausüben konnte (zahlreiche regionale Industrialisierungsimpulse mit einer syngenetischen Steigerung der gesamten regionalen Wirtschaftsaktivitäten). Erst jetzt zog Graz als regionale Primate City gegenüber Klagenfurt davon. Geschlossene gründerzeitliche Viertel sucht man in Klagenfurt vergebens. Auch der Wiener Börsenkrach 1873 wirkte sich für Kärnten dramatischer aus, weil damit das Aufbrechen der Monopolstellung der privaten Südbahn in Form einer staatlichen Direktlinie der Kronprinz-Rudolf-Bahn über Görz nach Triest aufgeschoben werden musste. Für Kärnten kam die Verdichtung des Eisenbahnnetzes durch die sogenannten „Neuen Alpenbahnen“ (Fig.1 , im sog. System „Transalpina – Neue Alpenbahnen“) viel zu spät. Das Jubiläum 100 Jahre Tauernbahn, soeben 2009 gefeiert, wodurch der Witschaftsmagnet Deutschland für Industrie und Tourismus überhaupt erst richtig greifen konnte, ist im Rückblick umso dramatischer, denn ein Konjunkturfenster städtebaulicher Entwicklung gab es nicht mehr und nur 10 Jahre später kämpfte Kärnten auf seinem Territorium um sein Überleben.

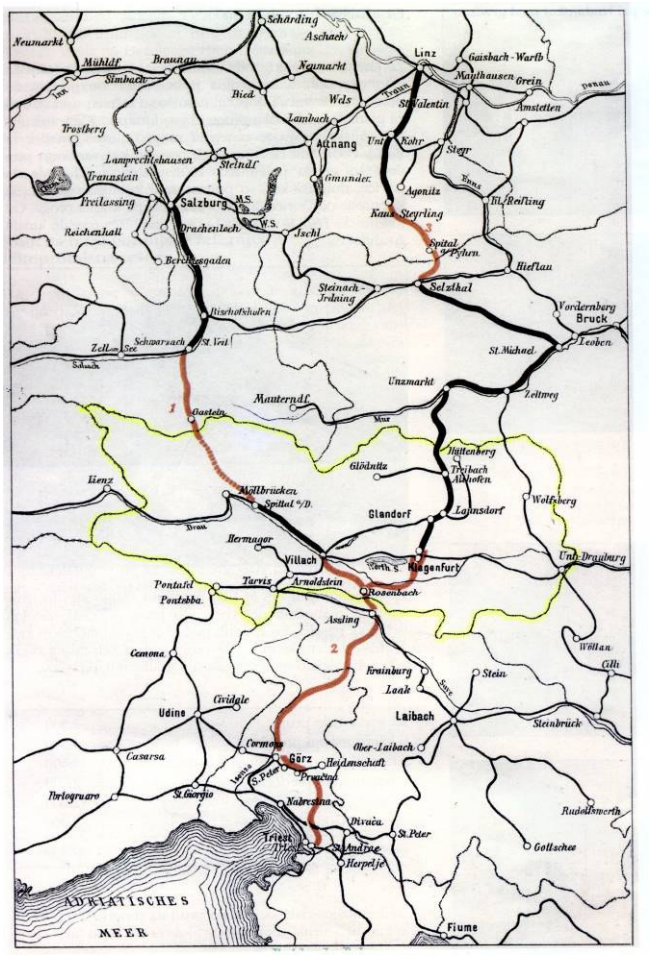

Fig. 1: Mit der vor 100 Jahren eröffneten Tauernbahn war das System “Neue Alpenbahnen“ abgeschlossen (Qu.: Eicher 2009)

Die Wirtschaftslage im Schatten Deutschlands, z.B. auch ein neu aufzubauendes Tourismus-Standbein im Schatten der Tauern-Barriere erkennt man in der Chronologie der regelmäßigen Seen-Schiffahrt im Sommerhalbjahr. Auf den sonst klimatisch bevorzugten Kärntner Seen ist der „Wirtschafts-Schatten“ der Tauern-Barriere evident. Während die Wörthersee-Schiffahrt bereits im Jahr 1853 bzw. auf dem Ossiacher See im Jahr 1886 aufgenommen werden konnte, ging die Schiffahrt auf dem Millstätter See erst mit dem Baubeschluss der Tauernbahn einher. In einer Zeit der fehlenden Massen-Motorisierung war dies für eine Seenlandschaft, die mit dem Millstätter Sonnseitenrücken und Seerücken zum Drautal nach Ansicht des Verfassers es mit den schönsten Schweizer Seenlandschaften aufnehmen konnte (- dort allerdings mit früher Eisenbahn-Erschließung -) ein beträchtlicher Nachteil. Als in den Zwanzigerjahren die Tauernbahn prioritär elektrifiziert wurde, gab es auch Vorschläge, zumal es im zweigleisigen Tauern-Tunnel fortan keine Ruß-Kontamination mehr gab, ein Gleis für einen Intervall-PKW-Richtungsverkehr abzureißen, um eine Hausse des Tourismus aus Deutschland zu ermöglichen. Die PKW-Tauernschleuse der ÖBB war in der

Nachkriegszeit des „Deutschen Wirtschaftswunders“ eine wesentliche Dienstleistungsfunktion für den aufstrebenden Oberkärntner Tourismus.

Die wirtschaftliche Integration der Alpen-Adria-Region als Folge der letzten Großanstrengung im Eisenbahnbau der Österreichisch-Ungarischen-Monarchie war angesichts des Systems „Transalpina – Neue Alpenbahnen“ als damaligen einzigen Hochleistungs-Verkehrsträger besonders hoffnungsvoll. Man warb nördlich und südlich der Karawanken auf die neue Infrastruktur hinweisend um dementsprechende Investitionen für neue Betriebsansiedlungen. Im Fahrplan 1913 gab es zwischen Villach über Wochein/Görz nach Triest fünf Fernzüge je Richtung (nicht alle täglich), u.a. mit durchgehenden Kurswagen Innsbruck – Triest, München – Triest, Berlin – Triest (Fahrplan-Ausschnitt mit jenen Dienstleisungsangeboten in H. Eicher 2009). Die hohe touristische Einschätzung der neuen Bahnlinie in den letzten Jahren der Belle Epoque zeigt auch die Bewerbung der Möglichkeit einer Automobil-Verladung (mit Adelsberg/Postojna und Grado als Entladungs-Destinationen) bzw. ein eigens angebotener „Aussichtswagen“ Salzburg – Triest. Die Desintegration dieser Alpen-Adria-Region durch den Zerfall der Monarchie muß hier angesichts dieser infrastrukturell bedingten neuen Hoffnungsträger für alle Raumplaner, wirtschaftsgeographisch und unternehmerisch Denkenden besonders schmerzlich empfunden worden sein. Für die Lavanttal-Region als einziger nennenswerter Schwerindustrie-Standort war die Einheit Kärntens besonders wichtig, weil sonst wegen der Saualm-Barriere kein einziger leistungsfähiger Verkehrsträger nach Zentralkärnten zu verbinden gewesen wäre.

3 DIE ÜBERÖRTLICHE RAUMPLANUNG IN DER ZWISCHENKRIEGSZEIT

Wie im übrigen Österreich war in der Zwischenkriegszeit kein Konjunktur-Fenster für nennenswerte, wirtschaftlich begründbare Großinvestitionen möglich. Der Erste Weltkrieg und die bald folgende Weltwirtschaftskrise hat auch die ursprünglich monarchischen Pläne einer „Kärntner Ostbahn“ zunichte gemacht (Klagenfurt – Griffen – Wolfsberg – Preitenegg – Edelschrott –Ligist –Graz, dokumentiert in K. Rießberger 2007). Das Beschäftigungsprogramm der Regierung Dollfuß bevorzugte, entgegen ursprünglichen Plänen eines Lavanttalbahn-Bypasses (Versprchen der SHS-Korridor-Beseitigung seitens der Bundesregierung bereits zur Volksabstimmung 1920), Investitionen für einen Straßenbau. Neben dem Ausbau der sogenannten „Packer Höhenstraße“ war vor allem die Großglockner Hochalpenstraße ein Prestige-Projekt der Dollfuß-Regierung (Spatenstich 23.9.1930 – Eröffnung 31.5.1936). Es vereinnahmte zwischen 1930 und 1935 über 14 % der gesamten Straßenbauausgaben des Bundes jener Zeit. Die alte einspurige Straße Heiligenblut-Glocknerhaus konnte wegen der Eingrenzung auf 10 % Steigung nach Wallacks Plänen nicht integriert werden.

Nach mündlicher Mitteilung des Triestiner Geographen Giorgio Valussi kam mit der Annäherung Dollfuß – Mussolini die Finanzierungsfrage Kärntner Ostbahn auch in Rom zur Sprache. Die Transalpina bekam ein letztes Mal Fernverkehrszüge der Destination Trieste/Camp. – Görz – Piedicolle – Jesenice – Villach – Salzburg – München, ehe diese monarchische Großinvestition in die Lokalbahn-Realität der Einzelstaaten versank. Für die immer schlechter werdenden Wirtschaftsbeziehungen war auch der Exodus der deutschen Volksgruppe im neuen SHS-Staat verantwortlich, die überverhältnismäßig unternehmerisch verankert war. Der bekannt gewordene Zeithistoriker Stefan Karner (1998) hat als weiteren desintegrativen Faktor nachgewiesen, dass längst vor Hitlers Machtübernahme die deutschsprachige Volksgruppe in Krain und der Untersteiermark in nur zwei Dezennien aufgehört hat zu bestehen. Von damals 1 Million Einwohnern erhob man zur letzen monarchischen Volkszählung 1910 gut 100.000 mit der Kennzeichnung „Umgangssprache Deutsch“. Im SHS-Staat gab es im Rahmen der Volkszählung 1931 nur mehr 17.000, die die Fragestellung „Deutsche Muttersprache“ ankreuzten. Kärnten selbst hatte in der Volksabstimmungs-Zone nach der Volkszählung 1910 ein Verhältnis von 81 % („Umgangssprache Deutsch“) zu 19 %. Nur 16,5 % entschieden sich schließlich am 10.10.1920 für den SHS-Staat.

Mit dem gewaltsamen Anschluss großer Teile von Krain und der Untersteiermark an Hitler-Deutschland ergaben sich für den Kärntner Zentralraum völlig neue Rahmenbedingungen. Maurice Williams (2005) erwähnt die besonderen raumplanerischen Fähigkeiten des Kärntner Gauleiters Dr. Friedrich Rainer, der zuvor als Gauleiter von Salzburg über den renommierten Architekten Hermann Schlegl zu Adolf Hitler einen besonderen „Gigantomanie-Bauherren-Diskussionskreis“ aufbauen konnte. Der St.Veiter Jurist Dr. Friedrich Rainer, Vater von 8 Kindern, wird als einer der gebildetsten, kreativsten und sozialsten Köpfe unter den mächtigen Gau-Fürsten des Reiches beschrieben. Als er als Gauleiter von Salzburg erneut zum

Reichsstatthalter und Gauleiter von Kärnten ernannt wurde, errichtete er ein Generalreferat für Raumordnung beim Reichsstatthalter in Kärnten und berief Hermann Schlegl mit dieser Aufgabe. Im großen Reichsbahn-Gebäude in Villach (ehem. k.u.k. Reichsbahn-Gebäude) wurde auch das Reichsautobahn-Planungsreferat eingerichtet. Selbst im Krieg wurden Reichsautobahn-Projektierungsarbeiten durchgeführt, die einzigen alpinen Projektierungen, während sonst mit Ausnahme von Salzburg und Wien durch den Krieg die Aktivitäten eingeschränkt waren. Walter Strzygowski arbeitete bereits damals an Varianten des Reichsautobahnbaues für den Wiener Großraum (G. Kotyza 1986, R. Breit 1990).

Es ist bei Williams auch bemerkenswert zu erfahren, dass der von den US-Amerikanern an Marschall Tito ausgelieferte Gauleiter als Ausnahmspersönlichkeit dem jugoslawischen Geheimdienst so interessant war, dass eine Schein-Hinrichtung für den 18.8.1947 verkündet wurde, es jedoch Beweise gibt, dass Friedrich Rainer noch Jahre danach lebte. Wie lange er noch für Marschall Titos System nützlich war, ist kontrovers diskutiert. Sein Tod ist Zeithistorikern unbekannt. Was vom Duo Friedrich Rainer & Hermann Schlegl bleibt, ist eine Raumplanungs-Liebe zu Klagenfurt, die Hitlers Beziehung zu Linz nicht unähnlich ist. Der sportlich sehr aktive Gauleiter wollte Klagenfurt mit einem völlig neuen groß angelegten Lendkanal (mit Regattabahn Fuktion), wie er sich ausdrückte, zu einer „Wörthersee-Stadt“ machen (Fig.2). Der Großkanal sollte sich zu einem neu zu bauenden Repräsentationsviertel im Südwesten der Altstadt ausrichten. Um die Planungen zu erleichtern wurden großzügige Eingemeindungen durchgesetzt, womit Klagenfurt erstmalig seine Gemeindegrenzen auf den Wörthersee ausdehnen konnte. Nach Fall des autoritären Regimes wurde „Groß-Klagenfurt“ nicht mehr rückgängig gemacht. Der in der Villacher Raumplanung groß gewordene renommierte Raumplaner Rudolf Wurzer konnte nur bedauernd feststellen: „Villach hätte sich das auch gewünscht“.

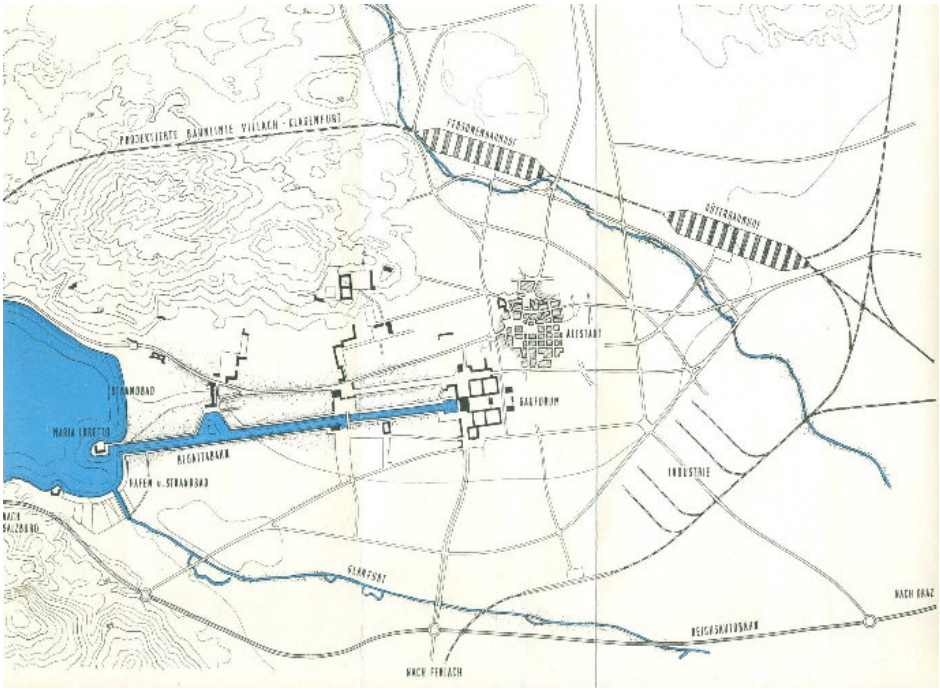

Fig. 2: Auschnitt aus Schlegels neue Raumordnung um „Groß-Klagenfurt“ (Qu.: Kärntner Landesarchiv)

Einem besonderen Planungsziel Schlegels galt die Einbindung völlig neuer Hochleistungsverkehrsträger. Die damals eingleisige „Kärntner Bahn Marburg - Franzensfeste“ der ehemaligen Südbahn-Gesellschaft sollte auf Klagenfurter Stadtgebiet nicht durch Hinzulegen eines zweiten Gleises erweitert werden. Eine Hochleistungs-Eisenbahn sollte mit einem Nord-Bypass die Zerschneidung des Stadtgebietes beseitigen und im frei werdenden Raum eine neue Anbindung zur Wörthersee-Norduferstraße frei geben. In der derzeitigen Diskussion des Koralmbahn-Lückenschlusses wurde erneut mit H. Schlegls Plänen eines Eisenbahn-Bypasses argumentiert. In der Ausdehnung des heutigen Stadtgebietes ist eine UVP-fähige Variante bzw. Finanzierung völlig illusorisch. Da der Süden des Wörthersees überhaupt erst 1908 eine Südufer-Straße erhielt (sog. „Kaiser-Franz-Josef-Süduferstraße“), entschied man sich wegen der daraus resultierenden geringeren touristischen Ausstattung für eine Verlagerung des Fernverkehrs in die Südufer-Gebigsflanke. Für die Einbindung der Reichsautobahn in das übrige überregionale Straßennetz sah Schlegl schon damals

Kreisverkehre vor (siehe Schlegels Überblicks-Darstellung Fig.2). Die Angliederung des Draudurchbruchtales Lavamünd - Marburg an das Reich ergab eine spontane Umplanung der Reichsautobahn östlich Klagenfurt. Von einer Pack-Trasse, die dem heutigen A2-Verlauf nicht unähnlich war, ging die Planung hin zu einer Radlpass-Wegfindung, zumal eine solche Trasse unter der halben Seehöhe gegenüber einer Koralm-Querung lag. Überdies waren die neuen Pläne in der Lage, die baugeologisch schwierigen Griffener Berge auszuweichen, eine Problematik, die bei den nachkriegszeitlichen Varianten in der Baudirektion noch zu schwierigen Bewertungen führte. Interessant ist, dass in der frühen Nachkriegszeit, als Rudolf Wurzer bereits am vorbildlichen Planungsatlas Lavanttal arbeitete, er schon zu Beginn des Freien Österreich die Investition der neuen Griffener Bundesstraße zu Gunsten eines Soboth-Ausbaues ablehnte. Eine Soboth-Straße sollte sozusagen provisorisch für eine Wiederaufnahme der Reichsautobahn-Planungen sorgen, weil Tito-Jugoslawien sich politisch hin zu einem „Blockfreien Staat" entwickelte. Ein Staatsvertrag mit Jugoslawien wäre es wert, die riesige Energie-Verschwendung eines gegen 1100m Höhe zu bewältigenden Autobahn-Scheitels (mit den verwirklichten Pack-Tunnelanlagen wurden es noch immer 1060m) zu vermeiden, insbesondere auch die fahrökologische Benachteiligung im mikroklimatisch schwierigen Winterhalbjahr im Straßenerhaltungs- und Absicherungsaufwand zu ersparen. Dieser Meinung schloss sich der an der Wirtschaftsuniversität lehrende renommierte Wiener Raumforscher Walter Strzygowski in mehreren Publikationen der Sechzigerjahre an (Fig.5b), ebenso der Kärntner Raumplaner M. Schmid (1958). Es ist somit wohl berechtigt, in dieser planungsgeschichtlichen Rückschau auch diese raumplanende Leistung von Hermann Schlegl und seinen Mitarbeitern zu würdigen, wenn sie auch in einem autoritären Regime zu Stande kamen.

4 DER KÄRNTNER ZENTRALRAUM UNTER BEDINGUNGEN DER HAUSSE DER STRASSE

Die schwierige Physiognomie zum Bau einer Hochleistungsstraße im Südkorridor (A2) war für die südlichen Bundesländer Steiermark und Kärnten besonders benachteiligend, weil durch die Desintegration Europas der Eiserne Vorhang eine besondere Benachteiligung der Wirtschaftsbeziehungen im Freien Europa bedeutete, insbesondere durch die zusätzliche zeitliche Ferne zum aufsteigenden Wirtschaftsgiganten BRD. Obwohl an der Südachse gleich viele Menschen leben wie an der Donauachse, reichte bei Vollendung der A1 (Westautobahn von Beginn an als Vollautobahn) die A2 im Jahr 1963 gerade einmal bis Wr.Neustadt. Innovative Betriebsansiedlungen waren unter solchen Rahmenbedingungen viel schwieriger lukrierbar. Für Kärntens aufsteigender Tourismus-Entwicklung, insbesondere einem Oberkärntner Wintertourismus ergab sich in einer Zeit vor dem Flugtourismus, aber im Boom des MIV im Vergleich zu Salzburg oder Tirol (Brenner- und Felbertauern-Hochleistungswege in den späten Sechzigerjahren fast gleichzeitig gebaut) ein nicht mehr gut zu machender Erreichbarkeits-Nachteil, insbesondere in den Auswirkungen für zweisaisonale Strukturen. Kärnten musste noch bis 1980 auf die Alpenhauptkamm-Bewältigung der A10 warten (Rauchenkatsch – Gmünd/Maltatal 27.6.1980, A10-Vollendung Villach/West-Knoten Villach am 28.6.1988). Wie der späte Boom des Wintertourismus in Oberkärnten zeigt, kommunizierte dieser maßgeblich mit dem späten Bau der A10. Die Kärntner Übernachtungen im Winterhalbjahr verdoppelten sich zwischen 1979 und 2007 auf 3,6 Mio. Nächtigungen bei gleichzeitiger Abnahme des Sommer-Tourismus von 14 Mio. auf 9 Mio (letztere Zahl macht Kärnten noch immer zu einer touristischen Großmacht Österreichs – sie ist seit 1997 stabil). Mit der deutlichen Kerosin-Verteuerung und der Weltwirtschaftskrise 2009, die der Flug-Kurzstrecke überproportional zusetzte, vermehren sich neuerdings erneut Touristenströme aus Nachbarländern im MIV, die durch die zunehmenden Kurzzeit-Buchungen („create-it-yourself-journeys" im Internet-Segment) schnelle Autobahn-Erreichungen als Voraussetzung der Destinationswahl implizieren. Im Sommerhalbjahr macht seit 2007 der Tourismus aus anderen Bundesländern in Kärnten wieder 37 % aus und bringt es mit Bayern (17 %) und neuerdings Italien (7 %) auf über 60 % „Nah-Anteil" (Visualisierung in H.Eicher 2009).

Unter solchen Bedingungen war die Entwicklung der Raumordnung für Rudolf Wurzers Hinterfragungen besonders schwierig. Zentralkärnten, das retrospektiv so sehr in einen touristischen Spitzenraum Österreichs hinein reicht, mit seiner „Twin-City-Region Villach-Klagenfurt" für neue Industrie- und Gewerbe-Ansiedlungen auch an hochrangige europäische Güterverkehrs-Korridore (Südachse und Korridor 10 für Straße und Schiene) angebunden sein wollte, war Wurzers Gutachten „Entwicklungsprogramm Kärntner Zentralraum – Raumordnung in Kärnten" die Frage nach einer Quadratur des Kreises. Sein Kompromiss war eine Aufspaltung der Hochleistungsverkehrsträger in eine Schnellstraße Klagenfurt – Villach, die für den schweren Güterverkehr gesperrt sein sollte, bzw. eine Fernverkehrsautobahn, die das Klagenfurter Industrie-

und Gewerbegebiet anbinden sollte, dann aber über die Hollenburger Senke in das Drau-Gebiet (Rosental mit Ferlach als Industrie-Standort) zu verschwenken sei (Fig.3). Man kann davon ausgehen, dass unter heutigen Rahmenbedingungen eine „Wörthersee-Autobahn“ als einzuger Hochleistungs-Verkehrsträger im UVP-Verfahren nicht mehr durchsetzbar wäre. Kurze Zeit nach Rudolf Wurzers Stellungnahmen setzt sich in Raumordnungsverfahren in Europa immer mehr das sogenannte „Ecologically Compatible Tunnelling“ durch (H. Eicher 1994), das maßgeblich von der Kostenreduktion des NATM-Verfahrens („New Austrian Tunnelling Method“ bzw. NÖT – Neue österr. Tunnel-Bauweise) bestimmt ist. Ohne diese 20-30 % Kosten-Reduzierung (innovative Ankerungsverfahren mit Schalungs- und Spritzbeton-Einsparungen) wäre ein Grazer Plabutsch-Tunnel (10 km Länge im Längsstreichen eines Gebirges) bzw. ein Oswaldibergtunnel (8,6 km Auffahrlänge der Villach-Umfahrung als Twin-Tunnelanlage) nicht finanzierbar gewesen. Rudolf Wurzer konnte sich 1972 bei der Villacher Umfahrung noch keine Durchsetzung eines Oswaldibergtunnels vorstellen (Fig. 4b). Als zur Zeit der Regierung Kreisky I und Kreisky II und der absoluten Mehrheit der Sozialisten in der Kärntner Landesregierung im Lobbying ideale Bedingungen vorlagen und der regelmäßige Stau auf einer nur 5 km langen Strecke zwischen Pörtschach und Klagenfurt von 1 Stunde sich zu einer unhaltbaren Mobilitäts-Einschränkung und einem Vertreiben der Touristen gestaltete, wurde Wurzers Infrastruktur-Entwicklungsprogramm, dessen Entflechtungs-Wirkung von nachhaltigem Vorteil für Kärntens Raumordnung gedient hätte, vom Realitätsdruck überfahren. Es halfen auch nicht Wurzers Hinweise der Folgeausgaben eines kostenintensiven Fernverkehrs-Bypasses einer Klagenfurter Nordspange, die mit großer Verzögerung bis 1999 in zahlreichen Tunnel-Anlagen auch tatsächlich zur Ausführung gelangen mussten.

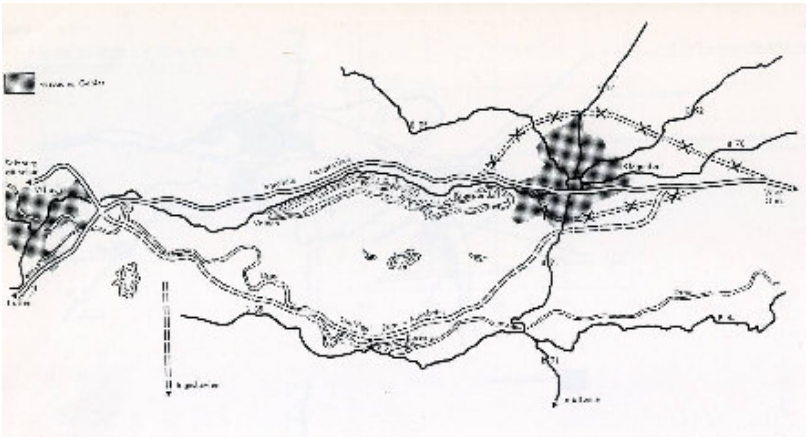

Fig. 3: R.Wurzers Ablehnung eines stadtnahen Fernautobahn-Bypasses (R. Wurzer 1966)

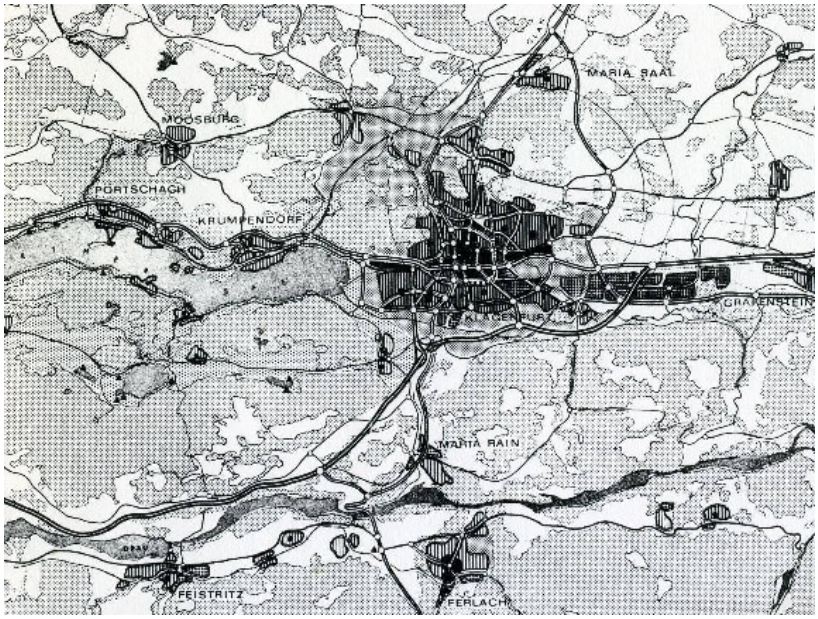

Fig. 4 a: Ausschnitt Großraum Klagenfurt aus Entwicklungsprogramm Kärntner Zentralraum (R. Wurzer 1972)

Für den Raum Oberes Drautal – Villach war die Konjunktureinbruchs-Gegensteuerung als Folge der Erdöl-Krisen 1973 und 1979 förderlich, dass nun die teuersten Varianten der Bauwirtschaft zu Gute kamen. Diese

neue Akzeptanz aufwändiger Trassen kam der Aufbruchstimmung der Grünbewegung zu Gute, die mit dem Bürgerprotest im Oberen Drautal einher ging und zur völligen Umplanung der Trasse Knoten Spittal Ost – Villach West (26,2 km / eröffnet 3.7.1986) führte. Ein zusätzlicher Verwirklichungsdruck ergab sich auch aus der Tatsache, dass Italien im Kanaltal eine der aufwänigsten Autobahnen Europas in Angriff nahm. Sie verläuft kaum mehr in einer Normalverkehrs-Ebene und erforderte kumulativ eine Tunnelbau-Auffahrlänge von 35 km (15 Jahre später wird Italien für die Hochleistungsbahn kumulativ noch einmal 44 km Tunnels graben).

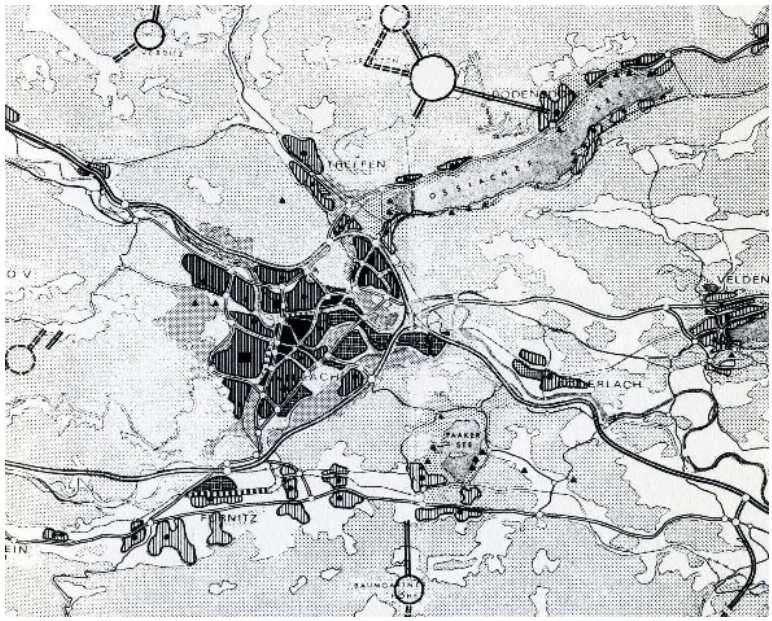

Fig. 4 b: Ausschnitt Großraum Villach aus Entwicklungsprogramm Kärntner Zentralraum (Kreissignatur: Schiesport Entwicklungsgebiete, Qu.: R. Wurzer 1972)

Mit der Regierung Kreisky II begann die größte Kraftanstrengung für Infrastrukturausgaben der Hochleistungsstraße der Nachkriegszeit. Die diesbezüglichen Ausgaben verdoppelten sich von 450 Mio. EUR 1972 inflationsbereinigt auf den vorläufigen Höchstbetrag von 870 Mio. EUR 1983. Die transalpinen Autobahnen kamen als transalpine Gesellschafts-Strecken in die Finalphase und die von der Reliefgeographie bestimmten teuersten Lückenschlüsse Wechsel und Pack wurden mit sogenannten „Sonderprofilen“ versehen (auf 100 km/h reduzierte engere Bögen und zum Teil nur im Halbausbau). Die Pack war so im September 1982 bewältigt, die schwierigen Griffener Berge (13,5 km St.Andrä – Völkermarkt Ost), die Rudolf Wurzer sich durch einen 19km-Korridor über Slowenien ersparen wollte, konnten erst 1990 eröffnet werden. Damit geriet das strukturschwache gemischtsprachige Südostkärnten (Region Feistritz i.R., Bleiburg, Globasnitz) in relativ große zeitliche Ferne zu einem HL-Verkehrsträger (tiefer Drau-Einschnitt als zusätzlicher Nachteil). Erst die Lippitzbach-Großbrücke (heute in Jörg-Haider-Brücke umbenannt) mit der Unfahrung Ruden hat unter Einbeziehung von Mitteln der Grenzland-Förderung seit 2006 diese Abseitslage abgemildert. Der derzeit in Bau befindliche neue A2-Knoten Völkermarkt mit der Umfahrung Völkermarkt-West zur Stausee-Brücke („Seeberg-Bundesstraße“/Landesstr.B Nr.82 nach Slowenien) dient auch dieser Grenzland-Erreichbarkeitsverbesserung.

Nach Ansicht des Verfassers sind die Raumordnungs-Vorschläge einer HL-Straße zwischen Steiermark und Kärnten von Rudolf Wurzer und Walter Strzygowski in der ungünstigsten politischen Ära der Sechzigerjahre publiziert bzw. diskutiert worden. Bis zur „Wende-Regierung 1970“ lagen die Straßenbau-Agentien immer bei der Österreichischen Volkspartei, beide Spitzenraumplaner standen jedoch der SPÖ nah. Der in Graz gebürtige Strzygowski war ab 1958 Vorstand des Instituts für Raumordnung der Hochschule für Welthandel in Wien bzw. später Lehrer von Franz Vranitzky an der Wirtschaftsuniversität (R. Breit 1990), Rudolf Wurzer besetzte ab 1959 die Lehrkanzel für Raumplanung an der TU Wien und war 1976-1983 gar amtsführender Stadtrat für Raum- und Stadtplanung in Wien (Großprojekte wie das UNO-Konferenzzentrum und das „Donauinsel“-Regulierungsprogramm wurden in seiner Ära durchgesetzt). Für eine „Umplanungstrasse Oberes Drautal“ war die Zeit noch nicht reif. Ein „Bundesverkehrswegeplan“ war noch ein Fremdwort. Als der Druck der „Fleckerlteppich-Angliederungen“ zu möglichst schnellen Entscheidungen drängte, hätte eine steirische Landesbaudirektion und wohl auch ihr Kärntner Pendant kein Verständnis

aufgebracht, Wurzers und Strsygowskis raumordnende Grundsatz- und Nachhaltigkeitsfragen eines Slowenien-Korridors (Fig. 5b) neu aufzurollen. Bei K. Sutschek 1960 war dies noch möglich. Der Erdölpreis blieb konstant, die Motoren wurden leistungsfähiger und so fürchtete man sich nicht vor 36 ‰ Längsachsenneigung und 1060m Seehöhe der Pack-Querung einer HL-Straße. Im Unterschied zu dem in Bau befindlichen Koralm-Basistunnel (6 ‰ Neigung / Scheitel 470 m / 200 km/h) der HL-Bahn muss der HL-Straßenverkehr für alle Zeiten im Winterhalbjahr schwierige Wetterlagen und 100 km/h Begrenzungen über weite Abschnitte der Koralm-Querung einhalten.

Ein anderer Staatsvertrag-Vorschlag mit unserem südlichen Nachbarn wurde auf Hochleistungschienen-Ebene vom in Villach geborenen Professor emeritus (Inst.f.Verkehrsplanung u. Verkehrstechnik TU Wien) Hermann Knoflacher für die Neue Südbahn ins Spiel gebracht. Bekannt ist Knoflacher und sein Schüler Macoun für Kritiken am Automobil generell, als Gegner von Großprojekten und hier insbesondere gegenüber den Südbahn-Großtunnel-Projekten. Sie verblieben bei der Koralmbahn-Variantendiskussion bei der südlichsten (Fig. 6 / Graz – Maribor – Draudurchbuchstal – Klagenfurt). Nach Ansicht des Verfassers sind die Vorteile, die Wurzer und Strzygowski für einen Radlpass-Lavamünd-Kurzkorridor über slowenisches Gebiet für eine HL-Straße forderten, für einen so großen Korridor im gesamten Drau-Durchbruchstal für eine HL-Schiene nicht übertragbar. Eine Kostenbeteiligung Sloweniens ist laut mündlicher Auskunft von Žan Oplotnik kaum realisierbar und die Umweltschutz-Maßnahmen im Drau-Durchbruch wären enorm.

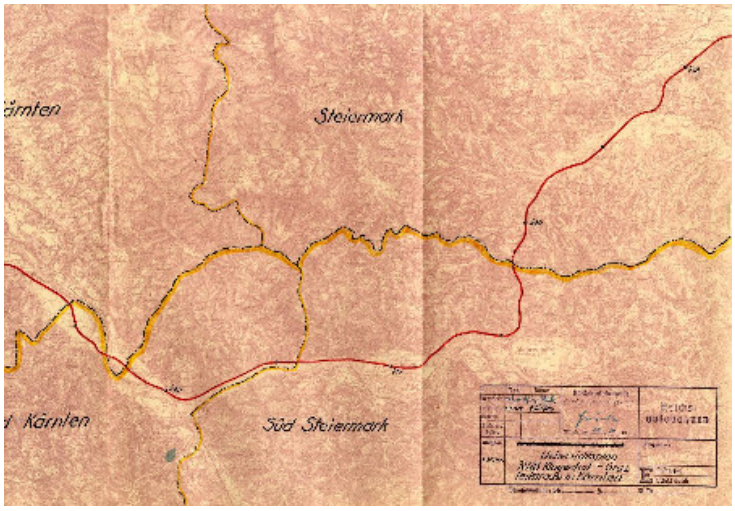

Fig. 5 a: Reichsautobahn-Umplanung 1942 (Qu. Übersichtsplan RAB-Direktion Villach im Kärntner Landesarchiv)

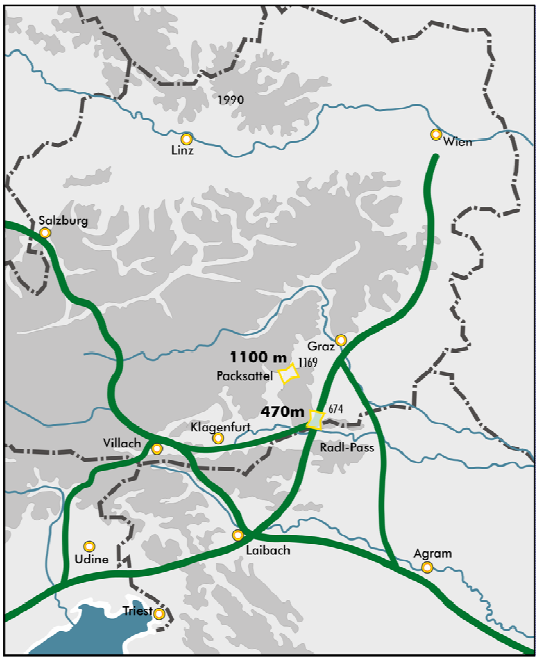

Fig. 5 b: Radlpass-Variante zur Scheitelminderung und Umgehung der Griffener Berge (Strzygowski in Sutschek 1960)

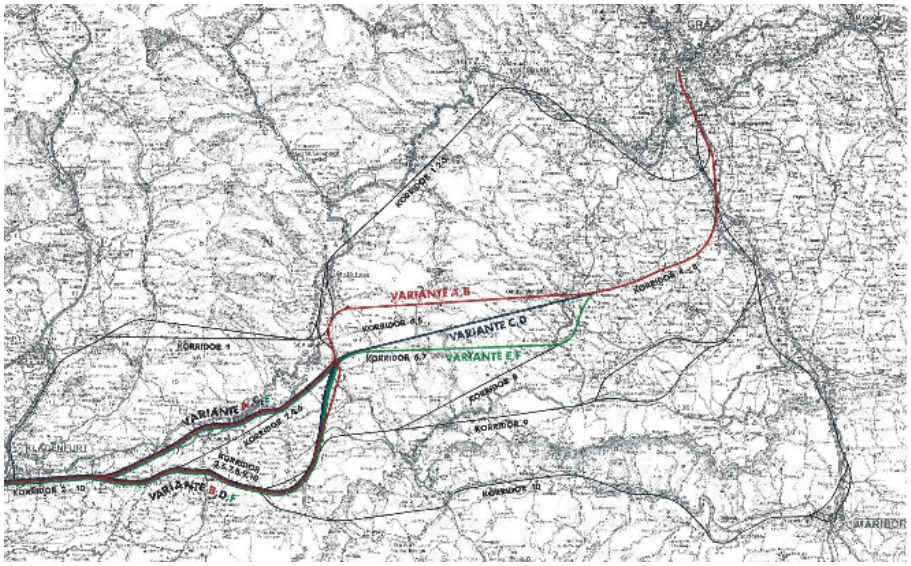

Fig. 6: Koralmbahn Varianten – die südlichste über Maribor wurde von Knoflacher und Macoun vertreten (Qu.: Zentrale Verwaltungsbibliothek Faller-Jaworski-Marx-Riedmüller-ÖIR 1991 in K. Rießberger 2007)

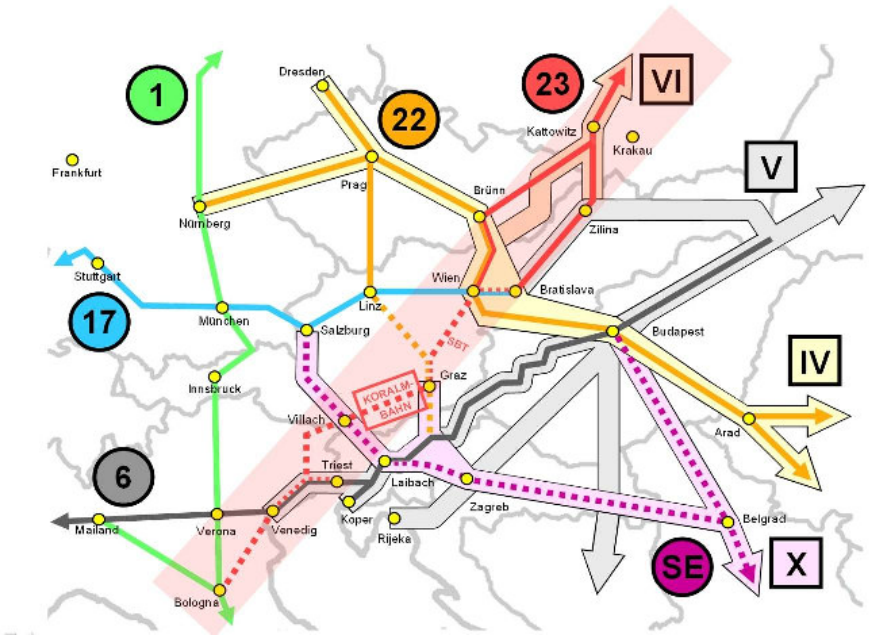

Fig. 7: HL-Verschränkung der Baltic-Adriatic-Axis zum TINA-Netz (Qu.: Adelsberger & Eicher 2008)

Ohne „Ecologically Compatible Tunnelling“ mit beträchtlichem Tunnel-Anteil ginge es auch hier nicht, wenngleich eine Anbindung der zweitgrößten Stadt Sloweniens an das österreichische HL-Netz seinen „Charm“ hätte. Die Umweg-Dimension ist nach dem international bekannten Eisenbahn-Fachmann Klaus Rießberger (2007) einfach zu groß, weil über Marburg die sogenannte „Kantenzeit“ (zur sinnvollen Vertaktung im HL-Netz) nicht einmal auf 1,5 Stunden gehalten werden kann. Die in Bau befindliche Koralmbahn-Trasse mit 6 % Längsachsenneigung ist jener Flachbahn-Trasse im Drau-Durchbruch sogar überlegen, vor allem aber mit der Kantenzeit von 1 Stunde zwischen Graz und Klagenfurt ohne Konkurrenz. Diese Kantenzeit im HL-Netz ist jedoch eine Grundvoraussetzung für das Abwerben des MIV von der A2. In Slowenien sind die Parameter HL-Straße / HL-Schiene umgekehrt. Dort hat nur die „Coridor5-Autobahn“ durch die kostenintensive Trojanipass-Bewältigung eine Direktverbindung Maribor – Celje – Ljubljana, die HL-Eisenbahntrasse (PP6 bzw. „Coridor 5“) berührt nicht einmal Maribor und verbleibt im Umweg des Sann-Tales (Celje – Savinja-Durchbruchstal – Zidani-Most – Ljubljana). Nach Eisenbahn-Parametern ist der PP6-Ausbau östlich Zidani-Most gar keine HL-Bahn (Achsdruck ausgenommen).

In einer Zeit, in der ganz Westeuropa an der Hochleistungs-Schiene baut, ist eine „Neue Südbahn“ eine Grundsatzfrage österreichischer Raumordnung, aber auch einer mitteleuropäischen, die im Grunde mit der

Vorleistung Italiens mit der HL-Strecke im Kanaltal (Udine – Pontebba – Tarvis / Fertigstellung 2001) und neuerdings mit der EU25-Erweiterung entschieden wurde, wodurch die „Baltic-Adriatic-Axis“ (PP23) zur Gänze auf EU-Territorium zu liegen kam. Nach Ansicht des Verfassers machte ein eben in Bau befindlicher „Hauptbahnhof Wien“ (der schon „Wien-Europa-Mitte“ tituliert wurde) in seiner Drehscheiben-Funktion ohne ein eingebundenes Nord-Süd-Bahnkreuz keinen Sinn. Kärnten hat durch diese schnelle EU-Erweiterung der 2000er Jahre und die Vorleistung Italiens, auf die soeben der italienische Außenminister in und für Triest Österreich auffordernd hingewiesen hat (Kleine Zeitung 7.2.2010), das Glück gehabt, in einer heiklen Diskussion zu Österreichs nachhaltiger Mobilitätsornung im Schulterschluss mit steirischen Interessen ganz knapp an einer Abkopplung von einem nachhaltigen HL-Verkehrsträger vorbei gekommen zu sein. Diese etwa ab 2020 verkehrswirksame HL-Bahn, dann von Danzig bis Bologna (Fig.7) weit gehend verkehrswirksam, wird zur überörtlichen Verkehrsentflechtung Südösterreichs und damit Kärntens ganz wesentlich beitragen – längerfristig auch gegenüber der Flug-Kurzstrecke – der Grundsatzvergleich von E. Hänsch (1995) wird immer schlagender werden. Ein Kärntner Tourismus, vor 100 Jahren ausschließlich von der Bahn abhängig und groß geworden, sollte sich Dienstleistungen überlegen, die eine retrograde Entwicklung einer Anreise auf der Schiene ermöglicht.

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🏆 *reviewed paper*

Understanding the city: Local Agendas 21, Territorial Audits and Urban Policies. Instruments and technologies applied in the AL21 of the city of Cuenca, Spain

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1 ABSTRACT

This paper analyzes the potentiality of the Local Agendas 21 to facilitate both the comprehension of the cities and the favouring of the local decision-taken processes. It details the techniques used in the Territorial Audit of the LA21 of the city of Cuenca (Spain), designed with the aim to detect existing problems and to indicate possible urban policies for the Local Social Forum. It analyses several topics related to social participation; local sustainability evaluation system and the graphical representations used as instruments of reference and monitoring.

2 FROM THE URBAN PLANNING TO THE TERRITORIAL SUSTAINABILITY

Cities have always been an object of planned interventions, though the urban demands of the industrial revolution where those that gave birth to the regulatory urbanism, in charge of planning the city according to a master plan. The 20th century consolidated the regional planning, as an instrument to give impulse to the economic and social development through a coordinated administrative management. The post-industrial era give a new insight to the planning process, giving the principles of the sustainability and the Local Agenda 21 as its principal instrument of action.

Unlike a traditional urban ordination scheme, LA21 is a strategic bet that allows solving urban problems without the bureaucratic-administrative requirements of a conventional planning instrument. Even though the methodologies applied to the drawing up of a LA21 are numerous, they all coincide with three basic topics: the problems identification and evaluation, the public participation, and the constitution of a Social Forum committed to agreeing on a Local Action Plan.

2.1 The problems exploration: the Territorial Audits

The fundamental activity in the draft of a LA21is to know the state of the local sustainability, since this not only defines the profile of the local situation but contains the elements required to define future local policies. The Territorial Audit is the instrument for detecting current and potential problems, studying the context from two complementary perspectives: the subjective one, related to know what the population feels and understands as problems, and the objective one, directed to detect territorial problems and opportunities. This double analysis drives to two concurring but methodologically different lines of work: the qualitative and the quantitative diagnoses. Unlike other territorial integral diagnoses, those ones are more expeditious, structured on the basis of much directed surveys and on a limited set of indicators.

The qualitative diagnosis gathers the perception of the inhabitants with relation to the territorial sustainable conditions. It is elaborated from public opinion polls directed to two different segments of the community: society in general and social key agents - associations, groups of pressure, institutions, etc. The pools statistical exploitation evaluates the citizens' vision related to the existing social, economic and environmental conditions while detect the aptitude of the local society to face the demands of the sustainable development, including the failures and the success of the existing social and political local system.

On the other hand, the quantitative diagnosis evaluates the real condition of the physical and socio economic context. It has an operative character built on the basis of indicators for which two factors are required: availability of updated and qualified information, including historical series; and the minor possible degree of spatial subdivision such as neighbourhoods, districts, blocks, etc.

The Territorial Audit ends its activity pointing out the principal problems and the possible actions to be taken. The selection of those possible actions, the fixing of its priority, the assignment of the agents in charge and, especially, the economic endowment for its attainment are specific activities of both the Social Forum and the local government. From the exercise of their corresponding functions the future Action Plan of action will arise, consolidating the local urban sustainability strategy.

3 KNOWING THE CITY OF CUENCA THROUGH ITS LOCAL AGENDA 21

The city of Cuenca (55.866 inhabitants in 2009), located in the Castilla-La Mancha Autonomous Region, leads a municipality characterized by a reduced demographic and urban dynamics, an acceptable urban services provision, an important but insufficiently exploited tourist-based potential, a reduced economic specialization and a scarce entrepreneurial dynamic. The draft of the LA21 was a part of the political program of its Town Hall, as it is testified by the approval of the "Declaration of Cuenca for Sustainability" in 2006

Map 1. Location: Cuenca and its administrative region

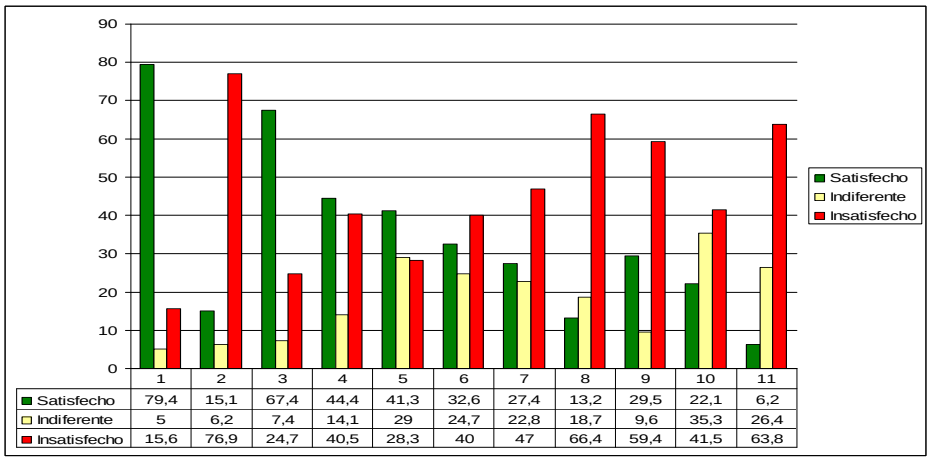
The technical works for the AL21 Territorial Audit were entrusted to a team of researchers belonging to the Institute of Geography, Economy and Demography of the Spanish National Research Council, the Complutense University of Madrid, the University San Paul CEU and the Royal Geographical Society.

3.1 The vision of the citizen: the public opinion

Opinion polls are strategic instruments for the drawing up of integrated diagnoses. Their results, no matter their sensitive or subjective character, offer relevant information for the ratification or nuance of the aspects gathered in the quantitative diagnoses. In this case of study, two different opinion polls were realised.

The first survey had a double objective: to know the degree of satisfaction of the citizens of Cuenca on a series of general urban topics, and to increase citizens´ awareness on the importance of its participation. For the accomplishment of this last topic, both the survey and the municipal campaigns of information about the LA 21 were launched at the same time.

Table 1 represents the citizens´ degree of satisfaction (satisfied, indifferent or unsatisfied) with regard to the following aspects of the city: Cuenca as a place to live (1), labour opportunities (2), open areas and natural environment (3), social and health services (4), educational centres (5), cultural provision (6), leisure facilities (7), public transport (8), civil safety (9), municipal services and facilities (10), civil participation in the municipal decisions taken process (11).



	1	2	3	4	5	6	7	8	9	10	11
Satisfecho	79,4	15,1	67,4	44,4	41,3	32,6	27,4	13,2	29,5	22,1	6,2
Indiferente	5	6,2	7,4	14,1	29	24,7	22,8	18,7	9,6	35,3	26,4
Insatisfecho	15,6	76,9	24,7	40,5	28,3	40	47	66,4	59,4	41,5	63,8

Table 1: Perception Survey results

The second survey was aimed to know concrete aspects concerning the Agenda 21, gathered into four big sections: Agenda 21, Environment, Urban Structure, and Society and Economy. For the AL21 section, questions were directed to evaluate citizens´ knowledge about the meaning of a LA21 as a participative plan for local action. The Environment questionnaire was directed to know some specific aspects that affect and determine the urban quality of life, such as protected spaces, forestry, rivers, quality of air, water, noise, waste or energy. The Urban Structure section deepened on three big topics: mobility, urban services and heritage protection, and urban image. The questions on Society and Economy analyzed several topics: immigration, civil safety and local police, attention to citizens, town hall information, access and use of the Internet, employment, business, and access to housing.

From the survey several considerations were detected, for example that the population had a scanty knowledge about the meaning of a LA21 and the fact that the Town Hall had putting in motion the drawing up process for the local one; the existence of several environmental problems affecting the conservation of the local natural resources due to pollutants of diverse origin; the deficits on mobility and public transportation, the lack of dynamism and innovation of the local companies; the low quality and the scarce quantity regarding employment supply, or the need to improve the relationships between citizens and Town Hall.

3.2 The sustainability profile: the indicators

The importance of the Territorial Audit is not only to detect the appropriate sustainable indicators but to evaluate them, for which to have access to available, updated and qualified information is decisive. The existence of historical series adds value to the diagnosis, since they allow the interpretation of possible trends. The use of statistical information proceeding from diverse sources, fundamentally censuses, municipal polls and official publications, favoured the technical analysis, based on real data, opposite to the sensitive vision of the citizen derived from the opinion polls.

Thematic area	Indicator	Threshold	Desirable trend
SOCIETY AND ECONOMY	Population growth	10,17	↔
	Aging population	138,80	↓
	Young population	15,43	↑
	Net density population	167,89	↔
	Illiterates up to 16 years old	1,73	↓
	Population with unfinished primary studies after compulsory education	38,73	↓
	Women in charge of single-parent families	2,40	↔
	Population up to 65 years old living alone	21,54	↔
	Population living in bad conditions buildings	10,95	↓
	Migrant population	10,95	↔
	Economic activities municipal licences	3,03	↑
PUBLIC SERVICES AND FACILITIES	Inhabitants within 300 metres from green areas	98,50	↑
	Green areas in relation to total urban area	15,04	↑
	Streets with trees	2,52	↑
	Inhabitants within 300 metres from health centres	19,68	↑
	Scholars (6-11 years old) within 300 metres from a primary education centre	69,56	↑
	Scholars (12-16 years old) within 300 metres from a secondary education centre	26,93	↑
	Means of transportation used for working	46,13	↓
	Trips average length	16,23	↓
	Accessibility to bus	94,71	↑
ENVIRONMENT	Domestic water consumption	166,84	↓
	Population within 300 metres from plastic packing containers.	99,35	↔
	Population within 300 metres from glass containers	99,57	↔
	Population within 300 metres from paper containers	99,70	↔
	Population within 300 metres from battery containers	88,85	↔
	Population within 300 metres from organic waste containers	99,93	↔
	Noise perception	28,03	↓

Table 2: Sustainability indicators

With relation to the selection of the indicators, they were coming fundamentally from the "Panel of Indicators of Local Sustainability of the Network of Sustainable Cities and Towns of the Castilla-La Mancha Autonomous Region". With the aim to ample the diagnoses, there were added those European indicators of compulsory fulfilment and others adopted by the research team to reflect local particularities.

The 94 finally selected had information at municipal level, except 27 that got information at census tract, fact that allowed a detailed profile of the urban sustainability for neighbourhoods and typical zones of the city (historical centre, central area, zones of residential expansion, industrial estates).

Table 2 shows the 27 selected indicators, the thresholds used, and the desirable trend of each indicator: to increase ↑, to maintain ↔, or to diminish ↓. The thresholds fixed as a value of reference was the weighted average between the maximum and minim situation registered in the different census tracts.

3.3 Understanding the city through LA21 instruments

One of the aims of the territorial sustainability evaluation is to put the numerical information into instruments of easy comprehension and interpretation for both local administration and citizenship. In this case of study, two types of graphical representations were used: GIS and Comprehensive Matrix.

The main aim of these instruments were to facilitate the drawing up of the future Local Action Plan and its related policies, giving spatial location to the problems, priority to the solutions and recording the information changes along the time.

3.3.1 GIS

As for the spatial location of the indicators, the GIS gave base to the technical diagnosis. It gave spatial correspondence to many indicators (index of aging, rate of illiteracy, water consumption) while facilitated make calculations that without this tool might not have been carried out (distances from public services, local mobility, net residential density). Another possibility for the GIS is its capacity to do simulations to know hypothetically certain situations.

It is expected that the updating of the information that feeds the system will allow a detailed follow-up of every indicator, mark its trends and make comparison among them in space and time.

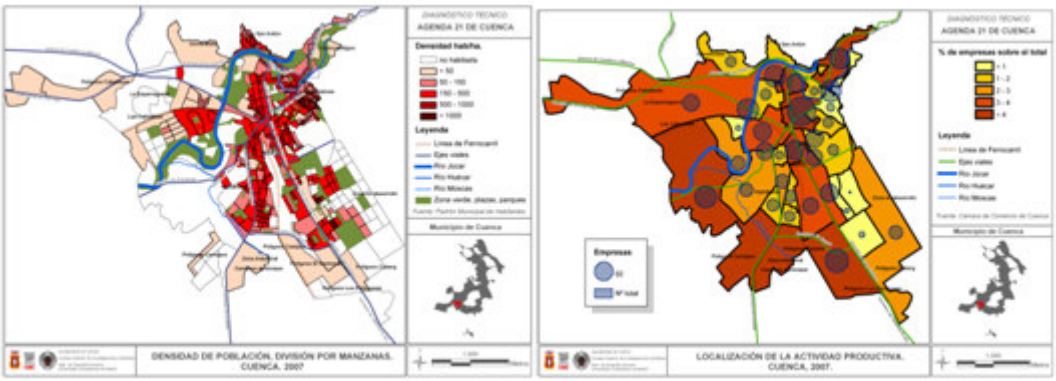


Fig. 2: GIS maps examples: density population and economic activities

3.3.2 Comprehensive Matrix

Thresholds are values of reference that allows finding critical and not critical situations from the sustainability point of view. The values under or below the thresholds were subdivided in three intermediate ranges - high, average and low – with the aim to detect the levels of efforts that every indicator needs to advance towards the maxim sustainability. This information gave pace to the so called band of balance, composed by the minimal critical and not critical ranges, assuming that a minimal negative value, still out of the threshold, demands reduced efforts to be improved.

Those numerical ranges were translated into a chromatic scheme of easy interpretation named Iconographic Tables, representing different situations: negative: critical high and average (red and orange); band of balance: critical low and not critical low (amber) and positive: no critic average and high (light and dark greens).

The aggregation of the Iconographic Tables for thematic areas gave place to the so called Comprehensive Matrix, graphics that allow to detect areas with adverse conditions of sustainability and to relate the state of every indicator to the remaining ones. The finding of chains of causality allows give attention to co-related effects.

Secciones censales	Hab. radio 300 m. zonas verdes	Hab. radio 300 m centros salud	Hab. radio 300 m colegios	Hab. radio 300 m. institutos	Hab. radio 300 m paradas autobús
	%	%	%	%	%
1001	100,00	0,00	69,39	0,00	96,96
2001	100,00	0,00	100,00	0,00	100,00
2003	100,00	22,71	100,00	0,00	100,00
3001	94,08	0,08	18,33	0,00	94,79
3002	100,00	100,00	100,00	64,86	100,00
3003	100,00	84,06	100,00	41,67	100,00
3004	100,00	9,32	100,00	11,76	82,90
3005	86,19	29,18	17,57	30,28	80,11
3006	100,00	0,00	25,00	0,00	100,00
3007	100,00	0,00	54,10	0,00	100,00
4001	100,00	0,00	98,72	0,00	77,56
4003	100,00	0,00	100,00	0,00	79,46
4004	100,00	0,00	70,24	15,94	88,94
4005	100,00	40,92	100,00	77,55	100,00
4006	100,00	10,23	54,00	17,65	100,00
4007	100,00	46,10	100,00	86,42	100,00
4008	100,00	7,31	100,00	6,98	100,00
4009	100,00	0,00	100,00	40,43	100,00
4010	100,00	0,00	100,00	0,00	100,00
4011	100,00	83,09	20,80	0,00	80,15
4012	100,00	4,35	100,00	94,62	93,66
4013	100,00	1,73	100,00	100,00	100,00
4014	100,00	12,10	47,73	0,00	100,00
4015	100,00	69,03	55,26	0,00	100,00
4016	100,00	51,06	100,00	0,00	100,00
4017	100,00	50,12	92,17	85,83	100,00
4018	100,00	0,00	63,23	55,50	100,00
4019	100,00	8,49	26,37	0,00	100,00
4020	100,00	0,00	70,00	81,73	100,00
4021	100,00	0,00	79,51	29,19	100,00
4022	96,53	0,00	38,92	0,00	97,58
4023	100,00	0,00	0,00	21,37	100,00
4024	77,78	0,00	0,00	0,00	69,25
4025	97,54	0,00	3,76	0,00	89,47
METAS	↑	↑	↑	↑	↑
UMBRAL	98,50	19,68	69,56	26,93	94,71

Table 2: Comprehensive Matrix of the Thematic Area "Public Services and Facilities"

3.3.3 The Municipal Integrated Diagnosis: proposals for future urban policies

The Territorial Audit sustains the technical recommendations of the Municipal Integrated Diagnosis (MID), a document aimed to encourage the draft of future urban policies. This case study, the MID offered a wide range of topics feasible to be translated into transversal actions. Some risk aspects detected for the city of Cuenca are:

- areas of high urban vulnerability, affected by loss of population and high index of aging

- areas with risk of social exclusion, due to conditions of illiteracy, single-parent families, high rates of immigrant population and shortage of specific public housing programmes
- decay of traditional neighbourhoods in historic centre, with a negative urban image and a reduced quality of life produced due to the lack of a stable rehabilitation policy
- unbalanced distribution of the economic activities, specially in the new low density residential expansions
- unstructured green spaces system, unconnected from the surrounding high valuable natural resources
- citizens are proud of the quality of the surrounding natural landscape but their perception about its conservation is unsatisfactory
- transport system highly dependant of the private car for daily movements, inefficient urban transport and scarce parking provision
- poor pedestrian accessibility, lack of pedestrian streets and spaces for alternative means of transportation
- lack of channels for communication between citizenship and Town Hall

4 FROM THE AUDIT TO THE FORUM: THE LONG WAY OF CITIES TOWARDS SUSTAINABILITY

Territorial Audits detect existing problems and indicate possible actions to the Social Forum and the local government. The responsibility of selecting the proper options according to the existing economic resources is in their hands. In this process, two required aspects have necessarily to coincide: the political will of the government to give course to the AL21 results, and the social co-responsibility of encouraging this activity in behalf of the whole community. In this unstable balance of determinations takes root the principal weakness of the approach that defends the draft of a LA21: the high dependence of relating to the moment circumstances they might limit the advances as for sustainability, turning it into an action politically attractive though ineffective in reality.

Even if the urban sustainability has established itself as a habitual practice in local governments - as it is demonstrated by the innumerable actions tackled worldwide - the results are still isolated and partial. In any case, local governments have to be adapted to the new times, centring their efforts on imaginative formulae that allow obtaining more with fewer resources.

The areas in local government where the major changes are expected are those concerning to management, control and results evaluation, for which the demands refers to departmental restructuring, reduction of the bureaucracy, rationalization in the use of local resources and administrative transparency, among others. Governance bets for the participation of citizens, organizations and companies for the definition of collective decisions. Examples in this respect are numerous, from programs of economic modernization, strategic plans, city-programs, participative budgets, environmental audits, partnership, administrative mediation in projects, up to the drawing up of Local Agendas 21.

Transforming existing cities into sustainable ones is a slow process consisting of small advances. But this will be the only way that in an indefinite future allows to the next generations to be much nearer of the paradigm that inaugurated the 21st century after years of excesses: to reach simultaneously the social well-being, the economic efficiency and the ecological balance.

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Urban Design and Lifestyle Changes. Creative Cities by Creative Citizens

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1 ABSTRACT

In relation to urban design, concepts can change. An abstract, cold design can disturb our idea of the city and, unfortunately, such design is very typical at the present time. The result of this is urban space design without citizens, the exclusion of a high quality lifestyle and natural sensations, and the production of spaces of little or no interest.

In the future we must change and this change should begin now with information and with new ideas. Citizen participation and involvement is very important because I think that in this context, sometimes architectural projects do not represent the interests of citizens. Citizens using the city on a daily basis often have different needs to those addressed in urban planning by local and national authorities and private planners. This paper develops this idea.

With regard to our feelings and new urban design tools, I want to show us a different view of the city, demonstrating contrasts in the urban landscape, a city full of life, the present situation and empty, open spaces. The city is the context of sensorial feelings, sounds and smells, while at the same time being the subject of iconic, representative and artistic elements. In this area we need to talk about the sustainability of our resources and also of our senses.

2 URBAN DESIGN AND LIFESTYLE CHANGES

At the present time, in relation to mutating cities and to changes in the image of cities, we often do not perceive subtle changes. The appearance of the city is not perceptible in our daily life and, probably, we need to view the city with the benefit of hindsight.

In relation to urban design, concepts can change. An abstract, cold, sterile design can disturb our idea of the city and, unfortunately, such design is currently very typical. The result of this is urban space design without citizens, the exclusion of a high quality lifestyle, the loss of natural sensations, and the production of spaces of little or no interest. These spaces are normally dynamic and full of references in a physical sense but, in the end, are static spaces in our memory, in a sensorial sense.

Regarding lifestyle in the city, factors such as people, space, weather, different situations, facilities or a whole ensemble of these can create a special perception of the city. I believe we can work with the citizens that live in these spaces and design solutions that better match their interests. This prompts the following questions:

- What is the meaning of rehabilitation in terms of the green city?
- Where can we work with abandoned spaces and not only on buildings or in the old city centre?
- When must we apply these ideas?

Rehabilitation is not only about the rehabilitation of buildings; I like to think of it in a more complex way. I want to think of urban or city rehabilitation in accordance with the concept of a green city. In contrast to this approach, we often talk about recycling while sometimes neglecting buildings and the cityscape.

An appropriate approach to rehabilitation should involve transport, infrastructure, private and public buildings, and so on. In this sense, I want to talk about recycling and not only concerning buildings, but also considering urban elements.

As well as this idea, we can refer to the configuration of built forms in interstitial and empty urban space, thereby working in empty, open or abandoned areas. Rehabilitation carried out on a small scale in these kinds of spaces should follow a master plan.

We can consider these changes in a non-static sense and, therefore, consider the city centre as a living organism. In addition, we can work with the citizens that live in these spaces to design a solution, which suits their interests.

As a consequence, new city projects applied to urban spaces or urban elements can evoke some of the most interesting ideas about cities. I am referring principally to those ideas that have taken place in our memory. These evoked urban spaces or urban elements are normally peaceful and empty in a physical sense, but in our memory they are probably dynamic in a sensorial sense. This evocation of feelings is frequently absent in new city projects and, therefore, as urban designers we must provide other kinds of feelings, and reject an indifferent approach.

For example, time can be different in different cities and different situations. Time in each city can represent one of its most relevant characteristics. Sixty minutes is different in dynamic Jaipur, peaceful Vienna, suggestive London, tourist Venice or chaotic Cairo…

With regard to our feelings and new urban design tools, the city is the context of sensorial feelings, such as sounds and smells, while at the same time being the subject of iconic, representative and artistic elements. In this area we need to talk about the sustainability of our resources and also of our senses, and in relation to this, we can ask the following questions:

- What is the smell and feel of the city? And more specifically, what do you feel? Fear perhaps? Or happiness?
- What about time?
- What are your first visual impressions? And later, over time, do your impressions change? Can you identify the differences and try to find the true reason for such differences?

The answers to the questions could lead to humanistic urban planning.

This paper develops this idea in different workshops that have taken place in diverse countries and universities. In this way:

Firstly, I want to show us a different view of the city, showing contrasts in the urban landscape and a city full of life, plus the present situation and empty, open spaces. These images can look like illusions inside our previous idea of the city. I try to discover beauty where it appears there is none. Probably, our impressions could change and our idea of the city will be alter too.

Secondly, I hope to have the skill to shape our ideas and to influence our ways of interpreting our environment. I try to make my work have an ideological dimension, so that it is not simply a transparent record of the world and of the activities that occur in it.

In the future we must change and this change should begin now with information and with new ideas. Citizen participation and involvement is very important because I think that in this context, architectural projects sometimes do not represent the interests of the citizens. Citizens using the city on a daily basis often have different needs to those addressed in urban planning by local and national authorities and by private planners.

3 CREATIVE CITIES BY CREATIVE CITIZENS

I present a proposal in relation to the city in general and to urban landscapes in particular. I refer to an approach, which applies the concept of the creative city to urban revitalization.

I have been working on two projects for at least three years. I analyze the city in two different and complementary research projects:

One of them is about the urban development of historic city centres, in particular in relation to their public spaces (squares, streets, etc.). The focus is the analysis of the city in relation to design but with a complementary viewpoint looking at the financial and social aspects of architecture.

Another project is about the perception of the city in relation to its character (its outstanding characteristics), its atmosphere (a subjective condition), its past, and so on.

In this last Project I am trying to find and show different contrasts and associations in relation to urban elements. It is a more artistic way of working than the previous project.

I analyze the city in a sensorial way, in relation to sight, touch, sound, smell, etc. I also compare the city and its urban landscape with nature (the natural environment) in an artistic sense. In this way, I am researching the role of different public spaces and elements which are the most characteristic or specific of the city: its texture (walls and pavements), its creativity (life, colour and art); its movements (the flow people, the reflections of its most characteristic materials), its emptiness (the transparency, the light, the shadows, the sounds).

4 THE OBJECTIVE OF THE PROJECT

The aim of the workshop is to analyze cities from an artistic point of view. The cities have been selected strategically according to the possibilities they offer for the artistic expression of their most interesting urban spaces and characteristic elements. The idea is create synergies and new options in relation to perception of the city.

I want to work with the idea of having an impact on the perception of cities, one which is far different from the typical vision of the city as a postcard image. In this way I would like to consider a different idea of the city, with varied and unusual points of view and diverse approaches to our homogeneous environment. These ideas present several standpoints, which highlight aspects of the city that may be hidden or operating on a secondary level.

I examine the city to provide a complementary approach: in an economic, a social and an artistic way, while not forgetting the subjective and sensitive point of view.

Sometimes we look at an object but we don't really see it, it goes unnoticed. Normally we have too much information about the city and we need to pay more attention in order to adopt a sensitive approach. This option can provide alternative proposals regarding urbanism.

5 AN URBAN ANALYSIS FROM AN ARTISTIC POINT OF VIEW

Firstly, my photographic work tries to have a influence on landscape images, making them full of life while at the same time dealing with absence and wide, empty spaces. I present disturbing ideas and an insinuation of imaginary worlds in which I try to discover beauty where it appears there is none.

I want to show an alternative view of the city, discovering contrasts between different elements in its urban landscape and analysing the current situation to make it look like an illusion inside a predetermined idea of the city.

At the end of the day, my work seeks to represent daily life, but in an isolated and descontextualised way which, consequently, creates a document of the strange, marginal and peripheral city elements. In this way, when I work in typical genres I tend to adopt different perspectives and points of view, far from the usual approaches.

Secondly, my photographic work has its background in an artistic, ethical and ideological dimension. The conceptual system I employ reveals my reflections on the present human condition and displays relationships of alliance and symbiosis, in addition to contrasts between pairs: the environment and man, landscape and architecture, or nature and culture.

6 WORKSHOP DEVELOPMENT

I am very hopeful about the project and at the moment, I think that it is possible to work on a subject related to the city, focusing on its public spaces in relation to its historical memory and its design. This Project is being developed in different workshops with students. These students could belong to different universities in the cities where we obtain the photographic works. In this way, the work could link different countries and I could involve some university students.

The workshop begins with a stroll around the city, taking photographs that can help us to understand it better. After this walk, we will be able to analyse the images that have been obtained. This analysis is carried out in two stages, employing different methods of analysis.

- Our interest may relate to the city as an individual place, showing us its most relevant characteristics or, at least, some of them. The result could be relevant in relation to the city and could provide us with some images that stand out in our memory.
- In addition, our interest may be in relation to different cities and the relationships between them.

The students can work in different ways, for example:

- They can work with pairs of contrasting concepts or with associations between different concepts.
- They can also work with complementary questions:
- What does your city mean for you?
- What are the most interesting characteristics of its urban elements?
- Finally they will be able to show us a few of their photographs, illustrating the most expressive and subjective or objective visions of the city.

After the analysis, we will have a more specific knowledge of the city and we can analyse the different visions of the cities from the perspective of university students. In addition, we will be able to show some photographs of a few countries and of the people from these countries.

7 PRACTICAL URBAN APPLICATION IN THE BUILT ENVIRONMENT SCENE

I want to provide some practical urban applications in the built environment scene, relating to the ideas I have outlined above. At the moment, and with institutional support, I am working on different international workshops with different universities. The workshop methodology is as follows:

The first step is for the citizens to get to know their own cities better and to be able to identify the most relevant city characteristics in a coherent, suggestive and synthetic way. As result of this analysis and this newly acquired knowledge, a new concept of the city can emerge and may be examined from different points of view and with complementary city parameters. These city parameters are the starting point for the practical urban applications.

In the second step, the citizens can discover new possibilities to increase or create financial results originating from the city's "memory" and from the city's intangible assets. I believe citizens relate more to their cities than to their countries. This closer relationship can be reflected in active participation by citizens in city projects.

The question is: How can they do this? How can they incorporate the factors which emerged in the first step? (see above) I would like to suggest some examples and work ideas:

City image as an urban planning tool.

Citizens could work on a more attractive image in relation to a city or urban area and, as a consequence, they could manage this idea in order to develop a new approach to urban planning. This could provide us with an effective qualitative analysis tool.

A physical point of view of the rehabilitation of traditional urban areas in cities.

Headquarters, streets, squares and buildings are the physical reference points for the creativity of citizens. These actions provide urban planning with a strategic framework in order to obtain financial results and to add value originating from the background city parameters.

In relation to the city, citizens could create financial alternatives, such as tourist businesses based on city walks, history, art, and different discovered elements.

In relation to rehabilitation and revitalization, citizens could promote a specific building or groups of buildings, both in relation to an urban public space. These buildings could be focal points inside the neighbourhood or even in the city as a whole.
Building rehabilitation could create communication by connecting the public spaces. In addition, citizens could be involved in the rehabilitation process and could be renovated themselves - creating work, culture, art, communication, etc. Citizens could create wealth by introducing alternative uses for buildings and public spaces and by utilising newly formed network opportunities.

8 CONCLUSIONS

As a consequence of these approaches, I set up a game involving several mirrors, which suggests a triple vision: on one hand, an artistic and ethical approach and, on the other hand, disturbing ideas, empty spaces, and an insinuation of imaginary worlds. Finally, in the middle, we find the spectator with his / her own vision.

Personal and subjective visions are normally different because when we read or look at something, we are interpreting it. Two persons' experiences are never the same.

I hope to have the skills to shape our ideas and to influence our ways of interpreting our environment, rather than simply presenting a transparent record of the world and of the activities that occur in it.

We can identify the elements and characteristics of some cities and relate them to intangible values. In recent years, I think, some city values, are be unknown o not considerate and, therefore, we should facilitate theirs emergence.

These intangible values could help us to understand our cities and to involve citizens in their development in a creative way. We could translate these values into economic results that could help us to develop our cities and improve our quality of life. Citizen participation could be employed to revitalize their own neighbourhoods, squares, streets, and, also, their own buildings.

In the end, this approach could lead to the idea of creative citizens, as a parallel to the idea of creative cities. Creativity and the participation could flow from the citizens to the city and vice versa.

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reviewed paper

Urban Land Use Management in Ljubljana: From Competitiveness to Sustainability - or vice versa?

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1 ABSTRACT

Ljubljana, the capital city of Slovenia, is the largest town with approx. 250.000 inhabitants, located at the cross-roads between Central Europe, the Mediterranean, and the South-East Europe. Ljubljana has been exposed since 1990s to the international challenges of globalization, Europeanisation and inter and intra-city transformation. As a result of successful macro-economic reforms and sectoral policies (1992-2004), the City Municipality of Ljubljana (NUTS 5) and Central Slovenian statistical NUTS 3 region (or Ljubljana urban region) became the most important locations of economic activities in Slovenia, and one of the most competitive urban areas in Central Europe - while at the same time preserving social cohesion, environment and the quality of life for local citizens. Since year 2003 local authorities including the City Municipality of Ljubljana have been also obliged by the new Spatial Management and Planning Acts (2002, 2007) to formulate and adopt their own long-term spatial development strategies, and detailed land-use plans according to the sustainable development paradigm but also to market demands of capital investors and landowners. The overall objectives of these spatial development strategies are to facilitate future development of Ljubljana as "competitive and sustainable Central European capital city in an enlarged Europe''. The successful implementation of different strategies and land use plans will depend upon the ability of local leaders to encourage active involvement of professionals, local communities, inhabitants as well as co-operation and partnership between different public and private institutions and other stakeholders in other to achieve complex goals of city competitiveness and sustainability - but also to accommodate the new demands for energy efficiency, low carbon cities, and the lack of capital investments at the time of global financial austerity.

2 INTRODUCTION

"A strategy is a long term plan of action designed to achieve a particular goal. A strategy is a target-oriented approach having in mind a long- term-plan, in controversy to short-term tactics as a part of a strategy". (ISOCARP Congress, 2005)

Ljubljana is the largest (267.760 inhabitants in year 2009, SORS) and the most important city in Slovenia (2.032.262 inhabitants, SORS), located at the cross-roads of Central Europe, the Mediterranean, and South-East Europe. Ljubljana, the historical cultural capital of Slovenia was exposed in the 1990s to the international challenges of globalization, Europeanisation (or rather "EU-isation"), political, economic and institutional reforms that have shaped inter and intra-city transformation of Ljubljana, increased city competitiveness in the (inter)national context with different impacts on economic and social cohesion

Since 1991 political, economic and institutional reforms in Slovenia have been under direct influence of EU recommendations for achieving Maastricht convergence criteria, harmonisation of legislation, standards, norms and policies, as requirements for fully-fledged membership of the EU in year 2004. Since 1995 Slovenia has appeared to be the most successful Central and Eastern European country in implementing political and economic reforms and managing its own domestic and foreign affairs (Hamilton et al., 2005). Historically, Slovenia was the most developed republic of the former Yugoslav Federation, and a market and export oriented country even before 1990, due to its geographical location, former "self-management" system of exposing companies to international competition, and business relationships with European partners. Slovenia has the most outward-oriented economy with a relatively narrow technological gap. GDP per capita is compatible with Greece and Portugal and two or three time higher than in other Central and Eastern European countries (Hamilton et al., 2005; Pichler-Milanović, 2005a). Slovenia became the fully-fledged EU member state in May 2004, adopted the EURO currency in January 2007 and joined the Schengen border area in December 2007. Between January-June 2008 Slovenia assumed the Presidency of the Council of the EU, as the first new EU member state to be entrusted with such responsibility.

The independence of Slovenia from the former Yugoslav Federation in 1991 was an important »trigger« for the capital city formation – strengthening administrative, financial and business functions, and internationalisation of Ljubljana, - strengthening of cross-border links with cities and regions in Central Europe, the emergence of the new political, economic and cultural links with (capital) cities in the EU member states, and (re)establishing contacts with other cities and in the former Yugoslavia (Pichler-Milanović, 2005a, 2005b). Ljubljana has substantial comparative advantages relative to other Central and Eastern European cities on the basis of the strategic geographical location in Europe, strengths of the national and city economy, institutional capacity for reforms, social cohesion and environmental quality (Pichler-Milanović, 2005a, 2005b).

But the overall spatial development and land use management of Ljubljana since 1991 was not a result of the spatial development strategy and land use plans adopted in 1980s, but due to the:

- macro-economic reforms and sectoral development policies in 1990s, that led to fully-fledged Slovenia'a membership of the EU in year 2004,
- location of economic activities and public services in the capital city of Ljubljana, as a result of capital city formation and enhanced city competitiveness;
- privatisation of housing and land in public ownership, restitution, de-industrialisation, de-regulation, etc. as a result of market and structural reforms;
- ad-hoc development decisions of investment-led public authorities in the city of Ljubljana and in municipalities in Ljubljana urban region – to accommodate private demands of population and commercial activities for new housing, offices, shopping centres, enterprise zones, etc, not taking in consideration urban identity or urban design recommendations;
- new spatial and land use planning regulation since 2002 with new strategic documents, laws, by-laws and standards but lack of effective land use policy instruments with negative consequences on property development;
- demands from capital investors and landowners for property investments irrespective of regulations to protect public vs. private interests;
- inadequate participation of civil society in the process of spatial and land use planning especially in the case of large (state) investments in infrastructure.

In Ljubljana coherent land use planning and strategic spatial development activities were neglected in 1990s because of the priorities of macro-economic reforms, and the negative connotation of the planning system with the former socialist regime. The most important urban land use projects in 1990s were mainly related with new multi-dwelling private housing development on brownfields (e.g. former military sites of the Yugoslav Army) or on unused urban land (mainly reserved for industrial development in 1980s), development of new shopping centres, completion of the circle motorway around the inner-city of Ljubljana, and residential and commercial sprawl at the periphery of the inner-city area or in suburban municipalities, etc. Most of these new urban projects occurred not according to the spatial development and land use plans from 1980s but through changing land use of particular land plots in existing spatial and land use planning documents to accommodate new demands of the population and capital investors.

3 THE LOCAL GOVERNMENT REFORMS: TRANSFORMATION OF THE CITY TERRITORY

From 1955-1994 the city agglomeration of Ljubljana was administratively divided into ***five communes***: Center, Bežigrad, Šiška, Moste-Polje and Vič-Rudnik. In 1991 the territory of Ljubljana agglomeration comprised of 902 sq.km and 321.607 (SORS, www.stat.si) inhabitants which expressed the diversity of city's geographic location and morphological form. Division of the city into five communes was made in the context of decentralisation and self-management reforms to achieve 'even' redistribution of resources (services, housing, industrial investments, etc.) despite disadvantages for urban planning and management.

In December 1994 new *Local Self-Government Reform Act* has changed the local administrative division of Slovenia - from 62 communes to 211 municipalities (NUTS 5) by year 2009 of which only 11 are the ***urban municipalities***. At the same time the state (re)created 58 local administrative (NUTS 4) units, equivalent to previous larger communes, with the exception of Ljubljana agglomeration (former five communes) that became one NUTS 4 unit after year 1994. New local government reforms in late 1994 transformed the city of

Ljubljana administratively and spatially. The official city territory was reduced from 902 to 272 sq.km. The administrative division of the agglomeration into five communes was abolished with establishment of the City Municipality of Ljubljana and 9 surrounding small NUTS 5 municipalities: Brezovica, Dobrova-Horjul-Polhov Gradec, Dol pri Ljubljani, Ig, Medvode, Škofljica, Velike Lašče, Vodice, and the new small municipality Log-Dragomer from 2009 onwards (see Figure 2), with their own mayors and municipal councils. ***The City Municipality of Ljubljana*** became the largest local authority in Slovenia.

Characteristics of administrative city of Ljubljana	**Ljubljana agglomeration (NUTS 4)***						**City Municipality of Ljubljana (NUTS 5)**
	Total	**Center**	**Bežigrad**	**Šiška**	**Moste-Polje**	**Vič-Rudnik**	
Area (sq.km)	902	5	46	156	152	544	272
Population (1991)	321607	28351	58150	82845	72081	80180	272637
Density (pop/sq.km)	357	5670	1264	531	474	147	1002
Settlements (NUTS 7)	292	1	8	54	38	189	38

Table 1: Administrative division of the "city" of Ljubljana (Source: Pichler-Milanović, 2005a. SORS, www.stat.si)

* Ljubljana agglomeration (1955-1994): former 5 communes (NUTS 5); Ljubljana City Municipality (>1994)

The most visible form of Ljubljana's capital city formation in 1990s can be seen in establishment of new ministries and government offices, foreign embassies, consulates, representatives of international organisations and foreign companies, and since EU membership in 2004 the increase in the number of foreign tourists and visitors, with renovation and enlargement of existing hotels and establishment of new tourist capacities. The other spatial impact of *internationalisation* is the development in transport infrastructure such as completion of motorways, expansion of Ljubljana international airport with transnational intercity flights, development of telecommunications and the importance of the information society (e.g. commerce, banking, governance, etc).

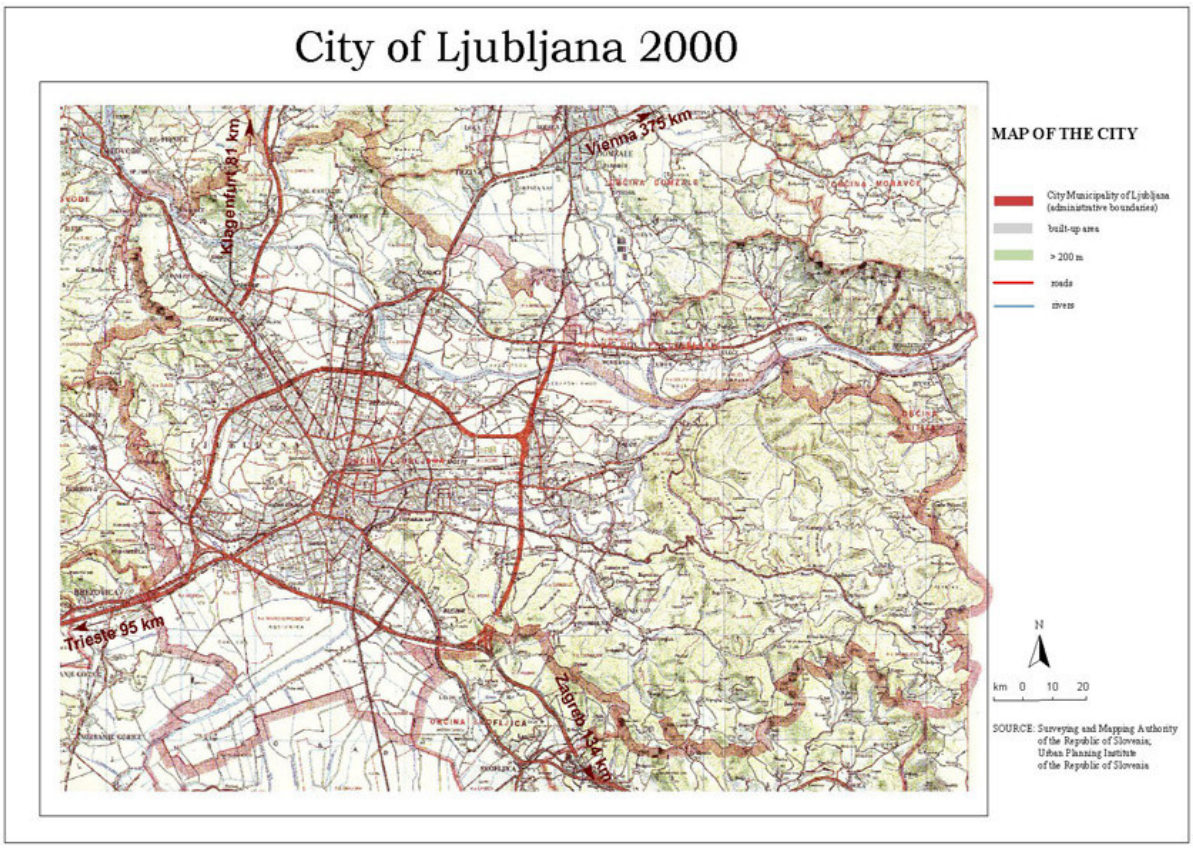

Figure 1: City Municipality of Ljubljana (NUTS 5), Source: www.gu.gov.si.

Until January 2010 no regional NUTS 3 administrative level (provinces) has been established as yet in Slovenia, due to long-term professional and political negotiations about the number and determination of administrative NUTS 3 regions. For analytical purposes ***12 »statistical« NUTS 3*** regions (known in 1980s as

»planning« regions) have been used for statistical and analytical purposes as well as in the regional policy documents known as »developing« NUTS 3 regions until the process of regionalisation is completed (by year 2011). The city of Ljubljana is a centre of Central Slovenian statistical NUTS 3 region, that is the largest region in Slovenia by population size (approx. 500.000 inhabitants) or 25% of total Slovenian population but not by the size of its territory (12.6% of Slovenian territory). Central Slovenian NUTS 3 statistical region is often called "Ljubljana Urban Region", especially after establishment of the Regional Development Agency of Ljubljana Urban Region in year 2002 (www.rralur.si).

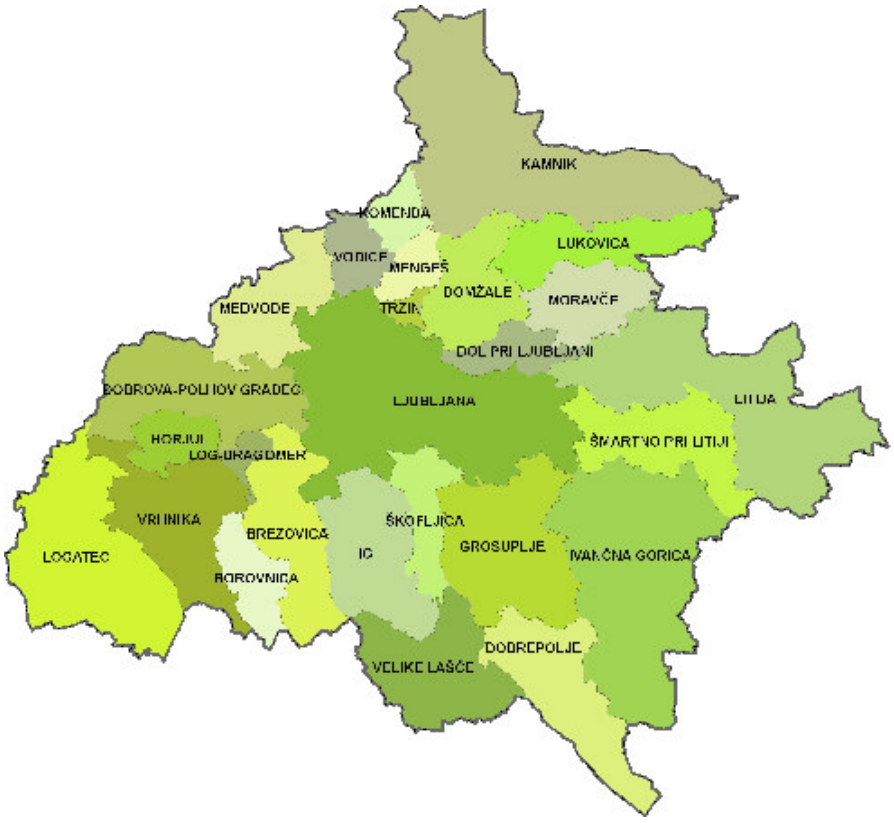

Figure 2: City Municipality of Ljubljana (NUTS 5) and Ljubljana Urban Region (NUTS 3). Source: www.rralur.si.

In year 2002 ***Regional Developed Agency of the Ljubljana Urban Region*** was established with the main task to prepare Regional Development Programmes of Ljubljana Urban Region for the period 2002-2006 and the new programming period 2007-2013, as well as operational programmes with the list of priority projects of regional importance eligible for EU funds. According to the regional development strategy of LUR the overall development goal is the following: *"Ljubljana Urban Region is a conurbation, intertwined with nature. The region will achieve high level of global competitiveness and high-quality living through encouraging creativity and co-operation. The entire region will benefit from Ljubljana being "a European capital"* (RRA LUR, 2007). To achieve this goal the main activities of LUR are:

- development of relationships between the public and private sector at the local, regional, national and international levels in order to promote development initiatives and enhance coherent regional development,
- acceleration of integrated regional development, planning and implementation of regional and other development programmes,
- acquisition of domestic and foreign financial support.

The most important regional development programmes of LUR are the following: accessibility for quality of life, preserved heritage, efficient high-quality spatial planning, efficient municipal utility services, equal opportunities – contribution to the region's competitiveness, culture – competitive advantage of the region, e-administration, supportive entrepreneurial environment (RRA LUR 2007).

4 POPULATION AND EMPLOYMENT CHANGE IN LJUBLJANA

During 1991-2009 the population growth occurred in Ljubljana urban region while population decline characterised the City Municipality of Ljubljana as a result of intensive suburbanisation and urban sprawl. In 1990s the construction activity of multi-dwelling buildings was deferred in the city of Ljubljana with lack of maintenance of housing estates. As a result of a difference in property prices between the city of Ljubljana and surrounding towns and rural areas in Ljubljana urban region, and the wage differences between Ljubljana and the rest of Slovenia due to location of better-paid jobs for educated and well-qualified people in Ljubljana, - the daily commuting for work, education and shopping has increased since 1994 towards the City Municipality of Ljubljana. This was also possible due to completion of the motorways along the corridors E5 and E10 and the circle motorway around the inner-city of Ljubljana (see also Pichler-Milanović, 2002, 2005a; Pichler-Milanović et al. 2007).

Total employment in Ljubljana urban region declined during 1990s, while growth of jobs was recorded mainly in public administration and financial services in the City Municipality of Ljubljana (www.stat.si, www.umar.si). Most people in Ljubljana urban region are employed in producer services (40 percent) as trade, catering, transport and infrastructure, financial, real estate and business services, and further 30 percent are employed in consumer services (i.e. public administration, education and research, health services), while less than 30 percent are employed in industrial activities. With respect to employment, key features are the concentration of services in the city of Ljubljana while secondary activities, especially manufacturing still dominate in municipalities outside the city agglomeration. The most important companies in Slovenia according to sales, exports, number of employees, capital, and net profit are actually based in the city of Ljubljana and near-by cities (regional centres) of Kranj (25 km north of Ljubljana) and Novo mesto (60 km south of Ljubljana).

Ljubljana urban region with 13 percent of national land and 25 percent of total population represents the most important location of economic activities that generates 35 percent of the country's GDP. GDP per capita in LUR was for 30 percent higher than the national average. LUR accounts for 27 percent of exports and 37 percent of country's imports respectively, 40 percent of the total value-added, and almost half of all foreign investments in Slovenia. Productivity (e.g. value added per employee) is more than 25 percent higher than in Slovenia while the average salary is 20 percent above the national average, mirroring the concentration of employment in higher value added activities (i.e. banking, insurance, public administration, pharmaceuticals, etc.), and showing a rather successful transformation from the "socialist industrial city" to competitive "service and knowledge-based European capital city" (see Pichler-Milanović, 2005a; www.rralur.si).

5 SPATIAL PLANNING AND LAND USE POLICIES IN LJUBLJANA

Urban planners tried to control the post-Second World War development of Ljubljana primarily through the Master Plan (1966) and long-term comprehensive development document for the period 1986-2000 called "Ljubljana 2000". The latter was initially approved in 1986 but partly revised in 1995 in line with the market ideology and property rights reforms (i.e. restitution, privatisation, abolishment of compulsory purchase, etc.). The other phenomenon that occurred is the unplanned development of free-standing single-family houses and the large scale of suburbanisation since 1980s onwards at the inner-city periphery and in suburban municipalities in Ljubljana urban region, with insufficient provision of local infrastructure (water supply and sewage system) and local services (schools, kindergardens), and the increase in individual motorisation, daily commuting, and transport congestion since the end of 1990s (Pichler-Milanović et al., 2007).

During transition reforms in 1990s spatial management and land use planning was in »flux« while directions from the spatial planning documents approved in 1980s were officially extended until recently. Only several amendments were added to the existing articles of the spatial planning legislation (i.e. Spatial Planning Act in Transition, 1993, 2000; Settlement Planning Act, 1993, 1997; Building Land Act, 1997; Construction Act, 1999, 2000). In 2002 the National Assembly of the Republic of Slovenia adopted the ***new Spatial Management and Planning Act and Construction Act*** with *Spatial Management Policy*, and two years later the ***Spatial Development Strategy of Slovenia and Spatial Order*** (2004). These documents were the first new spatial planning documents after Slovenia's independence (1991) introducing a new legal system and market economy rules but also the sustainable development paradigm. The *Spatial Management and*

Planning Act (2002) determines the responsibilities and procedures in spatial planning, and defines the types and contents of spatial documents at the national and local level. The law also introduces a new document, the Regional Spatial Development Concept. With this document, the municipalities and other local communities have an opportunity to coordinate their strategic development issues at the regional level. This is an »optional» document, filling the gap between national and local planning level until the establishment of administrative NUTS 3 regions (provinces) in Slovenia. In April 2007 the National Assembly adopted the new Spatial Planning Act with new hierarchy and content of spatial planning documents (e.g. bringing spatial plans and detailed land use plans back to the legislative agenda) at the national and local levels (but not regional). As a result all NUTS 5 municipalities are now obliged by this law to prepare the new strategic spatial plan and implementation (land use) plan – as part of new municipal spatial plan until the end of year 2010.

Ljubljana is the largest »urban settlement« (NUTS 7) and a »town« in Slovenia. Despite being the largest city in Slovenia, Ljubljana contains only about 15 percent of the total Slovenian population. This relatively low primacy rate of Ljubljana is directly related with the specificities of the urban network and settlement system and the polycentric urban and regional development policies in Slovenia from 1960s onwards. The Spatial Development Strategy of Republic of Slovenia (2004) is further promoting polycentric urban development of Slovenia through 51 »centres of (inter)national, regional and inter-municipal importance« (with 64 towns and urban settlements) and potential »functional urban regions« of 15 »centres of (inter)national importance« (i.e. regional centres). Ljubljana, the capital city, with Maribor, the second largest city (near Austria), and city conurbation (Koper-Izola-Piran) at the Adriatic coast near Italy and Croatia are defined as »centres of international importance«. The new concept of polycentrism (as before 1990s) highlights the improved (equal) accessibility to public goods – administration, jobs, services and knowledge, located in these 51 »urban centres«)[1]. They are the most important employment and service centres in Slovenia. Twelve of these 15 »centres of national importance« are also centres of current NUTS 3 (statistical or developing) regions. Therefore the polycentric urban development concept corresponds to the balanced regional development policies and development of transport infrastructure in Slovenia. The SPRS (2004) did not explicitly specify the role of Ljubljana as the capital city of Slovenia and the metropolitan area (e.g. functional urban region). But Ljubljana was recognised as a "weak MEGA" within 76 MEGA in Europe (among 1700 FUA) in the ESPON 1.1.1 project (2005).

5.1 New spatial development strategies and land use policies of Ljubljana

Since year 2003 all municipalities in Slovenia, including the City Municipality of Ljubljana, have been also obliged by the new spatial planning legislation to formulate new and/or adopt existing long-term spatial development strategies and concepts, municipal land-use plans with detailed site plans, and environmental impact assessments. The spatial development plans adopted in 1980s were mainly in use until now, with only minor changes to accommodate some ad-hoc projects that were not in accordance with the original land use plans (i.e. new commercial, recreation or housing areas). After adoption of the *Spatial Management and Planning Act* (2002) and new *Spatial Planning Act* (2007) and *Spatial Development Strategy and Spatial Order of RS* (2004) the City Municipality of Ljubljana has been preparing the new generation of local spatial development documents while up-dating and revising the existing land-use and site plans.

The first draft of the new city development strategy with spatial development concept of the City Municipality of Ljubljana was adopted in June 2002 under paradigm of sustainable development that also specified the list of programmes and projects needed for improvement of the city competitiveness, quality of life – and (partly) the internationalisation of the city of Ljubljana. These two planning documents are now part of the new more comprehensive drafts of the - ***Strategic Spatial Plan and Implementation Spatial Plan as part of the Spatial Development Plan of the City Municipality of Ljubljana***, being prepared according to the new Spatial Planning Act (2007). In year 2007 the City Municipality of Ljubljana has also adopted the new ***»Vision of the City of Ljubljana by year 2025«*** emphasising 22 strategic projects (from the list of approx. 100 projects) to be realised by year 2025, linking the three principal development aims of Ljubljana: »Ideal city« (i.e. the optimal city size – for living, working, recreation), ***»Sustainable city«*** (i.e. preserved

[1] In Slovenia only 58 urban settlements have the official status of "town", approved by the National Assembly or Municipal Councils. Since year 2003 the Statistical Office of RS has been also using the new definition and classification of "urban settlements" (156): 104 »urban areas« with 52 (sub)urban settlements).

natural and urban environment in the city and urban region), and ***»Slovenian metropolis«*** (European competitive capital city) (www.ljubljana.si).

The principle goal of this comprehensive draft of the ***Spatial Development Plan of the City Municipality of Ljubljana*** is the »smart city growth«, emphasising the internationalisation of the capital city through urban revitalisation, as the city of art, culture and knowledge, the safe and healthy city. Ljubljana is also an important transport node at the cross-road of E5 and E10 European corridors. The spatial development strategy also emphasises the quality of life for local citizens, preservation of local identity, enhancement of city competitiveness, use of information technology, while at the same time solving the city development constraints such as: suburbanisation and urban sprawl, decline of the city centre, inadequate maintenance of cultural heritage buildings and housing estates, and loss of urban identity with expansion of market forces, and globalisation of the cityscapes (www.ljubljana.si).

The Implementation Spatial Plan of the City Municipality of Ljubljana (municipal land use and detailed site plans), as part of the Spatial Development Plan of the City Municipality of Ljubljana, has been also prepared with revisions or adaptations of the existing land use plans. ***Environmental impact assessment*** has been also prepared including the expecting impact of the proposed strategic spatial plan and land use plans. From 15 December 2009 – 15 January 2010 these spatial planning documents were put to the second public hearing. The new Spatial Development Plan of the City Municipality of Ljubljana will need to be approved by the Ministry of Environment and Spatial Planning of RS and other institutional stakeholders before being adopted by the City Municipality Council of Ljubljana by the end of 2010 (www.ljubljana.si).

The capital investment projects in the city of Ljubljana that are approved in 2008 at the national level through operational programming activities are: new sports centre (under construction), new university and technical library, new medical centre, and improvement of transport infrastructure. In Ljubljana Urban Region (Central Slovenian NUTS 3 statistical region) the most important regional development projects are: new waste collection plants, integrative public transport, logistics centre, enterprise zones with technology parks, flood protection measures, and establishment of (natural) public parks. At the local level - the City Municipality of Ljubljana named 22 strategic projects, of which the most important are the new railway and bus station with offices, hotels, restaurants, shops, and construction of new or upgrading of existing sport and cultural centres and environmental projects (waste management and recycling plants). Some of these projects have been already under (re)development in parallel with the preparation of the Spatial development plan of the City Municipality of Ljubljana (www.ljubljana.si).

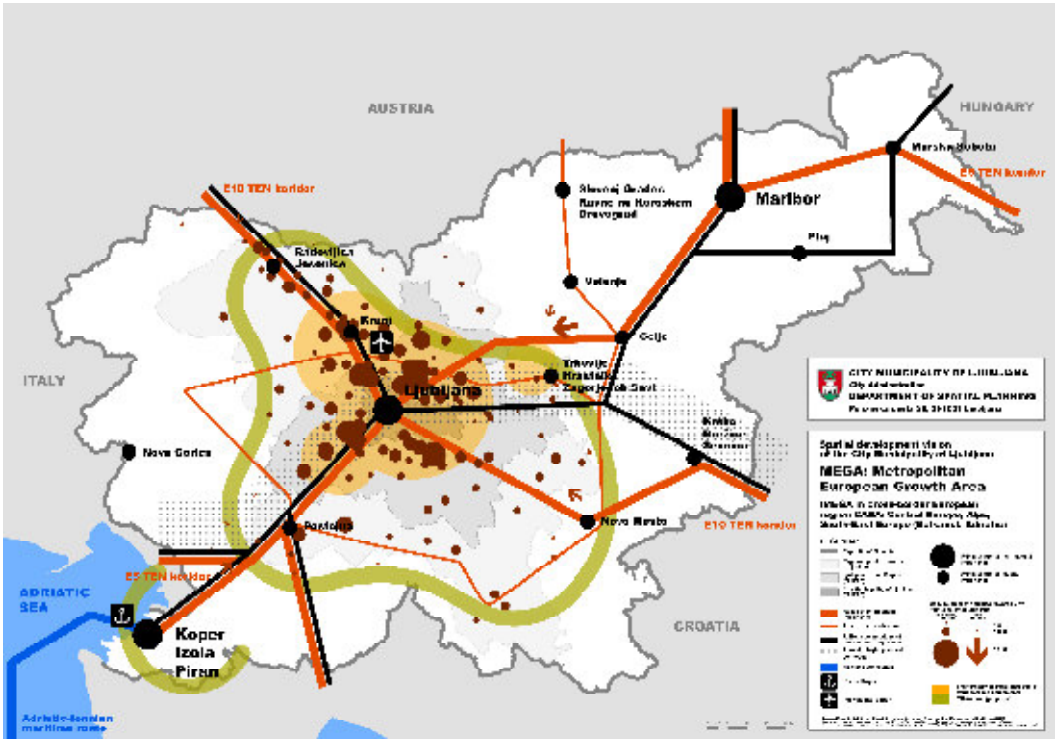

Figure 3: Ljubljana: "Metropolitan European Growth Area" (MEGA). Source: Department of Urban Planning, City Municipality of Ljubljana, 2007.

At the national level it is also important to strengthen the innovative, competitive, attractive and polycentric Ljubljana urban region. The geo-strategic location of the city of Ljubljana needs to be enhanced with strengthening of the position of Ljubljana metropolitan area from »weak« MEGA to »European engine« MEGA (as defined in ESPON 1.1.1 project, 2004) as well as to strengthen links and networks with other cities and regions in the cross-border Alps-Adriatic region, Central Europe, South-east Europe, and the Mediterranean - in order to become a central location in the new European potential integration zone (i.e. Alpe-Adria-Pannonia).

The new spatial planning documents of Ljubljana were prepared taking in consideration the international recommendation (UN, CEMAT, EU), especially the EU documents such as: Lisbon and Gothenburg Agenda(s), Territorial Agenda and Leipzig Charter (2007), and CEMAT Ljubljana Declaration on spatial impacts of sustainable development (2003). Also national legislation, sectoral strategies and programmes, professional studies, as well as needs and demands of various departments of the City Municipality of Ljubljana and other institutional stakeholders were taken in consideration during preparation of these documents. Therefore, for the fist time after 20 years, the new spatial development strategy and land use planning policy of Ljubljana has been prepared as a result of vertical and horizontal integration of different (new) documents at the (inter)national, regional and local levels with respect to requirements of the sustainable development and territorial cohesion paradigms. But the new spatial planning documents are also trying to satisfy the market demands of capital investors for different large scale projects that in some cases are not following the urban identity and urban design standards and recommendations (i.e. height of buildings, density, built-up area, etc) that are causing opposition from the inhabitants, new civil society groups, and professional planners.

During 2008-2010 Regional Development Agency of Ljubljana Urban Region coordinated a preparation of the first regional spatial development concept according to the new spatial planning regulation as a joint venture between the City Municipality of Ljubljana and other 25 municipalities in Ljubljana urban region - that represent an important first step towards preparation of the regional spatial development plan (www.rra-lur.si) after establishment of the administrative regions in Slovenia.

The next important phase in the spatial and land use management and development of Ljubljana will be the implementation of these demanding strategies, development goals, programmes, and projects - formulated at the national, regional and local levels, - especially now at the time of financial crisis since the end of year 2008 and economic and structural changes in Slovenia (e.g. unemployment, lack of new investments, property market collapse, etc.) and new demands for energy efficiency, retrofitting of buildings and low carbon cities.

6 CONCLUSION: FROM COMPETITIVENESS TO SUSTAINABILITY: OR VICE-VERSA'?

The jurisdiction and territory of the city of Ljubljana is different now than in it was before local government reforms in year 1994. Ljubljana is the capital city of Slovenia as the EU member state, the most important and the largest urban municipality in Slovenia. But the city agglomeration, urban region or functional urban area of Ljubljana is much larger than the City Municipality of Ljubljana. Due to lack of administrative NUTS 3 regions in Slovenia, the cooperation between the City Municipality of Ljubljana and 25 other municipalities in Ljubljana urban region is not sufficient for effective implementation of different horizontal and vertical strategies, programmes and projects being formulated at the (inter)national, regional or municipal levels.

Lack of coherent strategic and land use planning policies between the national, regional and city levels due to transition reforms in 1990s, and the »investment-led response of public leadership in a »planning« vacuum« in the City Municipality of Ljubljana, and surrounding municipalities in Ljubljana urban region, coupled with day-to-day urban problems and side-effects of transition reforms (e.g. privatisation, restitution, de-centralisation, etc.) have transformed the intra-urban pattern of Ljubljana (i.e. suburbanisation and urban sprawl, de-industrialisation, tertialisation, deferred maintenance of some buildings in the city centre and of housing estates, loss of urban identity, traffic congestion, etc.). Many projects were not developed according to the spatial development and land use planning strategies of Ljubljana from 1980s, but according to the needs and demands of the market economy and new public and private investors.

Recently there has been some cooperation between the City Municipality of Ljubljana and surrounding municipalities in Ljubljana Urban Region during formulation of the regional development programmes for 2004-2006 and 2007-2013 programming periods, implementation of some common infrastructure and environmental projects, and preparation of the first spatial development concept of Ljubljana urban region (2008-2010).

Therefore the successful implementation of the new spatial development strategies and land use planning policies of the city, municipality and urban region of Ljubljana depends upon the ability of local leaders to encourage active involvement of different professions, social groups and local communities, as well as efficient role of the city authority in implementation activities. Strong political leadership with co-operation and partnership between different public and private institutions and other stakeholders - that was often lacking until now - are important for the progress and essential for the implementation of comprehensive national, urban and regional development strategies in the future. The most important urban development activities need to be focused on improving the international position, role and identity of Ljubljana within the European urban networks, marketing the city's competitive advantages through implementation of the "flag-ship" projects. At the same time Ljubljana needs to strengthen economic, social and territorial cohesion to avoid the problems of homelessness, urban decline, social and spatial polarisation, crime and vandalism, or transport congestion, known to many other European cities. In order to achieve the overall goal of the new spatial development vision, strategy, programmes and individual land use projects - »competitive and sustainable Ljubljana with its own identity in national, cross-border, European and global networks« - a coherent horizontal and vertical actions are needed not only supporting growth but also other specificities of the territorial capital of Ljubljana in the (inter)national context.

Ljubljana may never become a Central European metropolis - as might be the result of global city formation and city competition between capital cities of Vienna, Berlin, Prague, Budapest or Warsaw. Yet, as a result of cultural heritage, quality of life, city identity and geo-strategic location in Europe – the middle size European capital city of Ljubljana has the opportunity to become an attractive meeting place and tourist destination between two global cities in Europe - Venice and Vienna.

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Urban Poverty and Environmental Conditions in Informal Settlements of Ajegunle, Lagos Nigeria

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1 ABSTRACT

In many parts of the world millions of people live in informal urban settlements especially in developing countries where lack of resources and inadequate infrastructural facilities lead to degradation of the environment. Deteriorating environmental conditions populate poverty. The issue of urban poverty in Nigeria as exemplified by the situation in Lagos being the commercial nerve centre of Nigeria has been aggravated by high rate of rural urban migration coupled with the inability of the urban areas to create jobs for the immigrants. Currently Lagos reflects the embodiment of the contemporary decay of urban life as evident in the standard of living, congested apartments, degraded environment, crime among others. This paper therefore examines the interplay between poverty and environmental conditions of informal settlement with Ajegunle, Lagos as case study. Social, economic and cultural characteristics as well as environmental issues associated with people living in this area are examined. For this purpose a reconnaissance survey of the study area was carried out and it was observed that there are currently a total of 4,236 houses from which 10% were selected for sampling. Therefore, by approximation a total number of 424 houses were selected for questionnaire administration. Systematic random sampling technique was used hence; every 10th house was selected for questionnaire administration. The findings revealed that majority of the residents are poor and their daily life pattern is characterised by unpleasant, unhealthy and difficult situation as a result of low financial capacity, lack of adequate infrastructural facilities and decent housing as well as environmental degradation. The study recommends the need to prepare detailed infrastructure network plan for the community with population density being the major index in determining the adequacy, improve the general quality of the environmental and physical conditions of the area, land tenure regularization, security of tenure and the need to recognize and improve the inhabitant means of livelihood which is centered on informal activities.

2 INTRODUCTION

The 1980s and early 1990s are commonly known as a period of urban crisis across the continent of Africa (UNCHS, 1996). This crisis reflected in the deterioration of urban services and infrastructure and changes in the labour market. The economic stagnation and the structural adjustment policies imposed on nearly all African governments did not also help matters as many people migrated to the cities from rural areas in search of a better means of livelihood. As a result of all these, the low-income and slum areas in the African cities generally became the fastest growing areas (Kanji 1996).

Today, cities in developing countries enmeshed in extreme poverty and fail to create the jobs necessary for development. The share of the population living in urban areas is rising inevitably. According to the report of the Global Urban Observatory (2003), urban poverty in developing countries is typically concentrated in slums and other informal settlements. The bulk of the urban poor in Africa as exemplified by the Nigerian situation are living in extremely deprived conditions and indecent housing with insufficient physical amenities like water supply, sanitation, sewerage, drainage, community centres, health care, nutrition, pre-school and non formal education. Nigeria with an estimated population of over 125 million and a land area of about 924 square kilometers has large deposits of oil, gas and solid minerals and a sizeable educated and skilled workforce. Despite these, the country has not been able to effectively harness her resources to develop the economy sufficiently to improve the poor condition of its people (Akpobasah, 2004). The UNDP Human Development Report 2004 ranks Nigeria as the 30th poorest country in the world. Currently about 65- 70% of the population lives below the poverty line, half of which probably lives on less than half a dollar per day and precarious situation (UNDP, 2004).

The issue of poverty in Nigeria especially in the urban areas as exemplified by the situation in Lagos being the commercial nerve of the country has been aggravated by the present trend of rural urban migration coupled with the inability of the urban areas to create the jobs necessary for development. Currently Lagos reflects the embodiment of the contemporary decay of urban life as evident in the poor standard of living, congested apartments, degraded environment, crime among others. The statistic released by UNDP in 2003 revealed that 51% of male residents and 54% of female residents of Metropolitan Lagos are poor and live in

a condition contrast to prosper, healthy and livable city. It is against this background that the research seeks to investigate the interplay between poverty and environmental condition in Ajegunle being the most populous informal settlement in Lagos metropolis.

LITERATURE REVIEW AND CONCEPTUAL ISSUES

Poverty can be defined in different ways. Some attempt to reduce it to numbers, while others argue that a more ambiguous definition must be used. In the end, a combination of both methods is used in defining poverty. Generally, economists and social workers use two approaches to define poverty. Some people describe poverty as a lack of essential items – such as food, clothing, water, and shelter – needed for proper living. At the UN's World Summit on Social Development, the 'Copenhagen Declaration' poverty was described as a condition characterised by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. When people are unable to eat, go to school, or have any access to health care, then they can be considered to be in poverty, regardless of their income. To measure poverty in any statistical way, however, more rigid definitions must be used.

Therefore, poverty is not only a state of existence but also a process with many dimensions and complexities (Mahmood). According to Ravallion (1995); Sen (1999) it is usually characterized by deprivation, vulnerability (high risk and low capacity to cope), and powerlessness. These characteristics impair people's sense of well-being. Poverty can be chronic or transient. Poverty has been defined in different ways, but it is important to know that poverty is not only defined in terms of economic needs (such as income or food). Poverty also has a social dimension (poor quality of housing and the living environment, i.e. lack of access to basic services like clean water, health care, education etc.). However, even a definition in economic and social terms does not describe poverty well enough. Apart from not having access to the benefits of development, poverty is also a lack of choice and of voice, of rights and security of participation in decision making (Shubert, 1996).

Consequently, urban poverty is a monster with many heads and arms that limits the possibilities available to the poor in the cities. The poor are marginalized to the point where they are unable to determine their own destiny. Two decade ago, only one third of the world's poor was living in urban areas while it is estimated that now half of the poor are concentrated in cities and towns. Currently, it is estimated that of the world's population of six billion people, half of whom live in urban areas, there are over one billion poor people living in slums and spontaneous settlements (UN HABITAT, 2003b).

The urban poor in developing countries nevertheless survive, because they can look after themselves. They find land in the city to live and build their own houses. If possible, they construct their toilet and drainage system. They tap electricity from an adjacent house through an informal connection. If they are threatened with eviction, they find another place to live. They work in irregular and low-paid jobs, and develop and operate micro-enterprises to make a living. They organize their savings and loans groups so that they can make investments in housing or business. They produce and sell goods and services to each other in quantities and quality for which there is a demand among the poor. The urban poor show a great ingenuity in finding solutions to their problems and meeting their basic needs (Fallavier et al, 1999). These solutions most often result into environmental problems inform of sub-standard housing, poor waste disposal system, poor environmental sanitation and degradation among others.

Almost everything the urban poor need is somehow available in the market. However, because the market is informal, if not illegal, and non-transparent, the poor have to buy whatever they need at a relatively high cost. Because they do not have much money, they buy goods and services on the informal market where the price per unit tends to be higher than in the formal market. Even if the public sector provides a good or service for free (e.g. education, health care), the poor have to pay to gain access, because free goods and services are always in short supply. As noted by Fallavier et al, (1999), the urban poor lack information (including information about their rights), therefore, they have to rely on middlemen who often take a disproportional cut. Because they cannot afford to follow the rules and regulations and are forced to operate in the informal sector (for their housing, their micro-business), they are always vulnerable to extortion (Fallavier et al, 1999). The urban poor would be less poor, if they did not have such relatively high costs of living.

2.1 The Urbanization of Poverty

Over 6 billion people currently inhabit the world and, despite a reduced population growth rate, this number is expected to increase to 8 billion over the coming decades (United Nations Population Division, 2001, 2002). It is important to note that most of this growth will occur in cities of developing countries. The term "urbanization of poverty" describes the process of cities becoming more and more the places where the poor of the world can be found.

In many developing countries, lack of employment opportunities in the rural areas contributes to urbanization, which is further accelerated by natural population growth. Often, however, cities do not offer sufficient employment opportunities for their rapidly increasing population. As a consequence, many cities are characterized by a high incidence of informal employment opportunities, which are unstable and yield only low incomes. The resulting poverty in combination with lack of affordable housing are driving forces behind the formation of informal settlements commonly known as slums, which offer only sub-standard living conditions to their inhabitants thereby compounding the poverty level.

It is an irony that the people in the cities are automatically better off compared to those living in the rural areas. Research by UN-HABITAT in 2003 has shown that 924 million people, or 31.6% of the world's urban population, are living under unacceptable conditions, and this figure will increase unless there is a deliberate efforts to improve the living conditions of current and future urban dwellers.

Urban poverty is a multidimensional phenomenon. The urban poor live with many deprivations. Their daily challenges according to Baharoglu and Kessides (2004) include; limited access to employment opportunities and income, inadequate and insecure housing and services, violent and unhealthy environments, little or no social protection mechanisms, and limited access to adequate health and education opportunities. He went further to state that urban poverty is not just a collection of characteristics; it is also a dynamic condition of vulnerability or susceptibility to risks.

The poor in the cities according to Baker and Schuler (2004) suffer from various deprivations such as lack of access to employment; adequate housing and infrastructure; and social protection and lack of access to health, education and personal security. Urban poverty is often characterized by cumulative deprivations: one dimension of poverty is often the cause of or contributor to another dimension.

2.2 Informal Settlements

The phrase informal settlements has been accepted as well as contested by scholars in various disciplines. According to Leeds and Leeds (1978), the occupation of land that does not belong to the person settling on it is what distinguishes informal settlements from other settlements. The inappropriate invasion of land characterizes these settlements as an illegal form of land use because occupation is neither based on the legal ownership of such land, nor in payment of rent to the legal owners. In a study identifying the significant variables that determine the character of squatter settlements, Leeds, (1969) argues that the uniform identifying characteristics are their illegal and unordered origins or organized invasion and, because of their origin, their continued juridically ambiguous status as settlements. Sietchiping (2000) refers to informal land use as any human establishment, human settlement or land use in the urban area which is not suitable or in opposition to the expected standard and regulations. Informal land use includes the poor and precarious housing within the city or in the city fringes or other areas where land are vacant, accessible and affordable.

According to Srinivas (2003) informal settlement is characterized by unauthorized use of vacant public or private land, illegal subdivision and/or rental of land, unauthorized construction of structures and buildings, reliance on low cost and locally available scrap construction materials, absence of restrictive standards and regulations, reliance on family labour and artisanal techniques for construction, non-availability of mortgage or any other subsidized finance. Study by Sietchiping in 2000 revealed that informal land use is characterised by overcrowding, deterioration, insecurity, absence or insufficient basic facilities. These conditions endanger the health, prosperity, safety or moral of the inhabitants and the community at large is unpleasant for living.

The development of informal settlement - the evolution of what are now described as illegal settlements- was blamed in the seventies on the tendency of the private land market to marginalize the poor (Turner, 1980; Gilbert and Ward, 1985). Informal land use according to World Bank (1999) constitutes an expression of poor urbanization and poverty of city dwellers as well as failed policies, bad governance, corruption, inappropriate regulations, dysfunctional land markets. Furthermore, informal (settlement) land use originated

from difficult problems of housing, immigration rate, politics, physical planning, landlessness, land tenure system and employment especially in the urban areas (Yapidiahou 1995). In particular, they originate from the existing gap between the number formal/regular land supply and the need.

In developing countries' cities, Lagos inclusive land in the formal market remains too expensive for the urban poor. Government allocations are slow and bureaucratic, and the land allocated for shelter considered usually insufficient. Recent empirical observations in nine African countries according to Mattingly and Durand-Lasserve (2004) revealed that informal land systems are effective enough in terms of the quantity delivered to be an alternative to formal urban land delivery systems. They are less bureaucratic and more flexible than formal systems. They are more effective in reaching poor people. However, their viability, sustainability and livability raise a series of questions as the system produce poorly planned areas with insufficient basic services as in the case of Nigerian cities.

Nigeria is one of the most rapidly urbanizing countries in Africa and the challenges that come with this especially in the supply of adequate land for basic services, decent housing and other uses that make settlement prosper, healthy and livable are major challenges that government faces (FMH&UD, 2003). This had long been recognised by government therefore; attempt to meet these challenges led to promulgation of land use act of 1978 which seeks to nationalize the land tenure system in the country and entrusts the administration on government. Nevertheless, in Nigeria today as epitomised by the situation in Lagos the informal sector is the dominant provider of urban land and housing, as only about 20% to 40% of the physical development in Nigeria cities is carried out with formal government approval. The weaknesses of government planning controls, and the haphazard developments associated with the informal sector have created disorderly and unhealthy urban environments (Nwaka, 2005). Generally, dwellings in informal settlements are built by the spontaneous undirected and untrained efforts of the squatters who cannot afford to secure legal or formal land or a safe site on which a house can be built. Usually informal developments are located on vulnerable and area such as deep or dangerous slopes. They are known as catastrophe prone areas (Sietchiping, 2000).

Informal land developments provide shelter for over 85% of the population of urban dwellers in most developing countries (UNCHS, 1996 and 2000; Durand-Lasserve, 1997). Yet, they either do not appear at all in government records or are regarded with so much negativism as to warrant constant harassment or exclusion from provision of necessary infrastructure and amenities (Durand-Lasserve and Tribillon, 2001; Agbola, 2001). As a result, actors involved in the informal and illegal land markets are denied access to formal opportunities for optimization of capital formation and accumulation.

According to World Bank (2006) over two-thirds of the population of Lagos lives in the informal settlements that are scattered around the city. The Lagos Master Plan 1980–2000 identified and classified 42 slums in the city. There are now over one hundred of such communities in Lagos. Many poor and low income families excluded from access to land and housing in the formal sector find refuge in the informal settlements where land and housing can be purchased and built according to means and capacity. Although, they generally lack security of tenure by virtue of not having the certificate of occupancy however, many informal settlement residents hold bona fide rights and interests in the land on which they live, having validly acquired land from legitimate land holding families or communities.

Driven by the quest to eliminate or drastically curb the spread of informal settlements, the government has used forced eviction as a preferred tool of urban engineering with counter-productive outcomes. Generally, these evictions are planned and carried out without regard for the due process of law. In addition to the broad range of social, economic, psychological, cultural and physical havoc inflicted on the victims, forced eviction has helped to fuel the growth of new informal settlements or the expansion of existing ones with more complex dimensions. These communities are routinely denied funds needed for the provision or maintenance of basic facilities such as community health centres or portable water (Morka 2007).

2.3 Environmental Condition of Informal Settlements in Lagos

Lagos urban agglomeration is characterized by a very significant presence of the urban poor, with a growing poverty profile. Informal settlements have multiplied over the years and the living condition of the poor is getting worse. Environmental decline, inadequate basic services and infrastructure in the informal settlements across the state hit the poor hardest. Informal settlements which range in size from clusters of

shacks to entire districts are scattered across the state in many local governments area. The number of informal settlements and informal settlements dwellers in Lagos Metropolis are increasing at a faster pace on daily basis. As far back as 1984, 42 settlements had been identified as blighted (UNCHS/Lagos State Government). The number has risen to about 100 as at 2004 (UN-Habitat/Lagos State Government, 2004). The study carried out by Nubi and Omirin in 2006 revealed that over 70% of the built up area of the Lagos metropolis is blighted. Although, presently there is no accurate data on the exact number of such settlements and their population but there are indications that there are over 200 of such settlement in the state. It is observed that the informal settlements are located on private and government lands without access to basic services. The poor, not only dwell in the slums of the city but are spread in squatters and informal settlements located in vulnerable areas such as swamp, canal setback, rail line setback, marginal land among others, deprived of basic infrastructural services. This makes them more vulnerable to environmental degradation, threats of eviction, ejection and demolition.

The urban challenges of developing countries as identified by Population Reference Bureau in 2004 include environmental hazards, natural disasters, public and reproductive health, and poverty. These are all apparent in the various pockets of informal communities located across Lagos metropolis. The environment components such as land, water and air which provide support system for healthy living are been polluted daily in Lagos as a result of pressure on them due to human developmental activities and desire to meet daily livelihood. According to Gandy (2006) the city's sewerage network is virtually non-existent and at least two-thirds of childhood disease is attributable to inadequate access to safe drinking water. In heavy rains, over half of the city's dwellings suffer from routine flooding and a third of households must contend with knee-deep water within their homes during raining season.

With this situation, the poor are mostly affected because they often live in ecologically vulnerable areas. There are many of such settlements in Lagos notably, Ajegunle, Makoko, Iwaya, Amukoko, Ilaje among others.

2.4 Urban Poverty, Environmental Conditions in Informal Settlements as a Bane of Achieving Livable, Prosper and Healthy Cities

In the 21st century the world has become urban, with the majority of the global population living in cities and towns. The fastest rates of urbanization are now taking place in developing countries, where average incomes are the lowest (Weiss, 2001). This suggests that poverty which used to be a rural phenomenon is becoming gradually more urban issue, especially in the developing world. Urban areas are the main generators of economic prosperity, and thus are best positioned to contribute toward the elimination of poverty. Urbanization is an incentive to development and wealth creation in the sense that cities are places of innovation and attractors of industrious and agile individuals (Serageldin, 1996). However, the potentials of urbanization especially in the developing countries have been hampered by the its overwhelming negative effects such as congestion, poverty, environmental decay, pollution, unemployment and incidence of informal settlements formation as a result of inability of government to adequately meet the housing and infrastructure needs of the urban poor. Urban poverty has many dimensions. It can generally be characterized by a combination of the following characteristics: inadequate income and inadequate or unstable economic assets, inadequate social capital, lack of services and infrastructure and inadequate housing.

It is worrisome that today millions of people still live in indecent housing in informal urban settlements without basic services like clean water, sanitation, basic roadways or footpaths, and drainage. This is a common phenomenon in Lagos urban centers. The impacts of service failures and indecent housing on health, livability, prosperity and sustainability of human settlement cannot be over emphasized. Housing in its present day definition is more than just a shelter but include the environment and all necessary infrastructures that make life comfortable. Housing is a key determinant of quality of life that can be measured at individual, household, and community levels. It has economic, social, and psychological and physical significance which support community functioning. The need for adequate and decent housing is now part of the central focus and an integral component in National strategies for growth and poverty reduction. Decent and affordable housing is one of the basic needs of individuals, the family and the community at large. It is a pre-requisite to the survival of man. Housing as a component of the environment has impact on the health, livability, prosperity, efficient, social behaviour, satisfaction and general welfare of the community at large.

However, it has been established that housing problem in developing countries' cities as exemplified by Lagos is not only limited to quantities but also qualities of the available housing units environment. The problem is more pronounced in urban informal settlements where overcrowding, congestion and inadequate facilities have become order of the day. These problems are more compounded by lack of legal title (secured tenure) of the residents. It has been argued at different quarters that security of tenure is one of the most important catalysts in stabilising communities, improving shelter conditions and provision of decent and adequate housing for the urban poor who are mostly accommodated in informal settlements which are characterized by poor environmental conditions.

The environmental quality of urban areas has a serious effect on the health status of all urban residents. While the entire urban population suffers from poor environmental quality, the urban poor tend to be the most vulnerable as they are often living in marginalized parts of the city, contiguous with waste sites and well beyond the reach of water, sanitation and other environmental services. Their situation is further amplified because they do not have sufficient resources to invest in infrastructure improvements. The negative consequences of poor environmental quality impact every aspect of their lives as well as the livability and health of the community at large.

Healthy cities require safe, easily accessible, and affordable water; sanitation; safe home and work environments; clean air; and reduced exposure to disease pathogens. Poor housing conditions, exposure to excessive heat or cold, diseases, air, soil and water pollution along with industrial and commercial occupational risks, which are inherent features of informal urban settlements and their dwellers, exacerbate the already high environmental health risks for the urban poor. Lack of safety nets and social support systems, such as health insurance, as well as lack of property rights and tenure, further contribute to the health vulnerability of the urban poor.

3 THE STUDY AREA (AJEGUNLE)

The study is set in Ajegunle which is located in Ajeromi Ifelodun Local Government Area of Lagos state Nigeria. The site is a major informal settlement, often described as 'jungle city' with a multi-ethnic population. It is the most populated slum in Lagos State. Ajegunle has a population density of 750 the highest of all slums in Lagos state. The slum area of Ajegunle constitutes 12.8% of the total area of all 42 blighted areas as at 1995. According to Stoveland Consult, WTP Study of 1997, majority of the multi-ethnic population of Ajegunle are of school age and highly, economically productive. Ajegunle is made up of five resident communities, and consist of people from all parts of the country with the dominant groups being the Ijaw, Ilaje, Hausa, Ibo, Urhobo and Yoruba ethnicity. Their main occupation is trading in the formal and informal sectors. The average household in Ajegunle spends about N6000 on food, N2000 of transport, N600 on housing and N885 on energy/fuel for cooking and lighting. Despite the slum nature, these figures of economic information are comparable to the Lagos average as found in 1995. Nevertheless, the present study is carried out to validate some of these figures.

4 METHODOLOGY

Two main types of data – spatial and attributes – were used for the study. These were obtained from the primary and secondary sources. The secondary sources include; published materials from journals, textbooks, government publications and gazettes. Primary data was obtained through personal observation and questionnaire administration. Questionnaire was designed and administered to elucidate information on socio-economic characteristics, building conditions, infrastructural facilities and environmental condition of the study area. Direct observation was also used to validate claims and responses on physical, environmental and housing conditions of the study area.

This study adopts Survey Research Design method, because it allows the establishment of unique characteristics of the population and the ability to develop a detailed picture and intensive knowledge of the case study. A reconnaissance survey of the study area was carried out and it was observed that there are currently a total of 4,236 houses from which 10% were selected for sampling. Therefore, by approximation a total number of 424 houses were selected for questionnaire administration. Systematic random sampling technique was used hence; every 10th house was selected for questionnaire administration. Data are presented on the socio-economic characteristics, building conditions, infrastructural facilities and

environmental condition of the study area. The analyses of data are therefore presented below to explain poverty and environmental conditions of the study area.

5 FINDINGS AND RESULTS

5.1 Socio–Economic Characteristics of Respondents

The study reveals that larger proportions of the respondents are male with a figure of 231 (59.2%) most of whom are of adult age of 20 years and above. Majority of the respondents are educated having at least basic primary education. It can therefore, be concluded that it will be an advantage in case of any attempt at improving the environmental conditions of this settlement, since it may not be difficult to communicate with them at the same time get practical input from them.

The study further reveals that majority of the respondents are Yoruba with a figure of 194 (49.7%) follow by Igbo which records 136 (34.9%) and Hausa with 21 (5.4%). People from other ethnic groups are not significant in the study area. As observed during the survey, majority of these people came from other states outside of Lagos. The Yorubas among them are mostly from Yoruba speaking states in the North Central geo-political zone (Kwara and Kogi States). The historical background of the people revealed that they were mostly traders from these hinterland states who used to stop over during their trips, until when they gradually began to make temporary structures that could accommodate them for the period of their transactions. The site later became prominent for such functions to the extent that the temporary habitation became relatively permanent homes for most of these people. Friends, family members and other relatives were invited and the process of permanent occupation began which, was later consolidated, sustained and established.

Typical of any informal or squatter settlement, the study reveals that majority of the respondents are employed in informal sector. 52.1% are traders, 30% are artisan, 7.9% are civil servants, 2.1% are farmers, 1.5% engaged in fishing while the remaining 6.4% fall in other category. This could be attributed to the fact that the area is dominated by poor immigrants, characterised by the informal activities that is uniquely associated with the low income groups. Majorities of the residents earn less than N10, 000.00 a month while only few of them earn above N50, 000.00 a month with a figure of 175 (48.3%) and 21 (5.8%) respectively. This suggests that majority of the resident live below poverty line. The implication of this is reflected in the daily standard of living as many are unable to meet their basic needs which make life more unbearable for them. Average number of household per building in the study area is between 5-6, while the average number of people per household is between 7-8. Further investigation revealed that the average room per building is six and average number of people per room is four. This suggests that the occupancy ratio is on the high side. The implication of this is reflected on the existing infrastructural facilities and daily life of the residents which is full of unpleasant and difficult situations.

5.2 Building, Infrastructure and Environmental Conditions

Over 70% of the buildings in the area are Brazilian type while 13.1% of the buildings in Ajegunle are traditional compound type and 9.2% are flat. It is not surprising that most of the building are Brazilian (face me and face you) buildings or rooming apartment because it is believed to be the main design and characteristics of low income group as well as poor communities in Nigeria cities. Most of the buildings (50.3%) are predominantly residential however, a significant proportion representing 40.5% of the buildings are mixed use while other land uses account for 9.2%. Personal observation revealed that the activities within the mixed use include residential, shops, schools, place of worship. This means that many of the residents engage in informal activities such as petty trading within their homes.

Most of the buildings sampled in the areas have been built over 20 years ago. 75.2% represents age of the buildings above 20 years in the study area. 17% of the buildings were built between 11-20 years ago while 5.1% were built between 6-10 years ago and 2.7% were built less than 5 years ago. Further investigation revealed that some of the recent buildings which are less than five years were rebuilt from the old decaying buildings. This suggests that the community is an old settlement and had been built up long ago.

About 85.9% of the buildings are accessible by roads but, the main problem is that majority of the roads are not tarred and the conditions are extremely poor. The roads are characterized by poor drainage, lack of street lighting, absence of pedestrian walkway as well as on street parking. Also some of the roads are used as refuse dump site.

Conditions of the roofs, walls and foundations were used to assess building condition. The survey revealed that larger percentage of the buildings is extremely poor. 80% of the buildings are poor, 13.8% are fair while 6.2% of the buildings are good . Further investigation revealed that poverty (lack of money), fear of forced eviction and long time neglect by government as claimed by the residents are major factors responsible for the present poor conditions of the buildings as well as overall physical and environmental condition of the communities.

The study revealed that 81.8% of the residents shared toilet facilities, 14.4% have access to private toilet and 3.8% of the residents do not even have access to toilet facilities. Field investigation revealed that significant proportion of these toilets are located outside or away from the buildings and their conditions are generally poor. Sharing of toilet facilities by too many people has bad environmental and health implications.

Majority of the respondents (75%) shared bathroom similar situation is applicable to kitchen, as high as over 81% shared kitchen. Also, some of the kitchen, bathroom and toilet facilities are detached away from the main buildings which make them not too convenient for use at some particular time of the day especially at night. Field observation revealed that the conditions are very poor.

5.3 Assessment of Community Infrastructural Facilities

Assessment of the infrastructural facilities by the residents revealed that the daily life pattern of the residents is characterised by unpleasant and difficult situation as majority adjudged that the conditions of the available infrastructural facilities are poor while some basic ones such as play ground, open space, recreational area, fire station, among others are not even available. These claims were also verified by personal observation and were found to be true.

Electricity is provided by Power Holding Company of Nigeria (PHCN but, the supply is erratic. This is not surprising as it exemplify the general power situation in Nigeria. The area lacks effective refuse collection service and has no central sewage system therefore, the main mode of solid waste disposal is through chart pushers who eventually dispose them to unknown destination or at times on the existing streets.

The need for children to play coupled with the absence of playgrounds has made them to convert streets to playgrounds. The existing road conditions are extremely poor while most of the buildings do not have access to potable public water supply, however, larger proportion get there water supply from well and borehole own by private individual.

6 RECOMMENDATIONS

With reference to the issues discussed under research findings and results as well as the issues arising from reviewed literature, recommendations in this study are structured into broad areas on: how to alleviate the poverty of the residents, improve the level of infrastructural facilities, housing conditions and general environmental conditions of the study area so as to achieve a Healthy, livable, prosperous and sustainable human settlement.

It is evident that decent housing is a major problem of informal settlement dwellers. This is largely due to their low level of financial capacity coupled with inefficient land administration system which have further exclude them from urban life and increased their vulnerability to eviction, disaster and environmental health problem. Therefore, any attempt to achieve livable, healthy and prosper cities must as a matter of urgency address housing issue. This means that there must be a conscious effort focusing on provision of decent housing for the poor at an affordable rate. This can be achieved through different means such as site and services, compressive housing. Also, the issue of land tenure must be looked into because land is a major factor of housing provision. It becomes very difficult to provide decent housing and basic services to the poor where the title or the interest on the land is unclear. Furthermore, urban informal settlements dwellers can be encouraged to improve housing and general environmental conditions of their settlement through land regularization that guaranties security of tenure and provision of array of basic facilities. Improvement in the living environment of the poor will help them to be more productive and increase their income over time while security of housing and land tenure is expected to help the poor overcome the problem of social exclusion from urban life.

The study discovered that the amount of infrastructural facilities available in the study area is grossly inadequate while some are not even available. Availability and adequacy of infrastructural facilities is a

major factor that determines the environmental condition and livability of any settlement. Therefore, efforts should be directed towards upgrading the existing ones while those that are not available should be provided. This could be achieved through preparation of detailed infrastructure network plan for the community with population density being the major yardstick in determining the adequacy. The design should allow for individual self-funded incremental service connections and affordable capital, maintenance and user costs for services. The infrastructure network should also be planned to extend outside of the community limits, to assist in the management of peri-urban growth.

The social economic characteristic of the residents suggests that the majority of them fall below poverty line and they are mostly employed in the informal sector. They make little money which could not even be enough to meet basic needs of food, cloth and shelter not to talk of having some to invest in the improvement of their housing conditions and general environmental conditions of the community. Therefore, deliberate effort should be made to improve the livelihood of this category of people. Their means of livelihood which is centered on informal sector should be recognised and be supported.

7 CONCLUSION

Ajegunle being the most populous informal settlement in Lagos, demand for infrastructural facilities continues to be on the increase despite the present situation of dwindling economy and inadequate infrastructural facilities or perhaps unavailability. The study has analyzed the interplay between poverty, environmental conditions of informal settlements and attainment of livable and healthy cities. Socio-economic characteristics and environmental conditions of Ajegunle informal settlement in Lagos were examined. It has been established that the residents are mostly poor, lack basic infrastructural facilities and live in precarious situation. It has also been observed that majority of them do not have adequate source of income which they could probably use to liberate themselves from bondage of poverty. Without equivocal, poverty, lack of adequate infrastructure facilities and decent housing are some of the major factors contributing to the poor environmental condition in informal settlements.

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Urban Remote Sensing – How Can Earth Observation Support the Sustainable Development of Urban Environments?

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1 ABSTRACT

Cities are centres of economy, policy, society and culture and more than half of the world's population already lives in metropolitan areas. Urbanization is one of the most dynamic processes in the context of global land use transformations. The sprawl of settlements and the emergence of megacities are rapidly accelerating – particularly in Asia and Africa. Cities require enormous quantities of resources and at the same time they generate large amounts of waste and pollutants. Hence, urban management increasingly demands alternative concepts and techniques to implement and assure effective and sustainable urban development. A key issue in this context is up-to-date information on the status and development of the urban system. Spaceborne earth observation (EO) has become a promising tool to provide the required geo-data. Over the past years the German Remote Sensing Data Center (DFD) of the German Aerospace Center (DLR) has increasingly researched into the support of urban and spatial planning by means of remote sensing techniques and EO-based geoinformation products. In this paper we first give a general overview on the concepts and products of a satellite-supported analysis of urban areas. Next, we introduce selected applications and value-added information products including the application of EO data for monitoring urban sprawl, mapping of impervious surface, modelling the urban-micro climate, assessing the potential for local heating, deriving socio-economic characteristics and describing the vulnerability towards natural desasters.

2 URBAN REMOTE SENSING

In the last decades the world has faced a constantly accelerating growth of urban areas - a development which is closely related to a tremendous increase of the urban population. In 2007 the amount of urban residents has outnumbered the rural population for the first time in history and by the year 2030 already two-thirds of the world's population is expected to live in cities (UNPP, 2008). Hence, urban and peri-urban environments show one of the highest dynamics in the context of global land use transformations. The constant urbanization and the rapid changes in urban environments involve considerable challenges with respect to the observation, analysis and understanding of the complex processes affecting and forming metropolitan areas. As a consequence, effective and sustainable urban management increasingly demands innovative concepts and techniques to obtain up-to-date and area-wide information on the characteristics and development of the urban system – regionally as well as globally. Currently, most of this information is collected by means of statistics, surveys and mapping or digitizing from aerial imagery. However, in consideration of stastistical information these approaches often show a comparably coarse spatial and temporal resolution while surveying and mapping is time consuming and cost-intensive - properties which significantly restrict periodic updates and regional, national or even global analyses.

Space- and airborne earth observation (EO) has become a promising tool to provide updated geoinformation on various aspects of built-up areas in manifold spatio-temporal dimensions (Bauer et al., 2004; Heiden et al. (2003); Henderson & Xia, 1998; Herold et al., 2003; Ji et al., 2006; Masek et al., 2000). Remotely sensed images represent an independent data source from which various layers of information can be derived area-

wide, with a flexible repetition rate and in various scales ranging from spatially detailed analysis on single-building or building block level to global studies on continental scale. In combination with widely automated methods of data processing and image analysis, urban remote sensing provides multiple options to support decision makers such as resource managers, planners, environmentalists, economists, ecologists and politicians with accurate and up-to-date geoinformation. This paper introduces selected geo-information products derived from multisensoral remote sensing data. The products and the underlying remote sensing techniques were developed in the context of a joint research co-operation for urban applications between the German Remote Sensing Data Center (DFD) of the German Aerospace Center (DLR) and the Department of Remote Sensing at the University of Würzburg.

3 EARTH OBSERVATION IN SUPPORT OF SUSTAINABLE URBAN DEVELOPMENT

In this chapter we intend to demonstrate the applicability and benefits of different remote sensing data and image analysis techniques in terms of a monitoring and assessment of urban agglomeration. This includes the monitoring of urban sprawl (section 3.1), the mapping of imperviousness (section 3.2), the urban structure analysis for assessing local heating potential and modelling urban micro climate (section 3.3) and the assessment of vulnerability and risk (section 3.4).

3.1 Monitoring of Urban Sprawl

A first and at the same time basic demand for urban planning is information on the location, shape and development of built-up areas. The constant process of urbanization which is taking place in many countries involves a permanent and sometimes rapid change of the city footprints. Hence, even developed countries lack up-to-date information on urban sprawl. For the delineation of city footprints we have developed two semi-automated procedures that analyse either multispectral data and/or imagery recored by synthetic aperture radar (SAR) sensors.

The classification approach using multispectral data is based on an object-oriented hierarchical top-down methodology extracting the classes ‘built-up areas’ and ‘water’ for the time series of Landsat data (Taubenböck, 2008). The approach utilises spectral, shape and texture features as well as principal component analysis to extract urbanized, sealed areas from the Landsat data sets. In terms of monitoring urban sprawl, a post classification comparison was found to be the most accurate procedure and presented the advantage of indicating the nature of the changes (Mas, 1999). A comparative analysis of the individual land cover classifications for the available times performed independently was therefore implemented to monitor and analyse the development of urban areas. Pixelwise change detection was implemented checking the land cover classes individually for the available years. For it, all individual land-cover classifications are sampled up on the highest available geometric resolution of Landsat ETM. Figure 1 shows the result of the change detection displaying the spatiotemporal physical evolution of urbanised areas for the years 1973, 1989 and 2001 at the mega city Kolkata in India. Thus, a first result enables to calculate absolute areal growth or assess directions of urban sprawl. We assessed the accuracy of every classification result with 250 randomly distributed pixels. Due to missing ground truth data, we then assessed the accuracy visually by comparing classification results to the Landsat data. Thus, this assessment of accuracies already includes uncertainties. Even so, the high overall accuracies range from 86% to 93% correctly classified pixels.

Alternatively to the use of optical data, the semi-automated detection of built-up areas can also be based on SAR imagery (Esch et al., 2010). The corresponding technique includes a specific preprocessing of the SAR data and an automated image analysis procedure. The preprocessing focuses on the analysis of local noise characteristics in the SAR data in order to provide a texture layer that highlights built-up areas. In the context of the image analysis, this texture layer is used along with the original intensity information to automatically extract settlements. The technique was demonstrated on the basis of 12 scenes of the German SAR satellite system TerraSAR-X (TSX) covering representative urban agglomerations distributed throughout the world. Figure 1 (right) shows the urban footprint that was derived from TSX data for the area of Munich, Germany. Overall, accuracies between 76% and 96% for the derived city footprints showed the high potential of both the TSX imagery and the proposed analysis approach in detecting built-up areas.

Urban growth is characterised by complex diversity of spatial types. Growth may be laminar or punctual; it may increase density or it may sprawl; it may be mono- or polycentric. Furthermore, urban structure is very much scale-dependent. For a quantitative analysis of urban form and its changes over time different methods

are implemented: We use gradient analysis defined by parameters like areal growth, urbanization rates, or built-up densities to assess on regional scale the diffencens in urban structure between the urban core and the periphery. In addition we chose landscape metrics (or spatial metrics) like the SHAPE index, patch density and largest patch index as quantitative indices to describe structures and pattern of the mega city. In general, spatial metrics can be defined as quantitative and aggregate measurements derived from digital analysis of thematic-categorical maps showing spatial heterogeneity at a specific scale and resolution (McGarigal, Cushman, Neel, & Ene, 2002; Herold et al., 2003). Figure 1 shows the change detection, the gradient analysis regarding built-up densities as weel as a spider charts showing landscape metrics quantitatively measuring the urban footprint of Kolkata in comparison to other cities.

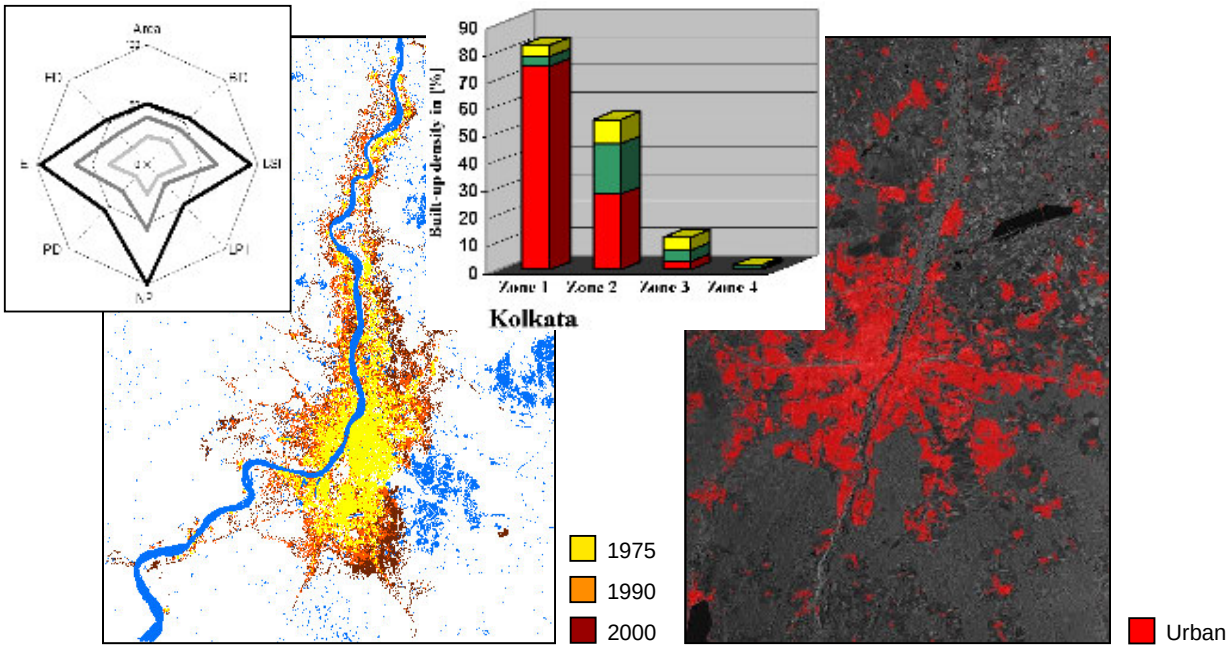

Fig. 1: Time series analysis of Landsat data for Kolkata, India (left), and urban footprint of Munich, Germany, derived from TerraSAR-X data (right). The spider diagram for Kolkata shows the development of different landscape metrics from 1975 – 2000.

3.2 Mapping of Impervious Surface

Most developed and emerging nations are confronted with a constantly increasing loss of land resources due to rapidly growing settlements and infrastructure. This development is closely associated with various negative consequences and therefore impervious surface (IS) is increasingly recognized as a key indicator for assessing the sustainability of land use changes due to urban growth. However, concepts and methods for a regional or state-wide quantification and assessment of IS in an accurate, fast and cost-effective way are still rare. Esch et al. (2009) presented a semi-automated approach towards a large-area assessment of IS based on an integrated analysis of single-date Landsat-7 images and geospatial vector data. The developed procedure includes three main steps: (1) the modeling of the percent impervious surface (PIS) based on Landsat-7 images, (2) the supplementation of the resulting imperviousness raster by line features providing information on small-scale infrastructure such as roads and railways and (3) the aggregation of the imperviousness layer to administrative boundaries of municipalities.

The estimation of the PIS for each pixel of the Landsat image is performed by means of a training area covering a region of 15x10 km. The reference information for this training site is provided in form of a manually digitized map of impervious surfaces which was derived from aerial images. Based on this binary mask a regression model is calculated using the support vector regression (SVR) functionality of Support Vector Machines (Vapnik, 1998). Thereby, the spectral information of all Landsat bands is correlated with the PIS provided by the reference data set. By applying the resulting model to arbitrary Landsat images – each image covers around 185*185 km – the PIS can be estimated for an extensive area. In order to accelerate the analysis and – at the same time – improve the accuracy of the modeling, the analysis of the Landsat data is specifically focused on residential, industrial and transport areas. The information on the position and extent of the corresponding regions is provided by vector data of the German Official

Topographic-Cartographic Information System (ATKIS). At the same time this vector data serves as a basis for the integration of linear infrastructure such as country roads or railway tracks which can not be detected properly by the Landsat data showing a ground resolution of 30*30 m per pixel. Hence, the impervious surface raster estimated on the basis of the Landsat data is combined with ATKIS vector information on linear infrastructure (object categories 3100 and 3200) (Fig. 2, right). Thereby each category is assigned with a specific width and PIS. By combining the impervious surface raster derived from the Landsat data with the vector information on linear infrastructure, the total IS can be calculated. In Figure 2 (left) this information is finally aggregated to the administrative units of the German municipalities. The validation of the impervious surface raster derived from the Landsat data based on reference data of different cities showed a mean absolute error between 15-20 % and a mean error between 0.5 and 1.0 %. For the PIS provided on a block by block basis for the city of Munich, reference data shows a mean imperviousness of 54 % whereas the modeled PIS came up to 50 %. The final product showing a combination of the impervious surface raster and the linear infrastructure (roads and railways) could be validated on the basis of reference data provided by the city of Passau. According to this reference 15 % of the municipality is covered by IS whereas the model-based estimation gave a value of 16 %.

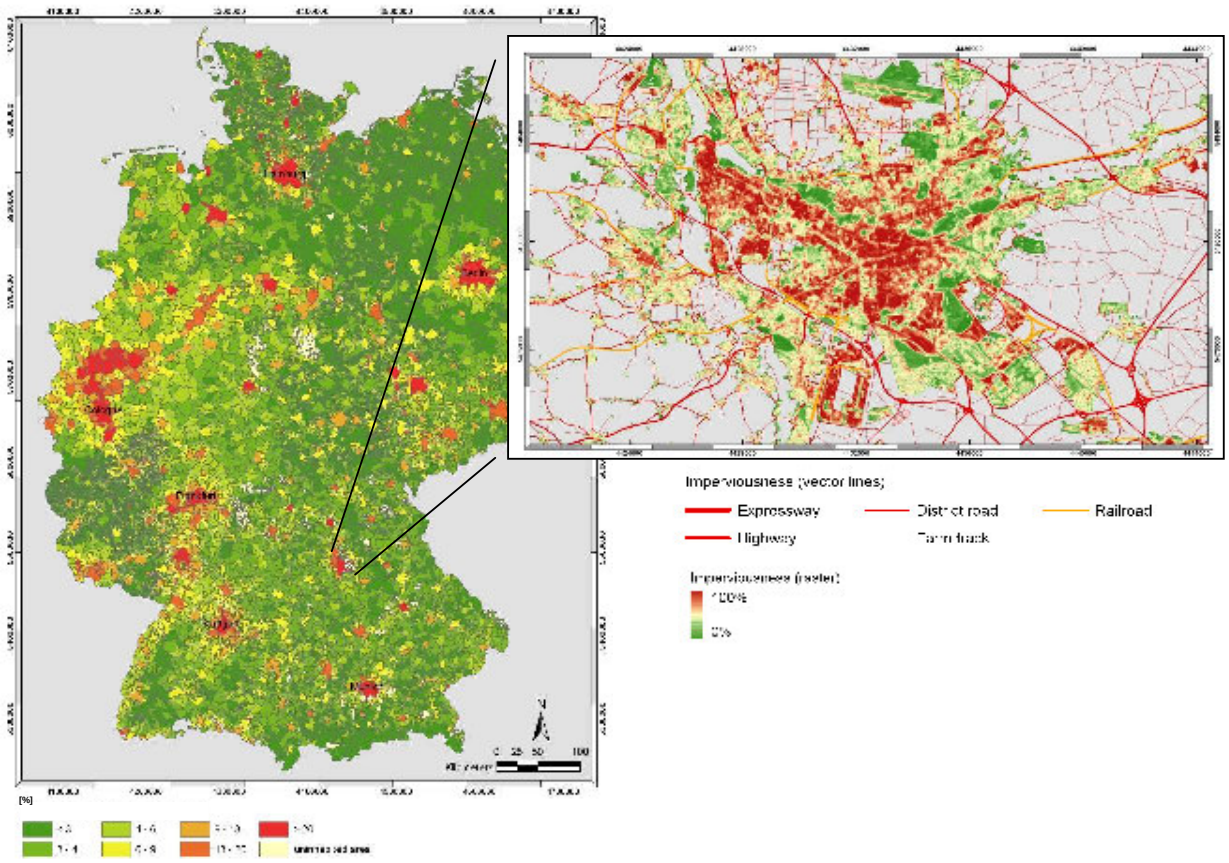

Fig. 2: Modeled percent impervious surface for the German municipalities (left) and subset of the underlying imperviousness data set (right), here showing the city of Nuremberg, Germany

The results of the study document that the proposed approach is qualified for an area-wide mapping of the PIS. The method provides spatially detailed and precise data on the characteristics and distribution of IS for large areas. The advantage of the presented technique lies in the ability of a fast, area-wide and at the same time spatially detailed and accurate mapping of IS – requirements that can not be met with existing reporting based on official statistics or survey. Moreover, the information on IS can be addressed at almost arbitrary spatial or administrative units. The approach also guarantees the mapping and assessment of IS by constant and objective rules - a key issue for regional or national surveys. The design of the developed approach facilitates the use of very high resolution data such as Ikonos and QuickBird imagery or aerial photographs instead of Landsat data. Thus, the level of detail can be further increased in order to meet the demands of municipalities with respect to the spatial resolution of corresponding analyses.

3.3 Urban structure analysis for local heating potential assessment and urban micro climate modelling

Remote sensing technology has not only the power to provide fundamental data for analysis on regional city level, but also to provide data in a very high level of spatial detail for local analyses. By integrating diverse information from various kinds of remote sensing sensors, a detailed characterisation of the complex urban landscape becomes possible. The identification of small single urban structure elements requires an appropriate geometrical resolution of the remotely sensed data. Spaceborne imagery has gained increased weight in the interpretation process since the sensors are able to dissolve objects with a size of one meter or less (Donnay et al., 2001). By means of these very high resolution optical satellite images, the components of urban landscape may be described. Open spaces, streets and individual buildings are the "bricks" of every urban environment. Classical thematic interpretation of monoscopic imagery allows the identification of these objects, but, despite indirect estimations (Hartl & Cheng, 1995), may not result in deeper, physiognomical information of the physical structures. However, characterisation of the three-dimensional urban landscape requires the integration of additional surface information. A digital surface model from the High Resolution Stereo Camera – Airborne Extended (HRSC-AX) as well as as IKONOS imagery is utilised for the derivation of a highly detailed 3-D city model. It is the basis for further urban structure analysis as well on single building as on block level. Additionally, it serves as input for local heating potential assessment and together with hyperspectral HyMAP data as input variables for modelling the urban microclimate.

The urban structure is a composition of single elements and may be mapped scale-dependantly. While for long-term spatio-temporal analysis the regional level is sufficient, analyses on the local level demand a very high geometrical resolution of the data sets. For the characterisation of the physical urban structure we developed a transferable, object-oriented workflow which can be applied on various urban areas. The result of the workflow is a 3-D city model with thematic representation of various landcover types and physiognomical characteristics of the single structure elements. The remote sensing data base for the presented workflow consists of very high resolution optical satellite imagery (IKONOS) and a digital surface model (DSM) derived by automatic photogrammetric analysis of HRSC-AX data (Scholten et al., 2003). A segmentation procedure is applied on the data with the result of a building mask, where each individual building is represented by a segment and an average height value. Hence, a physiognomical description of each individual building is possible due to its individual shape and size (area and height).

After derivation of the buildings, the optical data set is processed. This workflow follows a segmentation optimisation and landcover classification process which have been described by Esch et al. (2008), Taubenböck et al. (2010) and Wurm et al. (2010), resulting in a 3-D city model. This model includes individual buildings and various types of landcover such as 'streets', 'sSealed areas', 'soil', 'trees/bushes'. 'grass/meadow' and 'water'. Figure 3a represents a subset of the city center of Munich, Germany, in 3-D view showing various types of urban structures with different physiognomical characteristics as well as the "natural furnishing" of the city.

Information on the urban structures is also relevant for analyses in the context of local heating. The heat supply for residential buildings and for buildings of the public and private service sector is primarily based on the usage of fossil energy sources. These are often burned in old boilers with poor efficiency and high emissions. For a sustainable energy supply, which considers the finiteness of fossil resources as well as the drastic impact of an increasing emission of greenhouse gases, the usage of renewable energy resources and trigeneration is essential. In this context, small scale power grids are an important component for the technical heat allocation (Nitsch, 2008).

To use the outlined perspectives for regional planning, economic decisions, and the search for best suited locations, a spatial model is needed. Previous models are limited by their spatial resolution (Fischedick et al., 2007) or can only be applied for selected reference model cities or cities with more than 20000 inhabitants (Lutsch et al., 2004). Our goal was to combine these requirements by analysing how potentials for local heating can be assessed with a high spatial resolution, area-wide processability as well as transferability.

Roth (1980) and Winkens (1984) show the relation of settlement structure and heat distribution systems and describe the associated specific costs. Fischedick et al. (2007) adapt this relation by identifying structural types that are relevant for local heating, with characteristic shares of building types, building usage, and

period of construction, plus related costs for the infrastructure. This study is the basis for our assessment of potentials for local heating and gives reference values for several model parameters. A detailed description of the methodology is given in Geiss et al. (2010).

The main parameter of the model is the annual heat demand of the buildings. The heat demand correlates with the building volume and a specific heat demand coefficient. The heat demand coefficient in turn represents an idealised value, which is dependant on the building type and the age and usage of the building. The volume of a building is directly derived from the 3-D city model. The building type was determined by physiognomic characteristics. The usage of a building and period of construction can hardly be predicted solely using remote sensing data. Additionally, the economic costs of the necessary heat allocation infrastructure are estimated: costs for the small scale power grid, connections to the buildings, and transmission stations for every building. To quantify only the additional costs for local heating, costs for a conventional heat supply (oil or gas boilers) are subtracted. Typically small scale power grids are laid along streets. With a street network the length of the power grid and the connections to the buildings can be estimated.

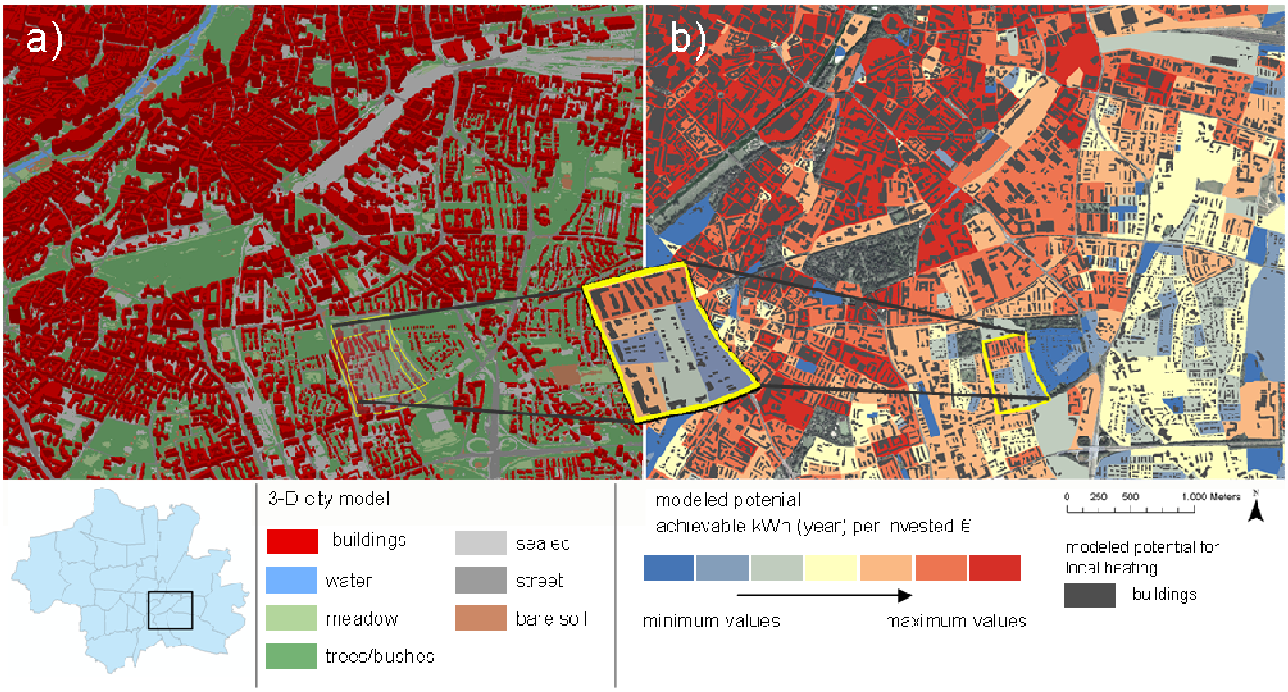

Fig. 3.: 3-D city model from the city center of Munich (a) and derived local heating potential (b)

With this information a specific value can be determined, which characterises the regional conditions for local heating on building block level. By dividing the annual heat demand of the buildings by the needed infrastructural investment costs, the achievable kWh/a per invested Euro can be quantified

Fig 3b shows the modelled potential for local heating for a subset of the city center of Munich, Germany. Remarkable is the decline of the potential values from central areas to outlying quarters. This is primarily due to above-average sized buildings in the centre, which causes, in combination with relatively short power grids and connections lengths, high potential values. Districts in the outskirts with a high share of detached houses have relatively low potential. This does not mean that these areas are generally not suited for local heating, but to be seen in the context of the shown area and the very favourable, alternative locations. Areas that are characterised by a heterogeneous building structure also show a high variability of potential values (see Fig 3, enlarged building blocks). The aim of this work is to show the surplus of the interdisciplinary combination of remote sensing and energy relevant questions. The developed method can be useful to identify suitable locations for local heating and determine the possibilities of local heating in general for several areas. Further research will focus on the improvement and enhancement of the used parameters and validate the accuracy of the predicted potentials with in-situ datasets.

The urban area itself - and finally also the single urban structure - is responsible for different climatic characteristics in contrast to its surroundings. Densely built-up areas, reduced vegetation, emission of air pollutants and waste heat lead in cities to a higher average temperature, lower humidity and less wind speed.

The local climate is influenced by the city on several scales. On the regional level an urban heat island effect can be identified. The urban structures, their alignement and their surface characteristics have influence on the local climate conditions in terms of air temperature, wind, humidity and air quality (Kuttler, 1998). Hence, these characteristics influence the climatical well-being of inhabitants and are therefore important for urban planning. By means of micro-climate models various planning-scenarios can be simulated regarding their influence on the urban microclimate (Bruse & Fleer, 1998).

For measuring effects on the local climate, area-wide information is needed. Traditionally, these data have been collected by field trips, being a very laborious and cost-intensive work. With airborne hyperspectral mapping, an objective and fast method is available for the retrieval of information on surface materials. These indicators serve asinput variables for the ENVI-met microclimate-simulation model developed by the University of Mainz. On the basis of numerical models, climate parameters like air temperature, humidity, wind direction and wind speed are calculated as well as the predicted mean vote (PMV), which is a measure of comfortness (Fanger, 1970). First, a spatial description of the study area is implemented. Location and height of individual buildings as well as vegetation is represented in a threedimensional raster. Based on that, various vegetation characteristics, thermal and hydrological characteristics, soil type characteristics and specific roof characteristics are integrated. The corresponding information is derived from interpretation of hyperspectral HyMAP imagery. Fig.4 presents model input parameters and a result of a 24h climate simulation for a test area in Munich, Germany. While differences in the absolute temperature are marginal, the shielding influences of building structures in the lower left corner are obvious. Additional information about this study can be found in Heldens & Heiden (2010).

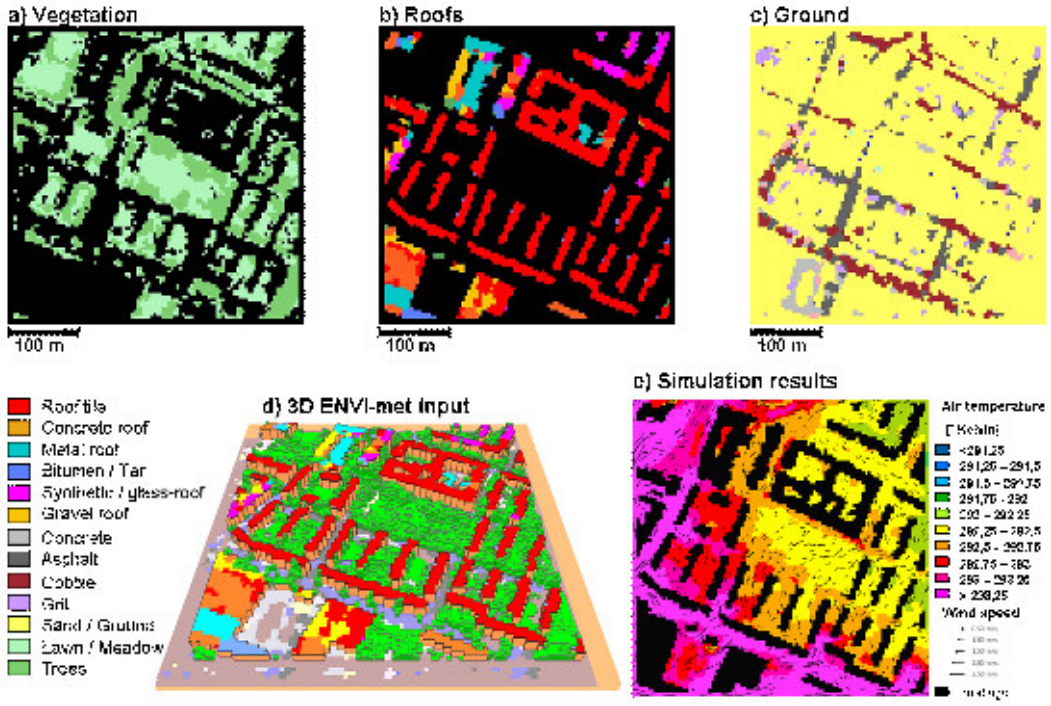

Fig. 4: Input variables for ENVI-met derived from HyMAP and HRSC data and simulated air temperature.

3.4 Assessment of Vulnerability and Risk

The past decade proofed the vulnerability of the urban areas acrros the world to natural hazards. Examples are the dramatic impacts of hurricane “Katrina” in New Orleans 2005, of the earthquakes in Sichuan 2008 or Haiti 2010. Risk results from a future interplay of a hazard and an environment, which is characterized by various components – physical, demographic, socioeconomic, etc. – defining the vulnerability (UNDP 2004). Problems associated with hazard and vulnerability identification, risk assessment, and developing mitigation solutions are inherently spatial in nature (Taubenböck et al. 2008). Especially urban environments are characterized by a small-scale heterogeneous morphology and a highly complex and dynamic pattern (cp. Fig 3). According to this, risk and vulnerability changes spatially with subject to a plurality of location factors or rather indicators. Remote sensing enables both the assessment of indicators related to the hazard

and the assessment of indicators related to vulnerability and thus serve as a powerful instrument for decision makers in disaster management (Taubenböck et al. 2009b).

Assessing risk and vulnerability on highest resolution the small-scale urban structure defined by the heterogeneous physical alignment and characteristics of buildings, streets and open spaces is derived from high resolution satellite data. We integrate the third dimension, assessing building heights using a digital elevation model. These data can be generated by airborne LaserScanning or in our case by an airborne Multi Functional Stereo Camera (MFC). Thus a three-dimensional city model has been derived (Taubenböck et al, 2009b). Furthermore, knowledge of the physical structure of urban morphology can be utilized to indirectly derive further parameters crucial for risk management. The basic idea behind inferring the population distribution is based on a correlation between the structural characteristics of the urban environment and its population. In combination with land use knowledge the capabilities of remote sensing enable to calculate dynamic behavior of urban population (Taubenböck et al. 2007). Inunadation modelling (Goseberg et al, 2009) combined with the e. g. the building mask or the population distribution allows quantifying houses at risk or vulnerable people (Fig. 5). Thus it allows the identification of safe areas and the derivation of the the main street network is basis to model evacuation scenarios (Lämmel et al. 2008) or analyze bottlenecks for accessibility.

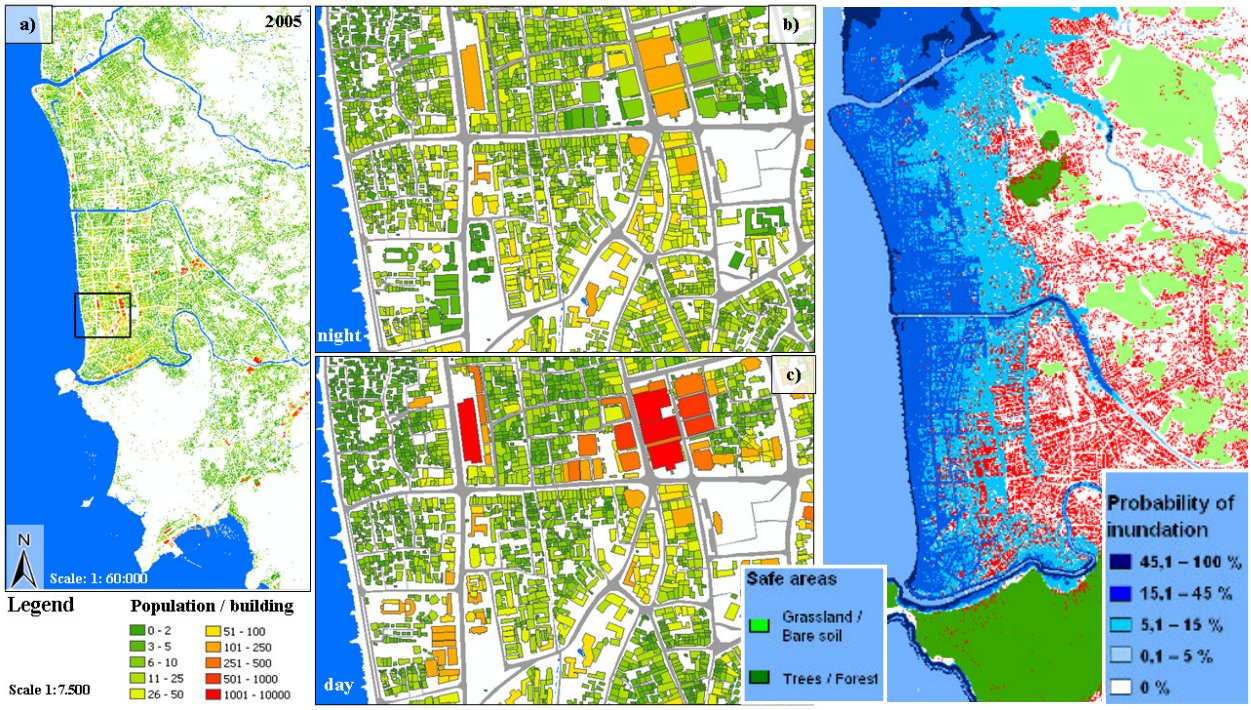

Fig. 5: Building mask, population distribution at nighttime, inunadation modelling and derivation of safe areas

4 CONCLUSIONS AND OUTLOOK

The constantly increasing availability and accessibility of modern remote sensing technologies has provided new opportunities for a wide range of urban applications such as mapping and monitoring of the urban environment (land cover, land use, morphology, urban structural types), socio-economic estimations (population density), characterization of urban climate (microclimate, human health conditions), analysis of regional and global impacts – (ground water and climate modelling, urban heat islands) or urban security and emergency preparedness (sustainability, vulnerability). The objective of the joint research initiative between DLR and University of Würzburg in terms of urban applications is to address issues of needs and the potential of remote sensing technologies and data for diverse stakeholders dealing with issues in environmental protection, urban and regional planning or resource management.

In this paper we have introduced a selection of applications and example products which have been developed in the context of this initiative in order to provide additional and innovative data that might support day-to-day decision-making of local and state governments. We could show that one basic challenge of an (semi-)operational analysis of urban agglomerations by means of remote sensing techniques and data respectively is related to their spectral heterogeneity and morphological complexity. The spectral

heterogeneity originates from the enormous diversity of different materials forming the urban landscape. Thereby, some land cover types such as vegetation, bare soil or water are also found in non-urban environments. Moreover, certain surfaces – for instance bare soil and specific construction materials of buildings or pavements – can hardly be differentiated from each other through their spectral signature. Regarding the morphological complexity, urban areas are characterized by structural elements featuring diverse scales and shapes. In order to accurately capture the morphological properties of urban objects a very high spatial resolution of the sensor system and images respectively is required. However, although an increased spatial resolution certainly expands the spectrum of urban application this development comes along with new challenges in terms of an automated image analysis. On the one hand the observable heterogeneity within the specific object types increases significantly since many local, but often non-relevant characteristics appear – e.g. roof lights and chimneys on top of building or cars, street furniture and sign-postings on streets. On the other hand urban features are hence formed by a group of pixels with a similar spectral signature. To address the mentioned challenges arising from an improved spatial resolution recent studies have increasingly used object-oriented analysis approaches. Compared to the established pixel-based approaches these techniques facilitate an improved consideration of spectral, geometric and textural, contextual and hierarchical characteristics.

The previous remarks regarding urban remote sensing stress that the appropriate approach, technology and data are highly dependent on the thematic focus and the spatial scale of the analysis. Medium resolution multispectral data – e.g., Landsat, Spot, IRS - are best suited for regional analyses since they cover areas of up to 32,000 km2 with one image ensuring cost-effective analyses. At the same time the spatial resolution is still sufficient to discriminate built-up areas from non-urban regions based on spectral and textural characteristics. Due to their direct link to morphologic properties high and medium resolution SAR images provide particularly robust features for the detection of settlements. However, the applicability of SAR data for local analysis of the urban structures is still limited since the complex geometrical and physical characteristics of metropolitan areas and the varying appearance and visibility of objects subject to the line of sight (LOS) lead to significant distortions of and ambiguities in the resulting radar images.

To cope with the entire heterogeneity and complexity of urban areas very high resolution multispectral systems such as Ikonos or QuickBird are required. Their sensors provide images in four spectral bands featuring a ground resolution of 4 m (Ikonos) and 2.44 m (QuickBird) supplemented by a panchromatic channel with a geometric resolution of 1 m (Ikonos) and 61 cm (QuickBird). A drawback of this data is the limitation of the spectral resolution to four bands – only facilitating a very rough reconstruction of the spectral signature – and the limited spatial coverage of a few hundred square kilometers by one image. Hence, analyses of complete metropolitan areas, major or mega cities demand a data volume which significantly increases the complexity and expense for image processing and classification. The immense spectral resolution of hyperspectral sensor systems enables thematically comprehensive and spatially detailed characterizations of the urban environment. However, current hyperspectral sensor systems showing a spatial resolution which is useful for urban applications are limited to airborne platforms. The first high resolution hyperspectral satellite sensor – EnMAP - is supposed to be launched by 2012. This system will feature a spatial resolution of 30 m and cover the spectral range of 420-2450 nm with about 200 bands (Kaufmann et al., 2006).

The synchronism and coexistence of economic activities, environmental threats, infrastructural deficits, poverty and population growth mark a significant challenge to urban planning. Therefore future research has to focus on integrated interdisciplinary studies to understand the multi-dimensional and complex interactions of urban systems and to analyze and assess the effects of plans, actions and concepts. An important step towards the improvement of the generated information products and their acceptance by decision makers consists in the adaption to holistic approaches on complex urban systems. Hence, the according concepts have to integrate and correlate multiple analysis tools (image analysis software, GIS), data types (satellite images, vector data and statistics) and data sources (EO, survey, census). The synergetic use of various data sources and their combined analysis increases the quality and information content of the resulting products, opens new levels of information and enhances the possibilities of integrating the resulting data and information into existing systems and concepts. First prototypes of such interdisciplinary approaches are presented in this paper – e.g. by combining results from remote sensing with data from civil engineering or demographic census. However, in view of regional, national or even global monitoring tasks there is still

some effort needed with respect to the availability and accessibility of remote sensing data and the operationalization of image processing and analysis in order to allow for cost- and time-efficient analyses and a rapid provision of the required information. Thereby new sensor systems such as RapidEye and Geoeye will improve the capabilities of urban remote sensing application, particularly in terms of providing detailed time series of multispectral imagery.

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Urban sprawl + politics + cars = Canberra vs. Compact city + innovative politics + active forms of transport = healthy Canberra

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1 ABSTRACT

Canberra, Australia is a city of excellence in terms of urban design principals from the 1960s and 70s. A true green city with a large quantity of open spaces for recreation, large avenues and roundabouts, the parliamentary triangle and sufficient car parking. A nation's capital that meets all the criteria of a well planned city of the 20th century. However, nothing lasts forever and new planning principles are required for a capital city in the 21st century. We are facing serious challenges such as climate change, peak oil and an increasing burden of chronic disease (such as cardivoasuclar diseases and obesity) caused in particular by physical inactivity.

How do we face this challenge, resolve these issues and embed solutions into the built environment in order to achieve a more healthy and sustainable Canberra for future generations? Certainly, doing business as usual cannot be the answer.

Researchers have shown that the built environment can have a significant impact on a person's level of physical activity. For instance, urban sprawl increases the demand for travel and gives too much priority to private vehicles, rather than encouraging people to walk, cycle and use public transport.

For the Australian Captial Territory (ACT) the Heart Foundation has established an Active Living project funded by the ACT Government. The project commenced in late 2009 and is guided by three key evidence based documents: Healthy Spaces and Places; the Heart Foundation's posititon statement, The built environment and walking and the Blueprint for an active Australia. Healthy Spaces and Places has been produced by the Heart Foundation and its partners, the Planning Institute of Australia and the Australian Local Government Association to support the development of healthy urban planning. This national guide to designing places for healthy living provides design principles that are the foundation stones of healthier, more active communities; different development types where these principles can be applied; and best practise case studies. An overview of Heathy Spaces and Places will be provided.

A comprehenive scoping study has been undertaken and some key findings will be presented on how these might be translated to the Canberra setting.

2 ACTIVE LIVING AND THE BUILT ENVIRONMENT

There is growing international recognition of the impact that the built environment has on physical activity. Urban sprawl with long distances between places increases the demand for travel and gives priority to cars, rather than encouraging people to walk, cycle, use public transport and be more physical active. Research has shown that increasing housing density, mixed-density, mixed-use planning and connectivity all contribute to the increased use of active transport[1]. Additionally, people lived in an aesthetically pleasing environment were 41 per cent more likely to walk[2].

Europe has been particularly responsive in considering the influence of the built environment on physical activity. For example, over ten years ago the European Division of the World Health Organzation adopted the Charter on Transport, Environment and Health which recognised the connection between transport, environment and health policies. Notably, the Charter recommended that the health impact of policies has to be better intregrated into approval procedures, impact assessments, and cost-benefit analyses of transport plans, land use planning, and infrastructure programmes and investments[3]. Europe has also benefited from a built environment that was largely planned and built before cars asserted their dominance.

By contrast, the urban landscape of many English-speaking industrialized countries, such as Australia were shaped after the second world war as cars became more affordable and planning principles responded by

[1] Gebel et al., 2005
[2] Humpel N. et al., 2004
[3] WHO Europe Charter on Transport, Environment and Health, 1999 p. 3-4

encouraging convenient and fast-traveling infrastructure wherever possible. In particular, planning principals outlined in the Athens Charter of CIAM[4], the city beautiful movement and the garden city prinicpals have encouraged built environments that are fragmented, have segregated land use, very low urban densities, are disconnected and have out of human scale road networks, poor public transport network and less local employment opportunities[5],[6],[7].Currently in Australia, urban developments have created an "obesogenic" environment[8], reinforcing sedentary behavior and car dependent lifestyles. The impact on the population is compounded by Australia being one of the most highly urbanized countries in the world with around 90% of its population living in urban centers[9].

This situation has helped create a number of health, environmental and economic problems within Australia.

Australia is one of the most overweight of the developed nations in the world. Obesity and overweight affects about one in two Australian adults and up to one in four children[10]. Cardiovascular disease is Australia's leading cause of death and the second highest burden of disease in the country.

The Australian Institute of Health and Welfare refers to Australia's ranking for adult obesity rates since 1987 as, "the 'worst' third of all OECD countries on this measure"[11]. Replacing trips in motor vehicles with walking or cycling for transport will lower greenhouse gas emissions, and air and noise pollution[12].In 2008, it was estimated that the total cost of physical inactivity in Australia, including direct health costs and lost productivity amounted to $13.8 billion.

Due to this growing burden on Australian society, governments across all levels and communities are interested in the work regarding the built environment and physical activity. The National Preventive Health Taskforce has recommended the development of a strategy that supports interventions in the built environment, primary health care and workplaces. This supports the strategic direction of the Heart Foundation which has been delivering projects across Australia for several years to promote supportive environments for active living.

Given Canberra's status as the capital of Australia it could be expected to apply the latest design principles to address the problems discussed above. Unfortunately, Canberra exhibits many of the features of urben design prinicples from the 1960s and 70s. Encouragingly, the Heart Foundation was funded by the Australia Captial Territory (ACT) Government to establish the Active Living Project which aims to identify opportunites to improve the built environment of the ACT to promote active living.

3 THE ACTIVE LIVING PROJECT IN THE AUSTRALIAN CAPITAL TERRITORY

The Heart Foundation understands the importance of the relationship between the built environment and physical activity and is using its key documents Healthy by Design; Healthy Spaces and Places; and Blueprint for an Active Australia as well as the Built Environment and Walking position statement for awareness raising and actively advocating for change to the built environment.

Healthy Spaces and Places is a national guide for planning, designing and creating sustainable communities that encourage active healthy living. The document has been produced by the Heart Foundation and its partners, the Planning Institute of Australia and the Australian Local Government Association to support the development of healthy urban planning. This national guide to designing places for healthy living provides evidence for the particular need for environments that support physical activity and shows the strong links between peoples overall health and regular physical activity.

As part of the Active Living Project in the ACT, Healthy Spaces and Places was used to examine the built environment in Canberra with a focus on the implications for active living. The findings are as follows.

[4] Congrès Internationaux d'Architecture Moderne (engl.: International Congress of Modern Architecutre)
[5] Jan Gehl at his speech at the RAIA Walter Burley Giffin Memorial Lecture on the 30th November 2009 in Canberra
[6] Newman P. et al., 1989
[7] Newman P. et al., 2000
[8] Swinburn B., et al., 1999
[9] Capon A., Dec 2007a
[10] House of Representatives Standing Committee on Health and Ageing, 2009, Weighting it up: obesity in Australia, House of Representatives Standing Committee on Health and Ageing, Canberra.
[11] AIHW, 2008, p. 7
[12] Davis A. et al., 2007 and NHFA, 2009a

3.1 Active transport

In order to encourage active forms of transport for a wider part of the community, transport infrastructure needs to have:

- High level of amenity, in particular around key destinations such as workplaces schools and neighborhood centres;
- Mixed land uses and densities; and
- Choices of destinations.[13]

Canberra does have a wide and extensive off road network of cycle paths that can support active transport. Recently the ACT government introduced new supporting infrastructure for individuals to cycle to bus stations and then finish their journey on public transport (Bike'n'Ride) and is working on a new Transport Plan. However, the current network is far from being sufficient or completed. Amenity issues occur in town centers such as Belconnen and Woden. Mixed use developments are fragmented throughout the settlement footprint of Canberra and play a significant role in the choice of destination, particularly when social infrastructure is nearby residential developments.

The emphasis on active transport in Canberra is still far from adequate and will require more than just the provision of infrastructure, but also major behaviour change campaigns.

3.2 Aesthetics

Aesthetics relate directly to the human and his or her individual impression of the attractiveness of an area.

Canberra, as the nation's capital, contains several representative government buildings with a particular and distinct architectural charm. Often these buildings are solitaires such as the National Portrait Gallery, Old Parliament House or the National Library. Green spaces are part of the aesthetic composition of Canberra and underpin its reputation as the 'bush capital'. Due to the car-friendly planning approach, most of the streetscape is out of scale. Often people feel lost if walking through the suburbs. Good aesthetics assist by providing a natural point of orientation and support navigation. Many parts of Canberra have a lack of connection between architecture and landscape components and make poor use of the cityscape. However, it should be noted that Canberra has strong view connections and vistas with a great appreciation by the local population of its green character.

3.3 Connectivity

Networks with a high amount of permeability ideally contain short links, several intersections, and minimal amount of Cul de sacs. Depending on the past development phases, some of Canberra's suburbs have poor permeability that fail to provide convenient links for walkers and cyclists. Newer subdivision plans include more effective connections, but do not include travel plans or provide information about context to the surrounding built enviornment. Nonetheless, many streets do not currently have footpaths, in part or entirely[14]. Specifically, an estimated 600 km of streets are without footpaths[15]. A high proportion of Canberra's 64,000 school children[16] and around 10,000 bus commuters[17] are unable walk to a bus stop without walking on the road reserve. Furthermore, subdivisions have many interrupted street crossings that potentially discriminate against pedestrians.

3.4 Environments for all people

"Engendering a sense of belonging can positively benefit an individual's personal mental health and wellbeing."[18]

Urban sprawl with monotone types of land use does not provide the ideal framework for environment for all Canberrans. Even with a large number of recreation and open spaces that can provide equal space for all

[13] WA Planning Commission, 2004
[14] Canberra's Pedestrian Forum, Media release from 6th Nov 2009
[15] Canberra's Pedestrian Forum in Comment on Cycling & Pedestrian Network Review – December 2009 draft report
[16] www.det.act.gov.au/_data/assets/pdf_file/0008/54278/ACT_School_Census_Publication_February_2009.pdf Access on 2 Feb 2010
[17] ABS, 2006b
[18] NHFA, 2009

members of the community, the city is unable to create an environment that attracts a sufficient amount of people to support a healthy sense of belonging on most times of the day.

3.5 Mixed density

Already research has shown that increased housing density or mixed density is one of the built environment features that contributes to increased active transport, along with mixed use planning and increased connectivity[19]. At the regional and city wide scale, increasing housing density can improve the proximity between homes and destinations. This is a major factor influencing active transport to encourage physical activity.

Canberra just recently started to apply higher densities along major transport corridors including North Canberra, Civic (city centre), Acton, Kingston and Manuka. Nonetheless,Canberra is currently far from having sufficiently dense areas with its settlement footprint. Low density neighbourhoods result in activities being spread out resulting in car dependence and geographic inequity (including stratification of the population) as wealthier people move to locations that minimise their travel. In order to encourage active living in an urban environment it is important that developments are located within walking distance of bus or tram stops (400 metres), which is not currently the case in the ACT.

The current ACT Government is undertaking several key projects that impact on land use and transport planning in a more holistic way than previously. A first step toward more integrated planning is the Sustainable Future workshop finding report and the Sustainable Transport Action Plan. Both documents are solid framework documents, but missed an opportunity to be groundbreaking by hesitating to call for a major reprioritization that sees active transport options as highest priority and radical densification within the existing urban footprint.

In general Australia has an ageing population. Canberra is not an exception in this regard. It is clear that Gungahlin and Belconnen will experience an increase in the total number of children and will require especially family friendly environments. Other districts such as Gungahlin/ Hall, North Canberra, South Canberra and Weston Creek should cater for higher densities rather new greenfield developments to meet their growth targets. Areas like Tuggeranong and Woden Valley need to start thinking about shrinking and the challenges for existing built environment.

3.6 Mixed land use

Mixed land use involves a range of complementary land uses that are ideally located together in a balanced mix, including residential development, shops, employment community, recreation facilities and parks and open space.

The current situation in Canberra is far from ideal because most parts of the city are low density neighbourhoods with a few local destinations seperated by land use types – which means fewer people walk and more people drive.

Districts such as New Action, Civic, Kingston and Manuka and partly Belconnen are starting to provide some hope. Ideally mixed land uses should occur wherever it does not result in environmental constraints (noise, air pollution or amenity issues). Therefore mixed land use excludes industrial types of land use as well as large scale offensive commercial activities. Most districts of Canberra have dedicated areas for retail and commercial activities. Currently these centers do not provide sufficient opportunity for mixed use, with consumer activities within walking distance. Redeveloping these centers by increasing densities with shop top living could vastly improve how livable these neigbourhoods are.

3.7 Parks and open space

Open spaces and recreational areas are ideally a consistent network throughout a settlement area in the right scale to sustain a decent vitality. For Canberra it is important to understand how parks influence each other in order to create evidence on the jettison confusion between its real use and mythical use. Jane Jacob said once about the parks that planners consider them the lungs of the city, “It takes about three acres of woods to absorb as much carbon dioxide as four people excude in breathing, cooking and heating. The ocean of air

[19] Gebel et al., 2005

circulation about us, not parks, keep cities from suffocating."[20] Bad air is a result of too much vehicle traffic and even large parks will not be able to resolve this issue.

It is important to understand that urban parks are volatile elements stabilizer of values or of their neighborhood and district. Therefore parks are directly and drastically affected by the way the neighborhood acts upon them. They tell a lot about the success of physical interaction in the neighborhood. A physical diversity among the users and their individual schedules can be directly translated into the success of an open space or park. Jacobs mentioned that city playgrounds can not be populated by mothers with their children alone. It needs also office workers and older adults comprise in a mixture of classes. A high quantity of parks can also serve as a barrier or interruption to the functioning of a healthy city.

In accordance to Jacobs what it needs to create a functional open space or park is economic and social diversity that results in people with different schedules using the space. Open spaces and parks should never be oversimplified.

3.8 Safety and surveillance

Researchers provided evidence that safety and security are major concerns throughout Australian communities[21]. The federal government has reacted on this matter and created Crime Prevention Through Environmental Design (CPTED) guidelines[22] for the built environment. Healthy Spaces and Places also refers to the health related benefits that encourage physical activity by improving safety and surveillance. Traffic calming measures, active street fronts and passive surveillance close to footpaths can potentially facilitate physical activity.

By introducing more mixed use developments, with high percentage of living within each centre, more facades become activated and provide a safer environment for its residence. In Canberra, the design of newer developments often fail to correspond to their street fronts or provide sufficient passive surveillance. Small windows, hatches, walls and high fences communicate fear or a feeling of spatial exclusion with their immediate surroundings. In combination with poor street lighting, it creates unsecure places especially at nighttime. Most of Canberra‘s roads do not even have street lighting on footor bike paths that provides safety and encourages passive surveillance.

3.9 Social inclusion

Social inclusion policies facilitate access to employment, education, health, housing and democratic processes. These socially inclusive policies create health and wellbeing for individuals by creating a supportive community.[23]

As mentioned earlier, Canberra has a large number of spaces for recreation. However, quantity does not necessarily translate into space for social inclusion.

Social inclusion functions are fragmented throughout Canberra. Through observations, selected areas such as Manuka shops, Curtin shops, New Acton, parts of Civic (pedestrian zone and Bunda street), Dickson town centre, Lyneham shops and parts of the Australian National University (ANU) campus provide a sense of social inclusion. Interestingly, all of these areas have low speed environments where a high number of people walk and cycle.

3.10 Supporting infrastructure

Not just the provision of a park itself is important, but also the size, range of facilities and aesthetic and landscape features influence its use[24]. Adults are more likely to walk if they have good access to attractive and large public open space.[25] Furthermore, children are more likely to be active if they have sufficient public spaces available which contain exercise related facilities such as basketball courts[26]. Quality public

[20] Jacobs J., 1992, p. 119
[21] Cozens P., 2007
[22] Cozen P., 2005
[23] Ferrie D., 2008
[24] Giles- Corti B. et al., 2005
[25] Giles- Corti B. et al., 2005
[26] Cohen et al, 2006

infrastructure that supports active transport, such as Bike'n Ride or Walk'n Ride, quality footpath or off-street cycle paths also contributeto better designed built environments.

In Canberra, basic infrastructure exists. However, there is scope to improve the quality of the infrastructure. Technical infrastructure will only work if all the are factors are convenient. For example, a bike rack placed too close to a concrete wall with no shade or lighting will not encourage people to park their bikes, even though on paper the development meets all criteria to support active transport infrastructure provision requirements. Therefore, the supportive infrastructure is highly relevant but must meet certain quality standards to achieve physical activity.

3.11 Policy/Strategies

Canberra has two major planning authorities who share control: ACT Planning and Land Authority (ACTPLA) and the National Capital Authority (NCA). This is a unique Australian situation where a federal authority has direct control over land within a state. Therefore different design strategies apply within the Territory.

Most of the greenfield developments occur under the jurisdiction of ACTPLA. Key documents are the Territory Plan, General Policy Plan (NCA) and the Canberra Spatial Plan. Recently ACTPLA has undertaken a sustainable future workshop and the major outcome messages was that business as usual is not a sustainable option for Canberra.A more integrative approach is needed that is adequately performance-based and can monitor and respond to changes. Another conclusion was that measures should be applied in order to evaluate the effects of change over long term.

The workshop identified two fields that require action; a comprehensive review of the policy content in the land use codes in the Territory Plan; and an evaluation of the Canberra Spatial Plan to achieve the ACT Government's policy agenda on affordability, liveability and sustainability with zero net carbon emissions by 2060.

According to the workshop publication[27] the new policy direction for the Spatial Plan will be a more compact form with consideration of the following aspects:

- De-carbonisation of the ACT economy;
- Economical and social prosperity for a more sustainable development;
- Resilience and adaptation of climate, cultural and demographic changes;
- Focus on climate change interventions;
- No spatial and access barriers that encourage sustainable behaviour;
- Environmental sensitivity towards the assets of the natural environment;
- A better community network;
- Canberra as a beautiful and liveable city.

It is clear that the built environment is an important consideration when encouraging large numbers of people to be physically active. However, it is essential that people behave in a particular way to realise the benefits of any environment. In the context of the Active Living Project in the ACT, social marketing will need to be used to both encourage people to be more active in the immediate future and demand more appropriate urban design from government and developers in the long-term.

In the case of the former, there are many examples of how to encourage people to be more active and include awareness campaigns, workplace programs and physical activity events. The latter will prove more challenging and probably require marketing upstream to the public who are the ones will have the greatest influence on government (through voting) and developers (through buying). This would ideally involve helping people to make the long-term consequences of their decisions to buy or live in particular areas more apparent and tangible.

[27] ACTPLA, 2009

4 CONCLUSION

Cities differ from each other and so do neighbourhoods within the cities.[28] Poor health standards occur in some neighbourhoods in the ACT which share particular health-damaging characteristics including:

- Substandard of housing;
- Limited connectivity;
- Poor access to public transport options;
- Often located in proximity to undesirable land uses such as busy roads;
- Lack of access to healthy food and overexposure to unhealthy fast food, alcohol and tobacco;
- Poorly designed and maintained open spaces for recreation;
- Signs of vandalism, excessive traffic, uncontrolled graffiti, external walls, dirty streets or poor pavement.

ACT areas that experience these characteristics may generate direct health risks by discouraging physical activity. They require adequate attention and innovative action by the ACT Government.

Some of the key findings from the Scoping study for Active Living in the ACT include:

- People in the ACT are the most active in the country but more than 22 per cent of the people are not physical active enough to gain health benefits;
- There is a commitment from the government to take on a more integrated and holistic approach in planning;
- Challenges remainbecaue the current built environment is not conducive to physical activity and greenfield development will remain at 60 percent of any developments that occur in the ACT.
- A great commitment in planning documents, but often the implementation or excecution requires constant involvent of NGO's to ensure healthy planning.
- Not suffiencent information about walking and cycling behaviour throughout the city

Due to the hosistic approach of Healthy Spaces and Places and other Heart Foundation key documents, it is recommended that a Chief Minister's Taskforce for active living be created to address this challenge and develop effective solutions. Potential tasks for this Taskforce may include the development of strategies and actions to get people out of the cars, steering of evidence research in the built environment, create tools to achive healthy planning in suburbs, influence decision- making processes wherever suitable, create efficient social marketing campaigns and provide advocacy for walking in the ACT.

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Urban Vision Linz. Ganze Stadt – halber Lärm

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1 ABSTRACT

Die Halbierung des Umgebungslärms im erweiterten Innenstadtbereich von Linz bis zum Jahr 2029 bildet den Ausgangspunkt der im Rahmen von Linz 2009 Kulturhauptstadt Europas erstellten Studie URBAN VISION LINZ. Der interdisziplinäre Projektansatz mit Experten/-innen aus den Fachbereichen Schalltechnik, Stadtplanung, Mobilität, Lufttechnik, Gemeindeforschung und Umweltmedizin ermöglicht, ein urbanes Konzept zur nachhaltigen Verbesserung der Lebensqualität zu entwickeln.

Die Lärmbelastung ist im Untersuchungsraum insbesondere durch den Verkehr bedingt und für die Bevölkerung auf rund 20 % der Fläche bei Dauerwirkung als gesundheitsgefährdend einzustufen. Konventionelle Mittel (z. B. Lärmschutzfenster) und eine massive Reduktion herkömmlich betriebener Fahrzeuge reichen nicht aus, das angestrebte Ziel der Lärmhalbierung zu erreichen. Vielmehr ist es notwendig, ein neues Modell von Mobilität, einschließlich der damit verbundenen Warenlogistik und dem öffentlichen und individuellen Personenverkehr zu etablieren. Dieses Modell basiert daher im Innenstadtbereich auf der ausschließlichen Verwendung von Elektrofahrzeugen oder anderen innovativen Verkehrsmitteln und einer Maximalgeschwindigkeit von 30 km/h. Die Verbindung zum Umland ist über Hauptverkehrskorridore gewährleistet, entlang derer an Logistikzentren das Umsteigen auf Elektrofahrzeuge möglich ist und die Warenan- und -auslieferung stattfindet. Bestehende Parkhäuser sowie Tankstellen im Zentrum dienen als Stellplätze für individuell nutzbare, öffentliche Elektrofahrzeuge sowie als interne Logistik- und Servicestationen. Die Neustrukturierung des Mobilitätssystems transformiert die bisherigen Parkplätze bzw. Verkehrsflächen primär in urbane Kommunikations- und Aufenthaltsräume. Mehr als die Hälfte der Verkehrsflächen sind als Begegnungs- und Fußgängerzonen gestaltet.

Das Stadtplanungsmodell entwickelt eine urbane Kernzone der Stadt Linz mit hohen Umwelt- und Lebensstandards, die durch eine Plafondierung der Immissionsbelastungen gesichert werden. Emissionsintensive, reine Produktionszonen (Industriegebiet Linz) sind vom Projektraum deutlich funktional getrennt und weisen hinreichende Flächenpotenziale auf. Transitorische Zonen und bauliche Interventionen bilden die Schnittstellen zu Belastungskorridoren und emissionsintensiven Produktionszonen. Bei Ausprägung funktional differenzierter Stadtbezirke ist das Modell modular erweiterbar.

Die Ergebnisse der visionären Grundsatzstudie URBAN VISION LINZ zeigen auf, dass es möglich ist, den primär verkehrsbedingten Umgebungslärm um die Hälfte zu verringern, die Luftqualität signifikant zu verbessern, die Mobilität und Multifunktionalität sicherzustellen bzw. weiterzuentwickeln sowie die Lebensqualität im urbanen Raum zu erhöhen. Der Studie liegen detaillierte Analysen und Prognosen der Verkehrs-, Lärm- und Luftdaten sowie der räumlich-funktionalen Stadtplanungsvoraussetzungen zugrunde, womit ein realisierbarer Weg aufgezeigt wird, die urbanen Zentren der Stadt als hochwertigen Lebens- und Wirtschaftsraum dauerhaft zu attraktivieren.

2 EINLEITUNG

Kann die Stadt Linz innerhalb von 20 Jahren den Umgebungslärm im Zentrum der Stadt um die Hälfte reduzieren, dennoch eine lebendige Stadt bleiben und als Lebens- und Wirtschaftsraum weiter funktionieren? Unter der Prämisse "Ganze Stadt – Halber Lärm" untersuchte ein interdisziplinäres Team im Rahmen von Linz 2009 Kulturhauptstadt Europas die technischen Möglichkeiten, ob bzw. wie die Vision einer solchen Stadt der Zukunft realisierbar wäre. Diese Vision wird maßgeblich beflügelt durch die Verabschiedung der "Linzer Charta", mit welcher der Gemeinderat der Stadt Linz am 22. Jänner 2009 die Werthaltungen für die Gestaltung und Entwicklung des akustischen Raumes beschloss.

Die Planungsvision URBAN VISION LINZ fühlt sich einem wohltemperierten Gesetz der Urbanität verpflichtet, das mittels Interventionen im bestehenden Stadtorganismus agiert. Zudem steht das Projekt im Kontext der Themenfelder Klimawandel und Endlichkeit fossiler Brennstoffe. CO2-neutrale, finanzökonomische Blasen in Masdar/Abu Dhabi und anderswo müssen erst ihre nachhaltig urbane Qualität beweisen.

3 ZIEL

Auf Basis einer Grundsatzstudie soll aufgezeigt werden, mit welchen Maßnahmen und Lösungsansätzen im Zentralraum von Linz die verkehrs- und betriebsbedingte Lärmbelastung (Lautheit) großflächig und nachhaltig bis zum Jahr 2029 halbiert werden kann. Gleichfalls gilt es, mit einem interdisziplinären Projektansatz ein urbanes Konzept zur nachhaltigen Attraktivitätssteigerung der Stadt als multifunktionalen Lebens- und Interaktionsraum mit urban qualifizierter Lebens- und Umweltqualität zu entwickeln.

4 AUSGANGSSITUATION

4.1 Planungsraum

Der Untersuchungsraum umfasst im Wesentlichen die urbane Kernzone der Stadt Linz, die von den Hauptverkehrskorridoren A7 und A26 (bestehend und geplant) begrenzt wird. Aus dieser Abgrenzung resultiert ein Gebiet, das aufgrund der Größe, der Bevölkerungszahl und Struktur repräsentative Aussagen ermöglicht. Modulare Erweiterungen des Projektraumes sind realisierbar.

Fläche	13,41 km²	Bauland	8,65 km²
Wohnbevölkerung 2008	ca. 63.700	Verkehrsflächen	3,27 km²
Gebäude	ca. 6.400		

Fig. 1: Gebietsdaten Planungsraum Urban Vision Linz

4.2 Stadtstrukturelle Voraussetzungen

Der Planungsraum gliedert sich in funktional differenzierte Stadtbezirke mit unterschiedlicher stadtmorphologischer Ausprägung. Bei großflächiger Ausweisung von Kerngebiet für Linz Mitte und das Zentrum Urfahr, mit einer grundsätzlichen Nutzungsmischung von tertiären Einrichtungen und einer Wohnnutzung, binden westlich und nördlich vorrangige bzw. zentrumsnahe Wohngebiete an. Der östlich der Innenstadt gelegene Bereich ist durch einen hohen Anteil öffentlicher Einrichtungen, insbesondere Krankenhäuser und Schulen, bestimmt. Der südliche Planungsraum schließt, bei partieller betrieblicher Nutzung, die gründerzeitlichen und zwischenkriegszeitlichen Stadterweiterungsgebiete mit ein. Emissionsintensive, reine Produktionszonen (Industriegebiet Linz) sind vom Projektraum deutlich funktional getrennt und das Industriegebiet Linz weist ein hinreichend großes Flächenausmaß für eine Konzentration emissionsintensiver Betriebe auf.

4.3 Umgebungslärm

Lärm als "unerwünschter, störender und belästigender Schall" (ÖNORM S 5004) kann Menschen unangenehm sein oder bei bestimmten Tätigkeiten stören und Konflikte auslösen, sodass Wohlbefinden und Gesundheit beeinträchtigt wird. Lärm hat also physische, psychische und soziale Auswirkungen, abhängig von der Art, Intensität und Dauer der Geräuscheinwirkung, von der Konstitution der betroffenen Person sowie von situativen Faktoren.

4.3.1 Analyse laut-leise

Im Zuge der Untersuchung wurden die Belastungspotenziale aufgrund der widmungsstrukturellen Voraussetzungen einerseits und der Verkehrssituation andererseits analysiert.

Die widmungsstrukturellen Voraussetzungen für eine "leise Stadt" sind, wie in Fig. 2 dargestellt, weitgehend gewährleistet. Nur punktuell sowie in Randzonen sind Anpassungen oder Übergangszonen erforderlich. Bei der Analyse gelten als "leise" neben den Grünlandkategorien sämtliche Widmungskategorien, in denen eine Wohnnutzung zulässig ist und weiters Bereiche mit öffentlichen und privaten Dienstleistungen sowie

Produktionseinrichtungen, die in ein urbanes Gewebe gemäß dem Projektziel integrierbar sind. Als "laut" wurden reine Produktionsstandorte mit hohen Belastungspotenzialen klassifiziert.

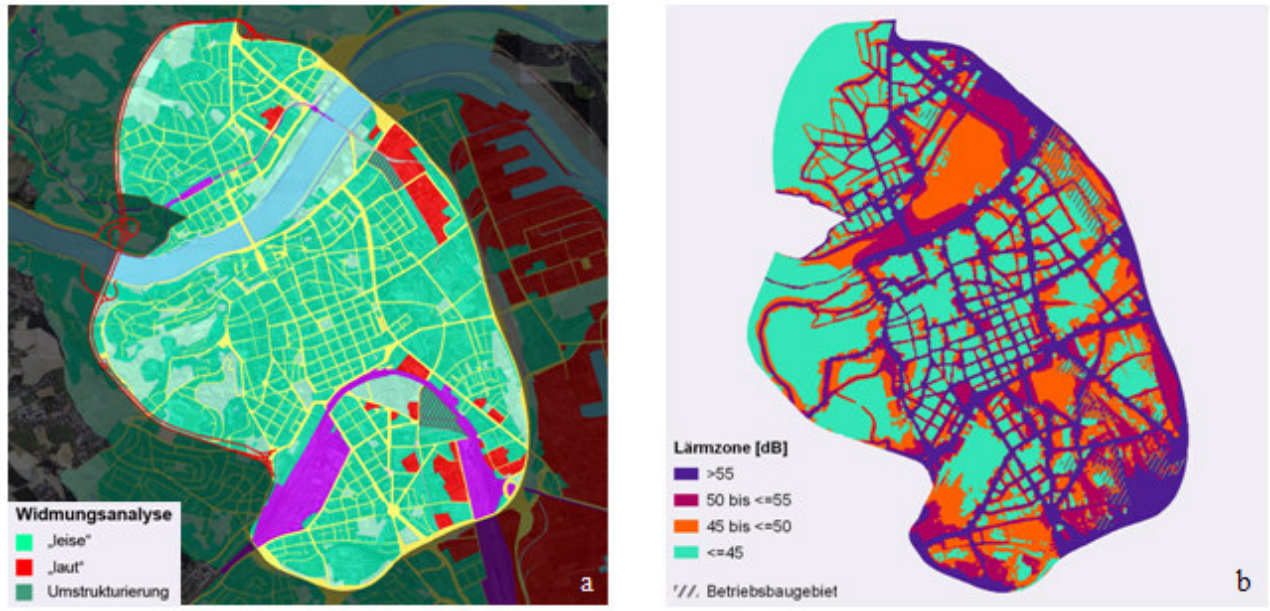

Fig. 2: Analyse "laut-leise" nach a) widmungsstrukturellen Voraussetzungen und b) Verkehrssituation (Nacht)

Stellt man die betrieblichen und verkehrlichen Belastungspotenziale gegenüber (circa 64 ha Produktionsstandorte mit hohen Belastungspotenzialen vs. circa 195 ha öffentliche Verkehrsflächen, exkl. Bahnflächen), wird ersichtlich, dass im Untersuchungsraum der alles überwiegende Anteil am Umgebungslärm durch den Verkehr bedingt ist. Für die Erreichung der halben Lautheit ist zudem die Lärmreduktion von Betriebsstandorten, aufgrund der weitgehenden Entflechtung der Funktionsräume von Produktion und immissionssensiblen Nutzungen, nicht maßgebend. Daher bleibt die Konzentration auf die verkehrsbedingten Lärmemissionen.

4.3.2 Verkehrslärm Bestand

Die Grundlagen für die Erstellung des Modells der Stadt Linz mit halbem Lärm lieferten aktuelle Bestandsdaten, etwa des Magistrats Linz, der ASFINAG BMG sowie eigener Begehungen und Erhebungen. Die Analyse der Schallausbreitungsberechnungen für Bestand und Prognose 2029 erfolgte nach unterschiedlichen Kriterien bzw. Grenzwerten:

Der Verkehrslärm verursacht derzeit in den Nachtstunden auf rund 41 % der Untersuchungsraumfläche einen Wert, der über dem Schwellenwert der Bundes-Umgebungslärmschutzverordnung von 50 Dezibel liegt. Mehr als die Hälfte dieser Fläche (ca. 20 % der Gesamtfläche) ist mit über 55 dB beschallt, wodurch bei Dauerwirkung eine Gesundheitsgefährdung durch vegetative Reaktionen (z. B. Stressreaktionen) zu erwarten ist. Die WHO definiert den Grenzwert mit 45 dB, der als Vorsorgewert für Gebiete mit ständiger Wohnnutzung gilt. Für 63 % der Untersuchungsraumfläche wurde der Verkehrslärm mit Werten berechnet, die über dem Grenzwert von 45 dB liegen.

4.3.3 Fluch der Akustik

Geht man – wie im Diagramm "Fluch der Akustik" (Fig. 3) ausgeführt – davon aus, dass der gesamte Kfz-Fuhrpark binnen 40 Jahren sukzessive auf lärmarme Fahrzeuge (strichlierte Linie) ausgetauscht wird, so ergibt sich die damit erzielte Pegelreduktion gemäß dem Verlauf der durchgezogenen Kurve, welche Folgendes aufzeigt:

- 1. Selbst wenn bereits 50 % der Kraftfahrzeuge um 14 dB leiser sind als die übrigen Kfz, so sinkt der Immissionspegel für die Anrainer lediglich um drei Dezibel.
- 2. Mit einem Anteil von rund 85 % an lärmarmen Fahrzeugen wird erst 50 % der insgesamt erzielbaren Wirkung erreicht. Das sind rd. 7 dB.

- 3. Erst wenn über 85 % aller Kfz durch lärmarme Verkehrsmittel ersetzt sind, wird die Emissionsreduktion auch immissionsseitig mehr und mehr wirksam. Die letzten 15 % an lärmarmen Kfz ergeben eine Reduktion um weitere 7 dB!

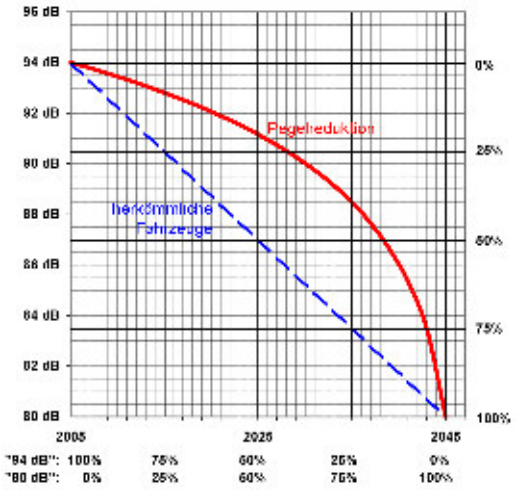

Fig. 3: "Fluch der Akustik" – BMLFUW (2007, 68), bearbeitet

Die Gesamtwirkung ist nur bei einem möglichst 100 %igen Austausch der Kraftfahrzeuge zu erzielen. Soll eine wirkungsvolle Maßnahme zur Halbierung der Lautheit gesetzt werden, so ist ein "radikaler Schnitt" erforderlich und ein vollständiger Austausch des gesamten Fuhrparks anzustreben.

Wie die Tabelle "Wirkungsanalyse von Lärmminderung" (Fig. 4) deutlich macht, ist es notwendig, den Schallpegel um 10 dB zu verringern, damit der Mensch den Lärm um die Hälfte gemindert wahrnimmt. Dies erfordert eine Reduktion der Schallenergie um 90 %.

Pegelreduktion [dB]	Reduktion der Quellen bzw. Schallenergie	subjektive Empfindung
3 dB	50 %	wahrnehmbare Änderung
10 dB	90 %	Reduktion um 50 %
20 dB	99 %	Reduktion um 75 %

Fig. 4: Wirkungsanalyse von Lärmminderung

4.4 Luftqualität

Basierend auf den Messdaten des Oö. Luftmessnetzes für den Zeitraum 2007 wurde die Vorbelastung für die in Linz problematischen Luftschadstoffe Stickoxide (NOx) bzw. Stickstoffdioxid (NO2) und Feinstaub (PM10) abgeschätzt. Anschließend folgte die Zuordnung der Immissionsbelastung zu unterschiedlichen Emittentengruppen, wobei zusätzlich aktuellere Daten des Oö. Luftmessnetzes und der Emissionskataster der Stadt Linz herangezogen wurden.

4.4.1 Stickoxide (NOx)

Das Ergebnis zeigt, dass der Kfz-Verkehr (inkl. Off-Road) im Jahr 2007 einen Anteil von 29 % an NOx(2) im gesamten Linzer Stadtgebiet ausmachte. Der Kfz-Anteil ist im Vergleich zu anderen Städten relativ gering und ist auf den hohen Anteil der Stahlindustrie (voestalpine AG) von 56 % zurückzuführen. Bei einer konservativen Betrachtung für den Untersuchungsraum kann man auf Basis der Messdaten des Oö. Luftmessnetzes daher davon ausgehen, dass die Immissionsbelastung an Stickoxiden (NOx) zu mindestens 40 % durch den Verkehr verursacht wird. Dabei ist in vielen Gebieten innerhalb des Untersuchungsbereiches der Anteil des Verkehrs bedeutend höher anzunehmen. Dies wird durch die Tatsache untermauert, dass laut Emissionskataster der Stadt Linz kein anderer signifikanter Emittent von Stickoxiden im Zentrumsbereich der Stadt Linz bekannt ist.

Gemäß Verordnung des Bundesministeriums für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW) über belastete Gebiete (Luft) zum Umweltverträglichkeitsprüfungsgesetz 2000 liegt der Planungsraum weitgehend innerhalb von Gebieten, in denen die Immissionsgrenzwerte des

Immissionsschutzgesetzes - Luft (IG-L) wiederholt oder auf längere Zeit überschritten werden. Es sind daher Sanierungsmaßnahmen geboten.

Im IG-L sind für Stickstoffdioxid ein Halbstundenmittelwert von 200 µg/m³ und ein Jahresmittelwert (JMW) von 40 µg/m³ festgelegt, wobei das IG-L in einem Stufenplan eine weitere Absenkung des JMW auf 30 µg/m³ bis zum Jahr 2012 vorsieht.

4.4.2 Partikel/Feinstaub (PM10, inklusive Dieselruß)

Der bedeutendste Verursacher von Feinstaub mit weniger als 10 µm Durchmesser (PM10) ist in Linz mit rund 70 % der Kfz-Verkehr, wobei für die Verkehrsemissionen drei Quellen unterschieden werden:

- Exhaust-Emissionen (Auspuff/Motoremissionen)
- Non-Exhaust-Emissionen (Reifen- und Bremsabrieb)
- Wiederaufwirbelung

Die Herkunft der Staubemissionen bestimmt auch deren Größe/Fraktion sowie die chemische Zusammensetzung. So bestehen etwa Aufwirbelungen tendenziell aus größeren Fraktionen als Exhaust-Emissionen. In der einschlägigen Literatur zu Feinstaub-Emissionen des Straßenverkehrs werden die kleineren Fraktionen (PM2,5 und PM1,0) den Auspuffemissionen zugeordnet.

Gemäß Verordnung des BMLFUW über belastete Gebiete (Luft) zum UVP-G 2000 liegt der Planungsraum zur Gänze innerhalb von Gebieten, in denen die Immissionsgrenzwerte des IG-L wiederholt oder auf längere Zeit überschritten werden. Es sind daher Sanierungsmaßnahmen geboten.

5 URBAN VISION LINZ

Das ursprüngliche Auftragsziel des Projektes URBAN VISION LINZ konzentrierte sich auf die Halbierung des Lärms im Linzer Zentralbereich. Die Forderung einer 10 dB-Pegelreduktion ist jedoch allein durch aktive Schallschutzmaßnahmen – wie Lärmschutzwände, Reduzierung der Verkehrsstärke und der Geschwindigkeit, lärmschutzoptimierte Straßenraumgestaltung, Bemautung von Verkehrswegen, etc. – bei herkömmlichem Einsatz praktisch nicht zu erfüllen.

Um eine nachhaltige Reduktion der Umweltbelastungen und eine Verbesserung der Lebensqualität zu erreichen, war ein interdisziplinärer, holistischer Ansatz notwendig. Mit dem Visionsansatz wurde ein völlig neues Mobilitäts- und Logistikmanagement entworfen, welches gleichzeitig die Stadt als multifunktionalen Lebens- und Interaktionsraum entwickelt bzw. erhält. Im Folgenden werden die Maßnahmen vorgestellt, welche für die Umsetzung des Konzeptes erforderlich sind.

5.1 Maßnahmenschema

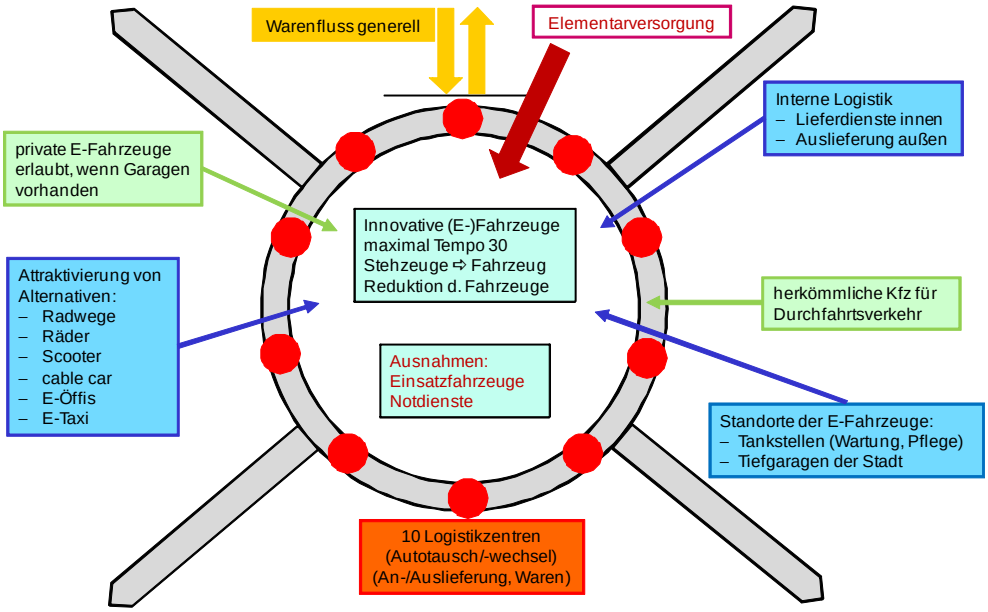

Fig. 5: Maßnahmenschema

5.2 Mobilitäts- & Logistikmanagement

Im Modellraum gilt innerhalb des Umfahrungsringes ein Fahrverbot für Fahrzeuge, die den festgelegten Umweltstandards nicht entsprechen, wobei dies einer Einschränkung auf z. B. Elektrofahrzeuge und andere innovative Verkehrsmittel gleichkommt. Ausgenommen sind nur Einsatzfahrzeuge und Notdienste.

Neben einem forcierten Ausbau des öffentlichen Verkehrs sowie der Radwege stehen im Modellraum Elektrofahrzeuge mit lärmarmen Reifen als Option individueller Mobilität zur Verfügung. Die Abstellanlagen sind die bestehenden Parkhäuser und Tankstellen (interne Logistik- und Servicestationen), wo auch die Aufladung der Batterien erfolgt.

Parken auf öffentlichen Verkehrsflächen ist nicht zulässig. Durch den Entfall der stehenden (parkenden) Fahrzeuge im Straßenraum ergeben sich erhebliche Entwicklungsoptionen des öffentlichen Raumes. Private Fahrzeuge sind nur dann zugelassen, wenn ein Garagen-/Stellplatz auf Privatgrund nachgewiesen wird. Die frei benützbaren Elektrofahrzeuge ermöglichen die Abwicklung der gleichen Fahrleistungen wie derzeit, mit einem Bruchteil an Fahrzeugen (Stehzeuge werden zu Fahrzeugen).

Generell gilt im Modellraum die Maximalgeschwindigkeit von 30 km/h.

Ein alternatives Mobilitätssystem soll unter anderem durch folgende Maßnahmen attraktiviert werden:

- Verbesserung des öffentlichen Verkehrs, einschließlich der Entwicklung innovativer Systeme
- Errichtung von Radwegen
- Zurverfügungstellung von Rädern, Pedelecs, Scootern, u. dgl.
- Elektrotaxis

Am Umfahrungsring ist die Errichtung von insgesamt zehn Logistik- und Distributionszentren als Knoten eines multimodalen Verkehrssystems vorgesehen. In diesen Zentren stehen Hochregallager für Waren und vollautomatische Parkhäuser zur Verfügung. Hier erfolgt der Warenumschlag wie auch der Umstieg von diesel- oder benzinbetriebenen Kfz auf Elektrofahrzeuge oder öffentliche Verkehrsmittel.

Die Warenströme werden so optimiert, dass ein unnötiger Warenfluss im Modellraum vermieden wird. Die Warenlieferung erfolgt von außen bis zum Umfahrungsring, von wo auch die Auslieferung durchgeführt wird. Insgesamt bleiben die Mobilitätschancen in vollem Umfang aufrecht.

5.3 Modell Stadtplanung

5.3.1 Gesamtschema

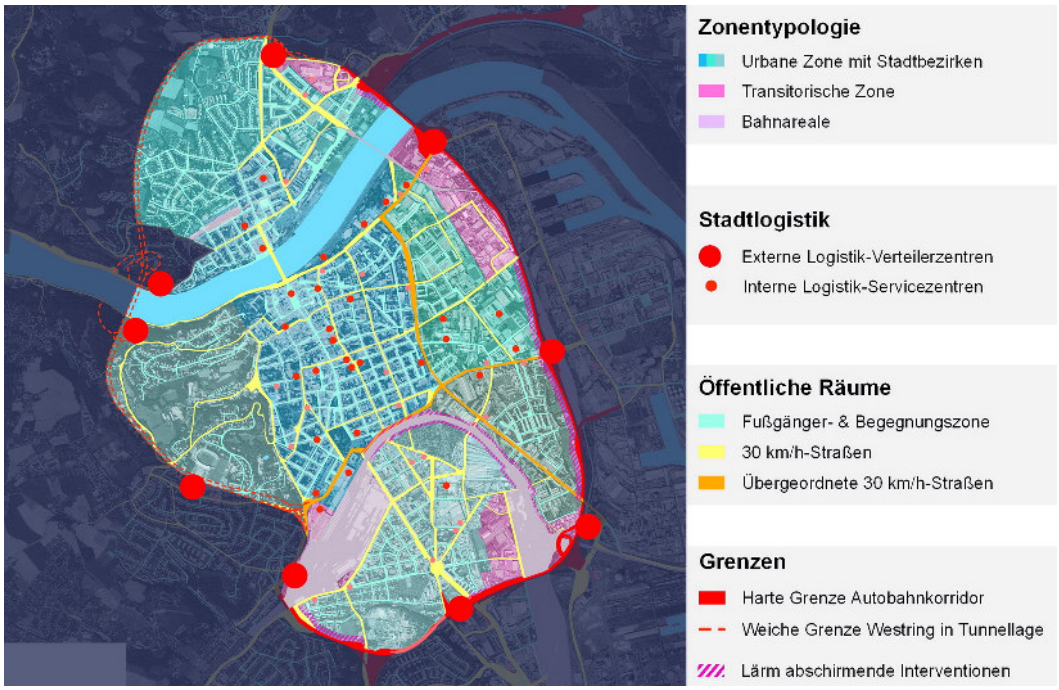

Fig. 6: Stadtplanungsmodell "Urban Vision Linz"

5.3.2 Modellelemente

Urbane Zone: Zentrales Konzeptelement ist die Bildung einer urbanen Zone zur Schaffung städtisch wohltemperierter Lebens- und Umweltqualität. Im übergeordneten funktionalen Kontext gliedert sich die Stadt in leise Zonen (Urbane Zonen) und laute Zonen (emissionsträchtige Produktionszonen mit industriellem Charakter). Maßnahmen innerhalb der urbanen Zone sind – bei differenziert stadtmorphologischer Ausprägung der Stadtbezirke – an die Einhaltung der Umweltstandards bzw. Belastungsplafonds gebunden.

Transitorische Zonen/Schnittstelleninterventionen: Transitorische Zonen sind betrieblich genutzte Übergangszonen am Rand der begrenzenden Verkehrskorridore. Interventionen entlang der Verkehrskorridore sichern durch Bebauung, Überdeckungen u. dgl. eine wirkungsvolle Abschirmung und sollen als betrieblich genutzte Zonenschnittstellen (Officestrip) mit den transitorischen Zonen entwickelt werden.

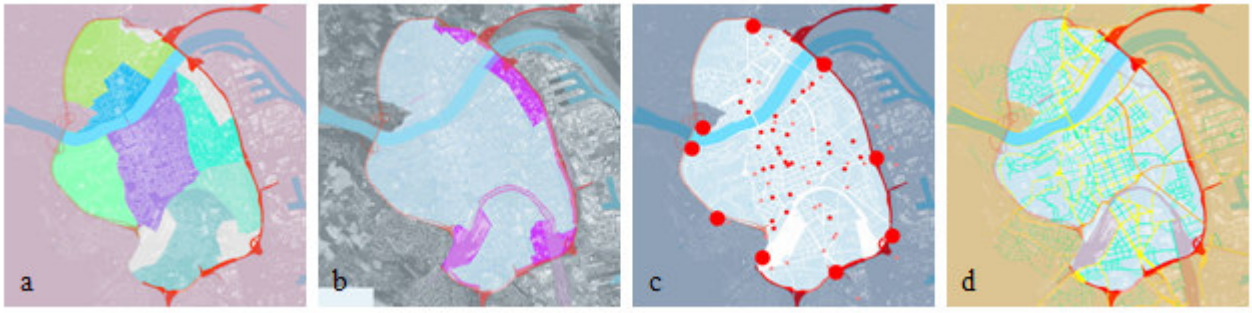

Fig. 7: a) Urbane Zone, b) Transitorische Zonen, c) Stadtlogistik, d) Öffentlicher Raum

Stadtlogistik: Das Stadtlogistikkonzept basiert auf externen und internen Logistikzentren als Knoten des Transportsystems von Personen und Gütern. Die externen Logistik- und Verteilerzentren dienen als Schnittstelle zwischen internem und externem Mobilitätssystem. Die internen Logistik- und Servicestationen entstehen durch die Transformation bisheriger Tiefgaragenstandorte und Tankstellen.

Öffentlicher Raum: Die Neustrukturierung des Mobilitätssystems transformiert die Verkehrsflächen primär in urbane Kommunikations- und Aufenthaltsräume. Mehr als die Hälfte der Verkehrsflächen sind als Begegnungs- und Fußgängerzonen gestaltet. Die Geschwindigkeit auf den befahrbaren Straßen ist beschränkt auf 30 km/h, wodurch sich die Emissionsbelastung deutlich reduziert und neue Gestaltungs- und Nutzungsqualitäten ergeben.

6 WIRKSAMKEITEN

Die Ergebnisse der Studie zeigen auf, dass es möglich ist, den straßenverkehrsbedingten Umgebungslärm um die Hälfte zu reduzieren, die Luftqualität deutlich zu verbessern, die Mobilität wie bisher sicherzustellen und die Lebensqualität im urbanen Raum signifikant zu erhöhen.

6.1 Stadtplanung

Gravierende Verbesserungen ergeben sich insbesondere für die Wohnnutzung sowie wie für die öffentlichen Einrichtungen, wie Schulen und Krankenhäuser, durch eine fast vollständige Sanierung des Wohnraumes hinsichtlich gesundheitlicher Belastungen. Vor dem Hintergrund, dass innerstädtische Problemzonen primär durch die Immissionsbelastungen entlang der Hauptverkehrsstraßen bedingt sind, ergeben sich neue Voraussetzungen einer sozial verträglichen Stadtplanung. Die funktionalen Voraussetzungen einer differenziert stadtmorphologischen Ausprägung der Stadtbezirke innerhalb des Modellraumes werden weiterentwickelt.

Bei grundsätzlicher Akzeptanz des bestehenden Nutzungsgefüges sind gemäß Zonentypologie nur maßvolle Anpassungsprozesse, wie punktuelle Standortverlagerungen sowie Anpassungen an Emissionsstandards, innerhalb des Projektraumes erforderlich. Die Fokussierung emissionsintensiver Betriebe auf die Produktionszone "Industriegebiet Linz-Ost" wird der Bedeutung der Stadt Linz als Industriestadt gerecht. Der angedachte Entwicklungskorridor an der Schnittstelle zwischen urbaner Zone und Industriezone mit Ausprägung als Logistik- und Officestrip vermag nicht nur eine schalltechnisch wirksame Zäsur zu

gewährleisten, sondern auch Produktionsflächen im Industriegebiet durch die Konzentration zugeordneter Dienstleistungsfunktionen mit Link zur urbanen Zone zu sichern.

Die Maßnahmen des Projektes schaffen – insbesondere in der Umstrukturierung und Neuentwicklung von derzeitigen Problemzonen und mindergenutzten Arealen – Potenziale einer Nutzungsintensivierung, unter Bedachtnahme auf eine sozial- und umweltgerechte Dichteverteilung und auf einen wohltemperierten urbanen Nutzungsmix.

6.2 Transformation der öffentlichen Räume

Das vorgeschlagene stadtverträgliche Mobilitätsmanagement mit Transformation der öffentlichen Verkehrsflächen bewirkt eine maßgebende Verbesserung der urbanen Lebensqualität. Neben der Vermeidung gesundheitsgefährdender und lebensqualitätsbeeinträchtigender Immissionsbelastung werden die Verkehrsflächen als urbane Lebensräume wiedergewonnen und entwickelt. Im Verbund mit bestehenden Grün-, Frei- und Erholungsflächen wird insgesamt eine hohe Erholungs- und Wohnumfeldqualität gesichert. Dabei vermag die Entwicklung des öffentlichen Raumes, sowohl aus soziokultureller Sicht, wie auch durch die essenzielle Aufwertung der Gestaltqualität, entscheidend zu einer Attraktivierung des baustrukturellen Nutzungsgefüges beizutragen.

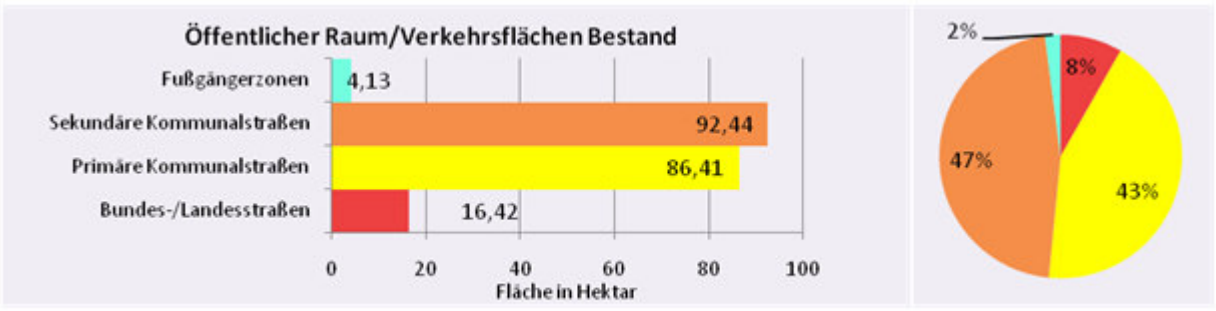

Fig. 8: Verkehrsflächen Bestand

Fig. 9: Verkehrsflächen Planung

Die Neustrukturierung des Mobilitätssystems transformiert die Verkehrsflächen primär in urbane Kommunikations- und Aufenthaltsräume. Die öffentlichen Flächen werden vollständig von parkenden Fahrzeugen freigehalten. Mehr als die Hälfte der Verkehrsflächen werden als Begegnungs- und Fußgängerzonen gestaltet. Bei deutlich reduzierten Verkehrs- und Immissionsbelastungen gewährleisten gleichfalls die 30 km/h-Straßen neue Qualitäten der Gestaltung und Nutzung.

6.3 Schalltechnik

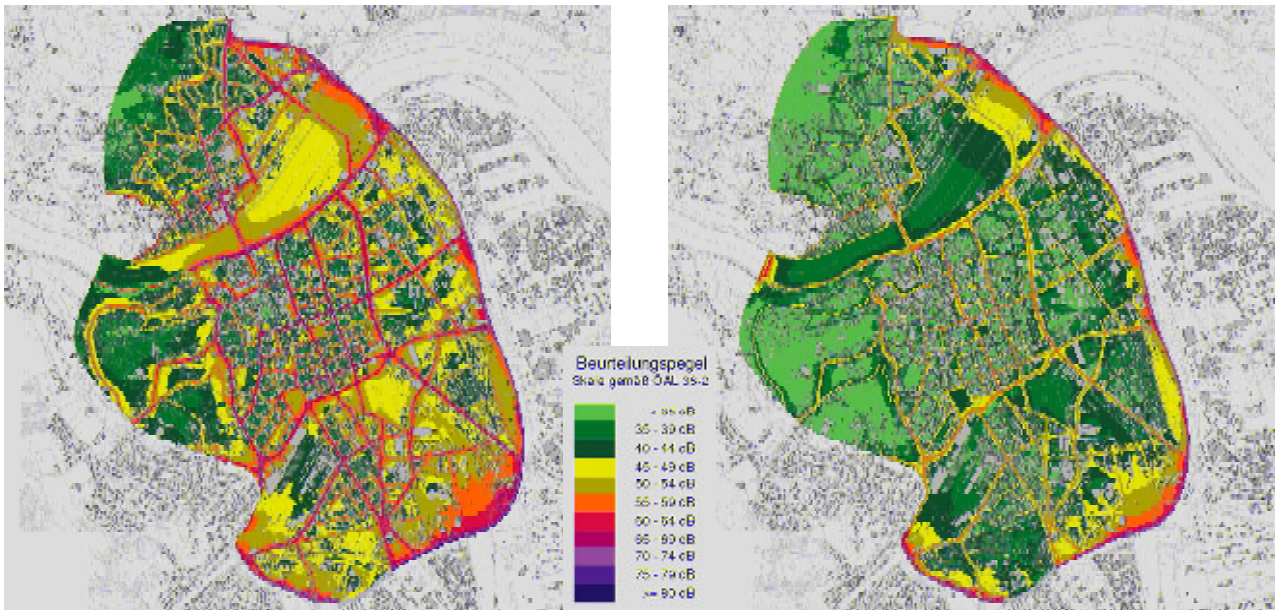

Fig. 10: Gegenüberstellung Rasterlärmkarte Straßenverkehr Bestand (links) und Prognose 2029 (rechts) – Nacht (22:00-06:00 Uhr), Immissionsniveau 1,5 m über dem Boden

Im Vergleich der Pegelwerte zwischen Bestand und Prognose 2029 wird bereits visuell deutlich, wie sich die Umgebungslärmsituation bei Realisierung des Projektes URBAN VISION LINZ verbessert. Geringfügige Überschreitungen der Schwellenwerte treten nur noch im Straßenraum bzw. im direkten Nahbereich des Autobahnrings auf.

Die nachfolgende Tabelle stellt die Analyseergebnisse für die Bestandssituation und den Prognosezeitpunkt 2029 gegenüber. Anhand der Auswertung, welche die Flächen des unmittelbaren Straßenraumes ausschließt, zeigt sich, dass für eine Wohnnutzung keine gesundheitsgefährdenden Auswirkungen mehr gegeben sind.

Kriterium	Schwellenwert [dB]	Bestand	Prognose 2029	Prognose exkl. Straßen
Gesundheitsgefährdung	> 55 dB	22 %	6 %	2 %
Bundes-LärmV	> 50 dB	41 %	13 %	5 %
WHO	> 45 dB	63 %	27 %	16 %

Fig. 11: Vergleich Flächenanteile in % nach unterschiedlichen Schwellenwerten für Bestand und Prognose 2029

6.4 Lufttechnik

Basierend auf der Annahme eines mindestens 40 %igen Anteils des Verkehrs an den Immissionen im Untersuchungsgebiet erhält man voraussichtlich im gesamten Projektraum eine Reduktion der Immissionskonzentration (JMW) von NOx(2) von wenigstens 10 µg/m³. Die erwartete Reduktion der Immissionskonzentrationen im Nahbereich der Straßen wird bedeutend höher ausfallen. Bei einem Stickstoffdioxid-Grenzwert ab 2012 von 30 µg/m³ bedeutet das ein Reduktionspotenzial von rund 33-66 % des Grenzwertes, dessen Einhaltung für Stickstoffdioxid ohne massiven Eingriff in den Straßenverkehr kaum realistisch scheint.

Die Verringerung der erlaubten Höchstgeschwindigkeit im Untersuchungsraum auf 30 km/h lässt eine geringere Aufwirbelung erwarten. Das Ausmaß ist allerdings aufgrund der vielen Einflussfaktoren nicht quantifizierbar. Weiters kann eine erhebliche Reduzierung von Sekundärstaub prognostiziert werden, welche durch die bedeutend geringeren Konzentrationen von Stickoxiden in der Luft verursacht wird.

Die Anteile der durch Verbrennungsmotoren verursachten Partikel im Verhältnis zu den Non-Exhaust-Emissionen sind relativ gering einzuschätzen. Demzufolge würden sich bei Umsetzung des Projektes die Feinstaub-Emissionen des Verkehrs um circa 10 % verringern. Besonders erwähnenswert erscheint hier allerdings, dass durch das Wegfallen der Exhaust-Emissionen vor allen Dingen die für die menschliche Gesundheit problematische kleinere Fraktion von PM2,5-Partikeln (Dieselruß) erheblich reduziert wird.

Bei Realisierung des Projektes werden signifikante Verbesserungen der Luftqualität erreicht, v. a. durch eine deutliche Reduktion von NOx, PM10 und Dieselruß. Derzeit vorhandene Grenzwertüberschreitungen könnten unterbunden und die Grenzwerte gemäß IG-L eingehalten werden. Dies ist neben rechtlichen oder politischen Konsequenzen von Interesse, da die Grenzwerte des IG-L definitionsgemäß zum vorbeugenden Gesundheitsschutz bestimmt sind.

6.5 Umweltmedizin

Lärm liefert wesentliche Beiträge zu gesundheitlichen Beeinträchtigungen und Störungen des Wohlbefindens. Verkehrslärm gilt hier als Stressor, durch den vermehrte vegetative Reaktionen (wie Stressreaktionen, psychovegetative Belastungen, Änderung des Sozialverhaltens) und zur Nachtzeit Störungen der Nachtruhe auftreten. Die verkehrsbedingte Lärmbelastung in der Wohnumgebung manifestiert sich vorerst in Form von Belästigungsreaktionen, die bei Fortbestand auch Gesundheitsrelevanz erlangen kann, indem sie selbst Krankheitswert erhält oder bestehende Erkrankungen verschlechtern kann.

Als luftgetragener Schadstoff gelangen Stäube in die Atemwege bzw. über diese in den Organismus. Dabei werden größere Partikel (bis ~2,5 µm) in den oberen Atemwegen zurückgehalten und wieder ausgeschieden. Je kleiner die Partikel sind (<2,5 µm), desto tiefer können sie in die Atemwege eindringen. Eine Ausscheidung des Materials wird erschwert bzw. unmöglich und es kommt zu einer Ablagerung in den Lymphknoten. Gemäß der bisherigen Untersuchungen bestehen jedoch Korrelationen zwischen Feinstaub und cardiovaskulärem Risiko sowie der Lungenfunktion. Zudem können an Feinstäube Toxine (u. a. Kanzerogene wie Benzpyrene) angelagert sein.

Die verkehrsbedingte Umgebungslärmbelastung reduziert sich bei Umsetzung des Modells massiv. Gesundheitsgefährdende Belastungen durch Verkehrslärm sind in einer flächenmäßigen Betrachtung des Projektgebietes auszuschließen. Medizinisch relevante Auswirkungen sind zudem in Form einer Verringerung der Atemwegserkrankungen (Asthma, chronische Bronchitis), einer Verbesserung der Lungenfunktion sowie der Reduktion von kanzerogenem Potenzial (Dieselruß) zu erwarten. Zu beachten ist, dass Störeinflüsse auf dieses Erkrankungsspektrum auch durch individuelle Faktoren (z. B. Tabakrauchen, Arbeitsplatzbelastungen) gegeben sind.

7 DISKUSSION

Die Vision für eine Stadt mit halbiertem Umgebungslärm ist realisierbar und vermag nicht nur den Lärm auf ein verträgliches Maß zu reduzieren, sondern auch die Lebensqualität insgesamt zu attraktivieren. Daneben liefert die Vision Optionen zum Themenfeld postfossile Mobilität. Allerdings ist es notwendig, den strukturellen Wandel proaktiv zu gestalten. Dies bedarf eines mentalen Paradigmenwechsels und einer Partitur der Planung mit einem kommunikativen Prozess des gemeinsamen demokratischen Ausverhandelns.

Die URBAN VISION LINZ zeigt einen gangbaren Weg, die Stadtentwicklung neu zu denken und die urbanen Zentren als Lebens- und Wirtschaftsraum dauerhaft zu attraktivieren. Das am Beispiel der Stadt Linz ausgearbeitete Projekt ist grundsätzlich auf jede andere Stadt übertragbar und modular erweiterbar.

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reviewed paper

Urban Workshop Plus - Concept of Public-Professional Partnership in Urban Development

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1 ABSTRACT

There are a few significant facts about cities and people. In 2007 urban population overtook non-urban population. This is to say, urban matters affect the majority of the world's population. In European countries urban society has never been better educated, generating precise demands concerning the quality of life and spatial solutions. As a consequence we – as professionals and researchers – need to re-define ways for the creation and transformation of urban space. New methods must involve the general public not only as an object of study ('socio-economic background') or even so popular recently as a 'creative participant' but as a real partner. This means that we need to find a proper 'place' for urban society in the planning process and equip it with essential knowledge. This task should define partners and their role in development process. The paper will describe outcomes of 'urban workshops' undertaken recently in Poland and highlight new opportunities of this public partnership.

2 INTRODUCTION

In European languages there are different terms for cities as human settlements. The oldest names like town, bourg, burg, gród, hrad, gorod – all come from fencing[1]. These names emphasise enclosure and protection. Second group of words like staed, stadt, miasto, miesto focuses on a place[2]. Finally, the third group including terms city, ciudad, cité, citta comes from Latin civitatem (nom. civitas) and accentuates the state of being vested with the rights, privileges and duties of a citizen. The first Latin word for city was urbs, but a resident was civis[3]. It is to say that 'citizenship' is the essential feature of a city. It is quite a remarkable concept as it doesn't relate to place or to physical form but to social structure and organization. The name of a city includes people living there. Urban studies, research and planning have to relate to a human being – the most essential component of city.

Gone are the days when the best that citizens could expect was to be told what was good for them (Cornwall, 2008); public engagement has become essential part of modern government. Furthermore, it seems that developed societies have achieved the state in which public participation or public involvement is not enough in political and civilizational terms; what is likely needed is partnership in urban development. The concept of partnership has to be translated into procedures making it implementable and workable. Planning systems across Europe have rather procedures for 'getting comments' on their proposals than procedures of public partnership.

New practice inevitably has to include mutual learning process. First, the methods of communication have to be launched. Professional urbanists tend to use hermetic language, which is, like ant professional language, incomprehensible for general public. Kunzmann (2004) indicated the gap between international theory and local practice. European civilizational model, in spite of local cultural distinctions, has produced similar expectations for political rights, including rights to space and place. And the right to co-decide how to arrange urban space. What is different is the way of expressing public demands and being involved in public affairs. To receive useful answer a planner needs to be sure that the 'general public' is able to understand the question. As a consequence, in order to get the answer people and institutions need to be not only informed but also 'educated'. It is just another aspect of learning society. Secondly, those who use the place: residents, employees, passers-by, tourists, companies should have an opportunity to express their demands and describe problems derived from the space. This helps urbanists with finding appropriate solutions and understanding public commitment of the profession. This demonstrates that an urban concept need to be not

[1] The widely used ending -burg –bourg, -burgh and related words borough, burglar, bourgeois, burgess, burgh, burgher derive from the Latin burgus (fortress, castle, fortified city), which is a transliteration of the Greek word pyrgos (burgus, fortress, castle); town derives from Old English tūn (enclosed place); in Slavic languages words gród, hrad, gorod, gardas, garth seem to derive from the Greek khórtos (fenced place).
[2] The word stead derives from Old English stede (place, position, standing, delay) related to standon (to stand) probably from Proto-Germanic stadiz (compare with Old Saxon stedi, Old Norvegian staðr, Swedish stad, Danish Stede, German stadt – all mean place).
[3] Civitas seems to have repalced urbs as Rome (the ultimate urbs) lost its prestige.

only explained but also accepted and eventually adopted by users (which is a wider category than only local community or stakeholders). Finally, local authorities responsible for spatial policy could learn in advance what kind of expectations concerning particular place might come into perceptible existence. Last but not least is society itself – learning that there are different needs and visions with respect to a particular place. And there is no 'two sides' of urban transformation process, but in fact many 'sides' having different expectations. This brings new role of an urbanist as a spatial mediator which has been already emphasised in the 'New Charter of Athens' (2003).

In this paper we explore opportunities of public partnership in urban development. Poland, which is our case study, is one of the countries having 'comprehensive integrated' planning system as well as Austria, Denmark, Luxembourg, the Netherlands, Sweden, Germany (CEC, 1997; Farinós Dasi, 2007) and this is why it might be a good example for investigating whether planning system fits to social needs and demands. As a post-socialist country and a new EU member (since 2004) Poland is as a well good case to examine whether there are particular problems concerning public partnership in urban development in post-communist countries even 20 years after political transformation.

In the first part of the paper we describe general background of public involvement in urban affairs. Then we study Polish planning system including public participation and social changes. In the next section we analyse recent urban projects involving general public and finally we focus on International Urban Workshop 'Gardens of Art' as an example of new model of public partnership. In conclusions we suggest a few general opportunities for the future regarding successful public-professional partnership in urban development.

3 SPACE AND LEARNING SOCIETY (INCLUDING URBANISTS)

The idea of 'common space' in cities had arisen before the first urban settlements in Mesopotamia came into existence. Lewis Mumford (1961) enumerated 'urban attributes' transferred to the cities directly from the Palaeolithic shrines and cemeteries, which Mumford calls 'the city archetype'. These very first 'magnets' were: collective places (they didn't belong to any particular person and it was everybody who had 'rights' to them), places of negotiations and agreements (where the tribes and people had to learn how to compromise and respect rights of 'others'), places of exchange (where not only goods but also ideas and innovations were exchanged), places of tradition (where the early version of cultural identity had been initiated) and finally places of 'cosmic links' (where the first ideas of the universe had been conceptualised).

All of them have been remaining vital during five thousand years of urban history. For our study all of them are important but two particular features are especially interesting – concept of 'shared space' and necessity for negotiations. Social structure has been becoming more and more complex not only in terms of cultural variety but also in terms of possible lifestyles and mobility. Globalization revealed that there are more lifestyle similarities between people living in remote places than between people of the same ethnic group or nationality. We don't claim that 'globalization caused' as it was probably already true long ago. Lifestyle of medieval craftsmen across Europe was probably quite similar as well as lifestyle of a 19th century worker and a 21st century student. European model of life has been shaped by the same civilisational processes. It is why – in spite of local differences in form and expression – we can consider the need of 'public' rights as quite homogeneous within 'Western civilisation'. Today the need of 'negotiations' for 'shared places' where 'exchange' includes exchange of cultural 'tradition' is not only alive but also thriving. This has a few implications within the cities.

First, of course is the right to 'participate' then to get involved or engaged and finally to decide ('negotiations and agreements'). Democracy ensures only basic 'influence' through election. It is to say that a citizen interested in sharing responsibility for decision-making has no direct influence on authorities. There has been vibrant debate across the world proving that getting citizens more involved in different aspects of governance has become an important part of reinvigorating democracy. It is said that a democratic state and local authorities have a duty to involve its citizens in decisions that affect their lives; participation is not a favour or a privilege but a 'basic right'. Exploring this issue we have to ask a few further questions: what is an adequate level of engagement? Who is empowered to get engaged and, as a result, get influence on final decisions? What procedures should be established to facilitate this process? In what way cultural context should be embodied into these procedures? These questions will be analysed in this paper. We assume that they may contain the general framework of a new concept of public partnership in urban development.

Second, diversity has been materialised in cities. There is a variety of land-use. There are different lifestyles, groups of interests, cultural, ethnical and ideological parties or bodies. All of them have the right to 'use' urban space. But on the other hand – there is no particular formation which could use urban space only for its own purpose ('collective place'). This brings two 'urban' questions: spatial competition and public and private use of space. Spatial competition in the city means that different 'users' (and as a consequence different 'functions') rival for the same place which keep 'negotiations and agreements' alive. What does distinguish this situation from the previous one that is the 'sides' of this operation. Local authority is not involved in this kind of competition but – using urban planning as a useful tool – it could play the role of a mediator. Differences relate not only to use but also to ownership. The problem of overtaking urban space has been widely deliberating. Having said that 'shared places' are essential in cities we have to agree that there is a basic need to keep urban space mostly as common. The question is: in what way can we balance in between two justifiable human requisites? The simple way of defining 'public' and 'private' is based on opposition. That is to say, it is impossible to conceive of public without an understanding of what is private. In this sense, private spaces are usually demarcated and protected in some way by regulated rules of private property like legal ownership and entitlement; public spaces on the other hand are conceived as open to participation, not subject to exclusive proprietary right of use and exchange. This rather vague definition of one being the anti-thesis of the other is an oversimplification of the numerous differentiations that can be drawn out according to conditions of access, control, behaviour and use. And again we have to get back to the questions of procedures of public partnership in urban development which had been asked already before.

Third, there is a substantial question about quality of life. One could relate this problem to the 'right to welfare'. In that respect learning from the past is potentially not very useful. The key assumption is that today more than half of the world's population lives in cities. Recognition of a new urban form as well as a new social structure may be a base for improving quality of life. Urban form follows only the social system. People aware of complexity of 'urban question' may cooperate and become an important factor of development; people ignored and excluded may be a growing problem not for cities but actually for themselves.

The concept of public education (learning society) seems to be a base of understanding and consequently of negotiation, engagement and partnership in urban development.

All announced phenomena had made quite an impact on urban planning practice and as a consequence – urban planning profession(s).

Professionals are at the heart of our everyday lives. We give professionals the licence to split up families and we send people to prison on their word. Urbanist is one of the professions having very strong influence on the quality of everyday life; the decision what sort of surface is laid on a pavement affects people more than signing new international agreement with a few countries. Urbanists shape everyday surroundings, facilitate accessibility or make it more difficult, increase or decrease value of particular places. Their responsibility is probably greater than they seem to think. There is a danger that professionalism is outgrowing its own legitimacy. Why are doctors able to deny people the right to die? What gives judges the right to interpret human rights? Why urbanists decide about shape of the roof of one's own house? An urbanist needs 'excuse' not only from the 'professional' point of view but from the 'social' background as well. An urbanist has to find good reason for introducing any limitation. All this doesn't mean that the profession is no more needed. But it has to be re-defined. A doctor cannot treat a patient without cooperation with him. An urbanist cannot create space for people without people.

Castells asked this question (1998) discussing the future of planning schools. He noted that planning /urban design schools have to 'renew their thinking, their framework, and their method while departing the world that is left behind: a world centred on the welfare of state, on rigid zoning, on the belief in models of metropolitan growth, on the predictability of social patterns, on the legitimacy of national governments, on the long term benefits of economic growth without social and environmental constraints and on the view of the world from patriarchalism as a way of life'. In the other words an urban planner has to be focused on civilizational trends. Only this understanding gives the opportunity for creating good cities which are only a spatial framework of the civilisation.

In this context the question what sort of skills are substantial for a modern urbanist should be examined. Kunzmann (1997) emphasises on creative skills and a deep understanding of the civilisational context. He enumerates urbanists' competences which are already required now and will be likely becoming more important in the near future: analytical competence for evaluating the local and regional influences of spatial problems and the impacts of different policies; methodological competence in selecting and applying appropriate quantitative and qualitative methods; visionary competence in making connections between periods, trends and pathways of development; creative competence in finding solutions to problems such as spatial conflicts and for developing new strategic concepts; social competence in understanding the social dimensions of urban and regional development; communicative competence in making an effective contribution to the planning and decision-making processes and intercultural competence in understanding the diversity of different planning cultures (European pluralism).

It hasn't happened by accident that 5 of 7 defined competences relate directly or indirectly to the society. There is no doubt that social, communicative and intercultural competences relate directly to different 'users' of urban space. But visionary and creative competences refer not only to new spatial solutions but also to new methods which should be introduced. Visionary means the sort of deep understanding which allows to perceive new trends, new arrangements and new tools. Creativity combines this understanding with ingenious solutions. But still there is a content of professional knowledge (analytical and methodological competence) which is needed to ensure visionary and creative answers.

4 PUBLIC PARTNERSHIP IN POLISH PLANNING SYSTEM

4.1 Historical framework

In 1918 Poland regained its independence as a result of WWI. This new political structure re-established after 123 years had to be constituted as a modern state. One of the most important tasks was to ensure territorial cohesion of the country after being a part of 3 different countries (Austria, Prussia and Russia). This attempt resulted in a modern (as for those times) regulation in planning. One of them was Building Code and Housing Act issued in 1928. Actually, planning in interwar period was very successful at national (Central Industrial District), regional (plan of 'functional Warsaw') and especially local level (public facilities, new city and harbour of Gdynia, social housing). This success was a result of already developed planning schools and research: i.e. a Department of Town Building was established as early as 1913 at Lviv Technical University[4] under the leadership of Ignacy Drexler. And, in 1915, a Polish urbanist Tadeusz Tołwiński, who had graduated in town planning from the University of Karlsruhe, became one of the founders of Warsaw University of Technology. Polish urbanists and architects were deeply involved in famous 'modernistic' C.I.A.M. in 1933. Society of Polish Town Planners was established in 1923, only 11 years after Société Française des Urbanistes, 9 years after RTPI and 1 year after Freie Akademie des Städtebaus.

After WWII Polish nation albeit with new territorial borders was faced with the task of rebuilding its largely destroyed cities, infrastructure and devastated economy. Now under Soviet influence, Poland's communist government rejected participation in the Marshall plan and reconstruction followed new socialist economic rules. This meant, that all important political, social and economic decisions were made by the communist party, reducing planning practice to a technocratic design task. Planning system during communist period consisted of a hierarchy of spatial plans: national, regional and local.

Plans did not require wide social acceptance. It was enough that they were accepted by an executive and political authority. Most often plans were seen by the society as an additional instrument of repression, especially by those social groups who as a result of the planning decisions were dispossessed of their property. Ownership was far less important then so-called 'social justice'. It is important to notice that land had no value in those times. Land expressed the political power rather then utility. With no urban planning studies as a separate track in existence, urban planning became a professional specialisation for graduates of architecture or engineering.

[4] Although in 1913 Poland was not an independent state and Lviv was a part of the Habsburg Monarchy, academic staff of Lviv Technical University – like the majority of Lviv citizens – consisted of many scientists of Polish nationality.

4.2 Planning system in Poland in the context of public consultation

Political transformation introduced in 1989 enforced the revision of the so far system of spatial planning. The first legal change was introduced in 1994 and then replaced with new regulation in 2003.

General concept of planning system follows the European (continental) model of planning. Zweigert and Korz (1998) describe its basis as 'legal certainty'. It is to say that the complete set of abstract rules and principles is created in advance of decision-making. The second impact on planning system comes from self-governance as a fundamental idea. For the last 20 years Polish legal system has been gradually implementing the rule 'decentralize if possible, centralize if necessary'.

This policy is reflected in planning documents passed by appropriate representation; respectively national, regional and local. On the national level National Spatial Strategy, approved by Parliament, provides a general framework for spatial development. On the regional level Regional Plan, approved by Regional Parliament (Sejmik), implements and amplifies this framework into the regional context. On the local level two kinds of urban plans approved by local (city or commune) council are required: a Spatial Development Framework (called Studium in Polish) and a local plan. Only the latter acts as local law which means that its regulations are binding on the respective area. Policies defined in all other planning documents are so-called 'acts of internal management' which means that they are binding for administrative public bodies and they do not apply to 'general public'. They contain a set of requirements, demands, guidelines and information.

A local plan defines quite precisely land use, density of future development including height of buildings and a kind of floor area ratio[5], physical dimensions of buildings (i.e. length of the facade) and even general architectural rules (i.e. shape of the roofs, way of location buildings on the sites, colour and texture of facades). A plan limits development because of sustainability and cultural heritage protection and reserve the land for the public investments such as transportation or infrastructure. A local plan should be coherent with the Studium which has to be prepared for the whole area of the city or commune (whereas a local plan may apply only to a defined part of urban territory). One of the functions of Studium is to coordinate development implemented through local plans. The main function however is to define a general vision of spatial development including land use, function within the city, regeneration areas, transportation and technical infrastructure.

Theoretically public consultation is included in 3 documents in Polish planning system. At the very early stage one can put forward a proposal to regional plan. There are no particular consequences of this activity. Planning Act wants regional government only to 'study and consider' proposals. Public consultation is a bit more developed in two local documents: the Studium and local plan. Both have the same procedure of public involvement consisted of 2 phases. General public is consulted at the early stage just as in the procedure of preparing regional plan. But consequences are different – local authorities should answer the proposal within 3 weeks after closing the submission period. Public consultation is carried out for the second time after completing the local plan. This is the last step before passing the plan by city council. The plan should be presented in a public place (i.e. in the municipality) with an open access for no less than 14 days and then everybody can give comments on this project. Each comment has to be answered within 3 weeks. Meanwhile a public debate has to be held. During this event the Studium or the local plan should be presented and explained in the way 'intelligible for non-professionals'. Comments may be accepted or rejected. Reasons of rejecting comments have to be explained to city council before the final approval.

There are a few significant disadvantages of this procedure. First, the obligation of answering initial proposals results in an illogical way of implementing the consultation procedure. Actually, an official announcement about the plan starting appears when it is almost ready. It is quite reasonable, as an urban planner working on the Studium or the local plan has to answer, thus needs to know the answer. The most common proposal relates to future spatial arrangement. If the plan is at the beginning stage the answer must be a bit fuzzy, on the contrary if the plan is finished the answer can be clear and coherent. This makes the first phase of public consultation only a bureaucratic activity and as a result – useless. Second, the last public presentation is after getting official approvals from the bodies and institutions being entitled to do so (i.e. regional conservation officer, regional environmental officer, neighbouring communes, the army, regional authorities). As the formal approval has to be renew after any 'important change' local authorities tend to

[5] This indicator describes relation of the total floor area of buildings on a certain location to the size of the land of that location.

reject final comments leading to any significant change and accept only the minor ones. In this way the second phase of consultation has as big influence on plans as the first one. Nobody can be astonished that people are not very interested in this kind of 'participation'. They believe that better way to get an influence on plan is – to protest. Demonstration attracts media and starts real debate. It may even stop the process of passing plan by city council. What is hopeful in this case it is that they do protest thus they do care.

4.3 Polish society after transformation and joining EU – need of change

There has been massive changes in Poland for the last 20 years. Transformation from politically-driven to market-oriented economy is one aspect of this changes. The second is 'civil society' evolution. Both have been influencing the society in many ways.

Social Survey 2009 (Czapiński, Panek, 2009) shows not only basic social indicators such as economic welfare or humans capital, but also explores the social capital question.

Polish society, in spite of economic and financial crisis, has been benefiting growing incomes (16% increase since 2007). Unemployment rate has fallen for the last 10 years from 17,6% in 2000 to 8,8% in 2009. This indicator seems to be relatively high but detailed research revealed that only half of the people registrated in Public Employment Offices as 'unemployed' really look for the job. The rest is not interested in working but wish to keep 'unemployed' status because of healthcare insurance.

Public services have been deeply transformed. Healthcare and pension system reforms have been implemented.

Education structure has adopted Bologna system in higher education. The rate of education has risen significantly for the last 10 years. In 2000 15,6% of men and 29,2% of women received university degree whereas in 2009 respective numbers are 31,8% and 46,8%. Before transformation (1988) only 6,5% of Polish population completed university education. There are as well high educational aspirations – 72% of people wants their children to complete studies at Master's level and only 15% would be satisfied with a bachelor's degree. Thinking in terms of learning society these numbers are quite optimistic but what is disquieting that is low (but growing) level of adults' education.

One of important indicators of information society is internet access rate. In Poland more than 60% of households has got a pc (17% has got more than one) and more than 50% of households has got an internet access which is an average European level.

Traditionally Polish society used to be considered as deeply religious. In 1992 55,7% of population declared regular religious practice whereas in 2009 it was only 43,5%. It seems that process of secularisation is quite quick in Poland.

Probably the most noteworthy indicator is 'general life satisfaction'. This well-being feeling has been gradually rising. Reasons of this state are both personal (family, friends, hope for the future) and socio-economic (better conditions of life, safety, leisure, professional satisfaction) but it is very good foundation for civil society. When 'basic needs' are supplied the possibility of social activity increases.

Social Survey reveals that Polish society accepts rather equality than hierarchy as social structure. Sadly, involvement in democratic procedures is still at relatively low level i.e. in the last general election (2007) only 54% of Polish voted. If we agree that civil society is a concept based on social activity and trust we have to admit that there is still much to do ahead. In Poland 13,4% of population accords with the statement that 'one can trust majority of people' (comparing with 67,3% in Denmark, 55,2% in Sweden, 35,1% in the UK, 29,8% in Belgium, 27,5% in Germany, 24,7% in Spain, 17,3% in France, 12,6% in Portugal).

This generally low level of trust along with short practice of civil society (lack of the state in 19th century, communist period) are the main reasons why only 13% of Polish population was in 2009 actively involved in 'public life' – as a members of political parties, societies, associations, NGOs or formal groups, 16% declared engagement in 'local community matters' and 19% attended public meeting or gathering.

Hope for the future is hidden in the correlation between education and the state of civil society development. It appears that the higher level of education, the deeper involvement into public matters.

It may seem that both history and planning system/practice discourage people from participation. In fact, the 'social destruction' is more fundamental – people do not believe that their voice is important, that their

opinion may change anything and their ideas would fall on deaf ears. As a matter of fact we can observe increasing public interest in urban matters. There are vibrant debates on the Internet forums, net of non-professionals involved in urban development flourishes, people are interested in expressing their opinion in concerning development plans. In that state of 'social' mind we needed to find a radical new approach to public involvement.

5 CONCEPTS OF PUBLIC INVOLVEMENT IN URBAN DEVELOPMENT

5.1 Public activity in urban matters in Poland

Having said that there is no long tradition of engagement in public matters nor real practice of partnership in planning we have to notice completely new social phenomena.

In many Polish cities, particularly in the biggest of them, 'urban' associations focused on local development, quality of public space and sustainable development have been established. Usually their 'core' consists of young enthusiasts using Internet as a main tool of communication. They study urban history, try to contact professional societies and learn more about urban planning. They participate actively in any public debate concerning urban matters and run lively websites[6]. They present their urban visions and give official comments to local plans. Implementing the rule 'act locally, think globally' they have established a net of this kind of organisations and have been launching annual meetings. Shortly, they are deeply involved in urban planning, regeneration and development being convinced that it influences everyday quality of life.

There is a growing number of groups interested in particular urban solutions. Probably the most active are cyclists' societies. They are perfectly prepared to discuss transportation issues and often they are better experts in pro-cyclist modern solutions than municipal planners. They are involved in international cooperation with organizations engaged in sustainability and ecology[7]. They create the second milieu deeply interested in urban planning.

Young professionals graduated from universities running new urban planning/urban studies courses are the third circle of public involvement. They started associations or informal groups exchanging knowledge and so-called best practices not only between themselves but also with general public. Usually they focus on urban transformation[8].

There has been quite a significant change in 'historical' societies like Society of Polish Town Planners. Many of regional branches has been 'overtaken' by young members being able to use new tools of communication and prepared to work with non-professionals. The present board consists not only of professionals but also academics and represents wide spectrum of 'urban professions'.

These new fields of public activity prove that not only quantity matters. Quality change might be more important for future system transformation.

5.2 New public activities – from debates to urban workshops

Apart from described 'new actors' the first 'accidental' involvements have been noticed recently. We are not talking about typical 'protest-groups', we are talking about citizens interested in quality of public space and wanting local authorities to take into account their expectations and visions. There are quite a lot regular (i.e. quarterly) meetings or debates organized by one of 'urban' or professional bodies gathering people wanting to have their say on particular spatial solutions or general urban problems. But recently a step forward has been made. In historic town of Starogard Gdański residents didn't accept the urban design concept of the main market square (the Rynek) proudly presented by local authorities. As a result of this probably for the first time the concept of 'urban workshop' was implemented as a tool of public partnership (Lorens, 2008). Professional 'urban negotiator' was commissioned by local authorities to mediate possible solutions. 'Urban workshop' run by a negotiator consisted of 3 phases: definition, debate and decision. At the beginning it was extremely important to find out about the problem. It was hidden in the language: the negotiator had to 'translate' citizens language into urban design terms and teach the general public 'urban design' vocabulary to

[6] i.e. Warsaw Development Forum (http://www.frw.fc.pl), Wrocław Beautification Association (http://www.tumw.pl), Lublin Development Forum (http://www.frl.org.pl), My City Assiciation (http://www.smm.pl) in Katowice.
[7] i.e. Biking Portal Wrocław (http://rowery.eko.org.pl), Biking Portal Białystok (http://www.rowerowy.bialystok.pl).
[8] i.e. Revitalisation Forum (http://www.fr.org.pl), My City (http://www.mojemiasto.org.pl)

facilitate the debate. The main task was to define the problem and describe public expectations. Then the negotiator introduced a few design groups which were working on the concepts characterised by citizens. Prepared proposals were discussed and improved. During the debate the general public had an opportunity to re-arrange the concepts. Finally, the most accepted option was approved. On the one hand the final concept was a result of real public partnership and on the other hand it met professional standard. The same method had been used in Katowice with respect to opposition to the municipal plan of re-arranging one of the main streets in the city. There is an important lesson learnt from these cases.

On the general level it is quite easy to recognize that 'local community' has become quite a fuzzy concept. There are more people having 'the rights' to the space than only local residents. 'Active citizens' not residents forced local authorities to cooperate. In both cases 'public side' wanted local authorities to protect real urban values. Their motivation didn't come from NIMBY syndrome, on the contrary it came from a visionary and real need of change.

In Poland there is no procedure of public involvement in the process of urban regeneration. As far as we do understand development process – it consists of both territorial expansion and transformation places already arranged. The latter is especially 'socially sensitive' as it strongly affects everyday life. Local authorities and urbanists have a special responsibility to 'users' of transforming areas. A successful change depends on 'users' rather than on 'structure'. People decide if the change is only 'regeneration' or 'revitalisation' as well. It is why procedure should include them at any stage – from defining the problem, through formulating the idea to discussing and accepting the final concept.

This collaborative procedure needs mutual learning. Especially important are comprehensive language and communication skills. Involvement process has to give everybody an opportunity to get engaged knowing that probably only few actors are interested in a real deep partnership. But even if people want only to express their opinion or give a comment it helps with building understanding and feeling of 'being respected' and 'having an influence'. Final agreement has to be an effect of reasonable compromise, not simply 'majority will'. History teaches us that quite often it is minority who is right.

5.3 Concept of workshop plus – case study of International Urban Workshop 'Gardens of Art'

In 2009 in Wrocław the International Urban Workshop ‘Gardens of Art’ was conducted. It was the second edition of the annual International Urban Workshop run by Wrocław University of Technology for Master and PhD students. During the workshop students were given the ‘real’ urban problem to study and resolve.

‘Gardens of Art’ was unusual not only because of the urban problem but as well because of the format. Using the ‘innocent’ (in terms of responsibility for the state of the city) students we tested new method of public involvement. As a result workshop from educational event has been developed into research experiment.

The workshop involved students of Wrocław University of Technol¬ogy, University of Wrocław, University of Łódź, Silesian University of Technology, University College London – Bartlett School of Planning, Institut d’Aménagement du Territoire et d’Environnement de l’Université de Reims and Brandenburgische Technische Universität Cottbus studying architecture, spatial planning, urban design and conservation. It has been run jointly by academics and professionals, both from Wrocław and abroad: the UK, France, Germany, Italy.

5.3.1 The general concept

Workshops are a well-known method of teaching. A typical urban workshop, especially run by the University of Technology which is training future engineers and designers, focuses on derelict areas and the ‘technical’ solution. Of course students need to consider the wider background and consequences of their proposals. But even if the site and problem is ‘real’, and it is more relevant if it is, students continue to work as if on a case study without thinking about factors affecting implementation in the ’real World’.

The concept of the International Urban Workshop ‘Gardens of Art’ was different because of real public involvement and partnership. It explored multi-level education – not only were the students expected to learn something from the public, but the public ‘was expected’ to learn from students. We wondered if the professionals involved in the workshop might learn from both groups. Local authorities might study these

recent innovations in public involvement. Multi-level education is the reason we call this event workshop plus.

We have chosen the street (Szewska St.) in the city centre which is actually not any kind of 'brownfield' or derelict area – on the contrary it has much potential. The real problem was that the street does not fulfil its potential. The main question was how to use this potential to lift the level of excellence. And what fascinated us was the mixture of uses on the street. We considered this aspect as our 'urban laboratory' of public involvement. We wanted to study and understand the different needs and prepare our concept with 'diagnostic and design transparency'.

We undertook many activities to encourage public engagement; we created a webpage (http://www.urbanworkshop.eu), described our project in the local media (newspapers, radio, TV), took up cooperation with local NGOs (Wrocław Beautification Association, Wrocław Cycling Initiative, Lower Silesia Foundation for Sustainable Development), artists (Kolektyf Graffiti Group, Knockout Design), research and art institutions (Institute of Archaeology, Art Gallery 'Design') and finally kept residents and companies informed of events. Our workshop had been planned with continuous activity embracing three main events:

- 27th June: Action Inauguration (aim: reveal project)

During the Wrocław Days banners and posters in city centre directed people to Szewska Street. Passers-by were led by various signs, actions and activities to courtyards adjacent to the street where they were invited to participate in creating a new reality with a virtual design. The process was run 'live' by students and the results were displayed in real-time on big screens. The citizens of Wrocław could discover unknown city spaces. The action was widely reported in local media.

- July-August 2009: Action Mediation – Action Re:Action (aim: get people involved)

We aimed for the widest possible public consultation. We wanted to reach consensus in building new places for the city and to avoid detached professional design which would be perceived as an imposition and un¬wanted. That is why a workshop with social interaction was organized, involving not only the inhabitants of the area, but also those interested in 'making use' of that part of the city. At this time the special event was Szewska Street Art held on 13th and 14th August. Students worked in the street asking people questions but not in the conventional way of interviews but using games, displays and fun. We organized activities in the spaces for passers-by to get them involved in a relaxed and stress free way. We attracted many including residents, tourists, workers and other 'urban actors'.

- 11th -19th September 2009: Action Creation – Action Formation (aim: prepare urban concept)

The nine day student workshop has a number of outcomes: strategies for the revitalisation of Szewska Street, the urban design of specific parts of the street; detailed solutions of particular courtyards; but also an exhibition on the streets of the city and a public presentation in City Hall. The outcome of the summer's social en¬deavours has been used to inform the student workshop. Design studio work was intertwined with lectures and presentations from our guests: residents, businessmen, journalists, members of our City Council, members of NGOs and artists.

Finally, outcome of the workshop and lesson learnt were published in the book (Mironowicz, Clerici, 2010).

5.3.2 The site and its urban context

The structure of Szewska Street is by no means complicated. As a result of its medieval origin its shape and location are obvious and transparent. It plays an important communication role in the adjacent city core.¬ However, its function is not limited to communication tasks and its potential is much greater. Well planned, it could influence spatial behaviour of its users in a natural way, as well as act as a catalyst for the city-wide functional transformation.

We have a 'little of everything' on Szewska Street, which may determine its final shape and development. It acts as a type of a lock on the way to the Rynek (main market square). Distributed along the street are important public, cultural, service and academic buildings. It also has a large number of residential apartments. Each of these elements, if matched appropriately, could attract interest and create a unique space in full symbiosis with the services of the Rynek and its surroundings.

Today Szewska Street, despite its recent renovation, is a little-used city space devoid of vitality. It is not worth walking there, it is not a place for viable busi¬nesses, it lacks resting places. The workshop aimed at creating a plan for revitalising the street – a strategy based on sustainable development, defined as the balance between a whole spectrum of issues. That spectrum would range from a vision of development, through general urban and spatial solutions, to detailed explanation of key places.

5.3.3 The public involvement concept

As it was already explained theoretically public consultation is included in the Polish planning system but it is treated rather like a part of bureaucratic procedure than real public involvement. In fact nobody needs public response. Additionally regeneration process doesn't include any negotiations or consultation. As a result it is often considered only as a 'technical' problem. It is why people feel excluded from the process and do not believe that they may have any influence on the urban transformation.

All these made our task more difficult – we had not only to get people and companies involved but also convince them that their voice and opinion were essentially important and would be taken into consideration and studied carefully. We defined few basic rules to follow:

- Treat people seriously – we worked very hard to keep residents and companies informed, delivering them comprehensive information about the workshop, its goals and format;
- Stay credible – we cooperated with local newspapers, radio and TV in the belief that for the people it would build up trust; we emphasised our academic roots – to inform that our goals are educational not commercial;
- Two-direction flow of knowledge – we wanted to get information from wide public – but we understood that quality of the answer is based on 'public' knowledge; it is why we prepared and delivered initial questions in our flyers, why we ran our webpage explaining the opportunities we saw for the place and finally – presented case studies being aware that sometimes people simply cannot imagine what is possible or they give up thinking their ideas are 'impossible to implement'.

Finally we decided that it would be easier to talk to people informally – our excuse was the 'student' character of the event. Chatting with people, playing with kids, having fun together – we were optimistic this approach would produce far more information than the 'serious' interview. Our only problem was how to 'store' and 'archive' the data. The solution appeared simple and effective – comments wall, a big board on which people could write, draw and explain their problems, ideas and solutions.

Having established our main rules we produced and delivered flyers to residents and companies in July. We didn't use the post, students delivered flyers to every flat, apartment, shop and business located in Szewska Street. Then at the beginning of August we delivered the general concept of 'Szewska Street Art' event (13th and 14th August) presenting what sort of activities and fun we were planning in the street and inviting them to participate. Then, just two days before the event we placed big posters in the street and sent information to the local newspapers, radio and TV. Students were expected not only to encourage passers-by to write on the comments walls but to talk to them and prepare short notes from these 'unwritten' thoughts.

Having a limited number of people able to work we decided to concentrate our activities in five points on the street. 'Typical' equipment of each point was a chalk to draw on the pavement, paints and col-our pencils, a huge map of the street to draw on, bubbles, balloons and of course – a comments wall on which we pined-up pictures of the the streets/yards and art and leisure in the streets across the world. But every fun-point had an additional attraction like leisure garden, playground, games, graffiti painting, double-sized bike, rickshaw-bike. An additional attraction was a historic tram dressed with the logo of our event, in which we offered a free tour around the Old Town and passengers were interviewed by our students during the trip.

5.3.4 The general public response

Our concept was generally very successful as we have got almost 1.300 written answers in a very short time and many information gathered by students in informal chats. They gave us a deep insight into social feelings and expectations. Having ordered notes written on comments walls we found that the most frequent topic was the function of the street which gathered 25% of all comments (desired arrangement, equipment, activities). It resulted from the wide scope of proposals, but at the same time showed in what field the lacks are noticed by users the most. Another frequently mentioned topic was transportation/circulation (15%).

Comments here mostly touched on vehicle traffic, the tram and Szewska as a promenade. Nearly as often appeared the topics of the spirit and character of the street (13%), appearance (11%) and greenery (11%). The vast majority (71%), the answers played the role of a 'book of wishes' and became for us a source of ideas. A large number of comments (1/3) revealed real creativity of the respondents, presenting people's vivid imagination, sense of humor, open mind and need of contact with others. The comments on the past and present, in turn, were valuable as observations – people referred this way to their experiences with the street and took a position on what is there at the moment. They helped a lot with the diagnosis.

Quite a big public attended our final presentation in the Town Hall. Workshop organizers had been asked for the future activities by 'ordinary citizens'. Vibrant debate flowed through Internet forums. Finally, local authorities have decided to take into consideration the outcome of the research and re-introduce revitalisation process for the second time.

The restoration of public interest and trust were probably more important outcome than data gathered during the research. The lesson learnt by general public was confrontation with different needs and expectations. Urban actors realised that they have to negotiate and compromise and learned that basic understanding facilitates these processes.

6 CONCLUSION

Arnstein (1969) described a 'ladder of citizen participation' consistsing of three 'rungs': non-participation (manipulation, therapy), tokenism (informing, consultation, placation) and citizen power (partnership, delegated power, citizen control) arguing that the best form of public involvement lies at the top of the ladder. Knowing that there are many detailed questions in respect of this concept (control of what? which citizens? what kind of control? where are the limits?) in terms of urban planning procedure we may answer that there is an opportunity to ensure citizens' control of urban developemnt. This opportunity is based on idea of 'workshop plus' – mutual learning process involving active citizens, urbanists and professionals focused on spatial-social relationship, creative bodies and people and local authorities. The procedure itself should consist of three phases: (1) revealing the problem and the initial idea, (2) a vision/concept debate and (3) a final proposal debate and acceptance. This scheme gives an opportunity to everybody who wishes to get involved. Future studies have to test different techniques of each phase. Our experience allows us to claim that it is not enough to keep people informed – we need to attract them through public events and show them a variety of opportunities. We need as well to redefine tools of 'investigation' switch from quantitive methods to qualitity ones. We need to test interactive tools remembering that rather personal involvement and public workshop ensure final agreement. Learning society needs to learn itself.

It seems that the method presented in this paper is a step towards Kunzmann's (2005) vision of creative planning: 'Creative planning needs creative people, creative planners, opinion leaders, moderators and communicators who know enough about the past to envision the future, and a planning culture that gets out of grid-locked bureaucratic statutory planning and political bargaining'.

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Using remote sensing and GIS for damage assessment after flooding, the case of Muscat, Oman after Gonu tropical cyclone 2007: Urban planning perspective

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1 ABSTRACT

Natural Disasters occur frequently around the world, and their incidence and intensity seem to be increasing in recent years. The Disasters such as cyclones and floods often cause significant loss of life, large-scale economic and social impacts, and environmental damage. For example, Cyclone Gonu was the strongest tropical cyclone on record in the Arabian Sea, and tied for the strongest tropical cyclone on record in the northern Indian Ocean and was the strongest named cyclone in this basin. On June 5 2007 it made landfall on the eastern-most tip of Oman with winds of 150 km/h (90 mph). Gonu dropped heavy rainfall near the eastern coastline, reaching up to 610 mm (24 inches), which caused flooding and heavy damage. The cyclone caused about $4 billion in damage and nearly 50 deaths in Oman, where the cyclone was considered the nation's worst natural disaster. Nowadays, we have access to data and techniques provided by remote sensing and GIS that have proven their usefulness in disaster management plan. Remote Sensing can assists in damage assessment monitoring, providing a quantitative base for relief operations. After that, it can be used to map the new situation and update the database used for the reconstruction of an area. Disaster management plan consists of two phases that takes place before disaster occurs, disaster prevention and disaster preparedness, a three phases that happens after the occurrence of a disaster i.e. disaster relief, rehabilitation and reconstruction. In the disaster rehabilitation phase GIS is used to organize the damage information and the post-disaster census information, and in the evaluation of sites for reconstruction. In this study, two IKONOS satellite images of Muscat, Oman have been utilized; one image before the cyclone and one after. The two images have been geometrically corrected. Change detection has been applied to identify and assess the damages. The results of this study emphasize the importance of using remote sensing and GIS in damage assessment phase as part of effective Disaster Management Plan.

2 INTRODUCTION

Cyclone Gonu, (also known as Super Cyclonic Storm Gonu) was the strongest tropical cyclone on record in the Arabian Sea, and tied for the strongest tropical cyclone on record in the northern Indian Ocean and was the strongest named cyclone in this basin (J.T.W.C., 2007). The second named tropical cyclone of the 2007 North Indian Ocean cyclone season, Gonu developed from a persistent area of convection in the eastern Arabian Sea on June 1. With a favorable upper-level environment and warm sea surface temperatures, it rapidly intensified to attain peak winds of 240 km/h (150 mph) on June 3, according to the India Meteorological Department. Gonu weakened after encountering dry air and cooler waters, and late on June 5 it made landfall on the eastern-most tip of Oman with winds of 150 km/h (90 mph), becoming the strongest tropical cyclone to hit the Arabian Peninsula. It then turned northward into the Gulf of Oman, and dissipated after moving ashore along southern Iran on June 7. Intense cyclones like Gonu have been extremely rare over the Arabian Sea, as most storms in this area tend to be small and dissipate quickly (NASA, 2007). About seven hours before passing near the northeastern Oman coastline, Cyclone Gonu began affecting the country with rough winds and heavy precipitation (Vaidya et al, 2007) with rainfall totals reaching 610 mm (24 in) near the coast (Daily News, 2007), figure (1), which caused flooding and heavy damage.

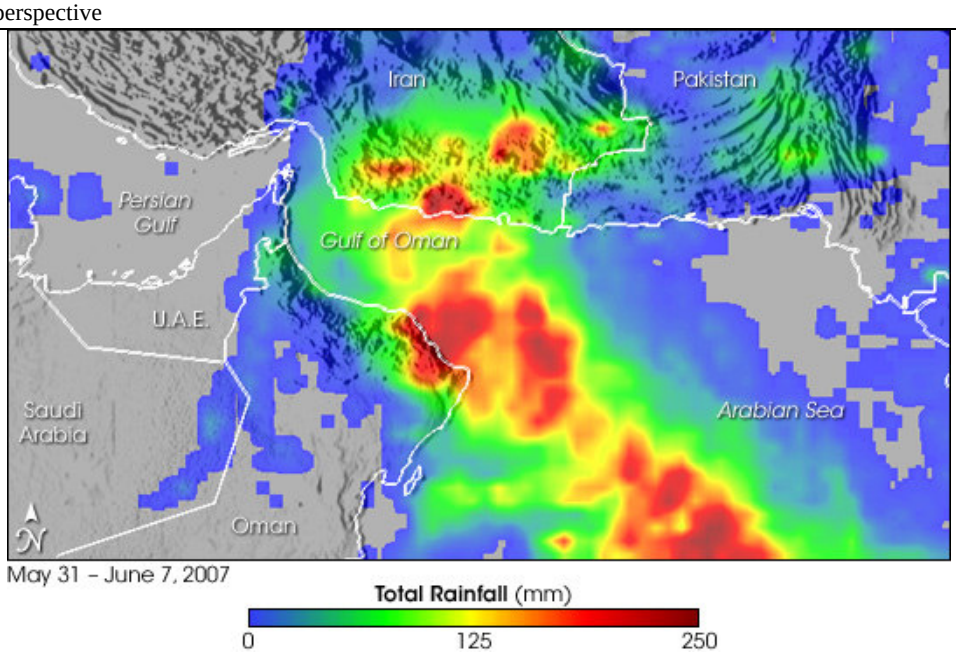

Fig. 1: Map showing rainfall totals around the Gulf of Oman between May 31 and June 7, 2007. The red areas show where rainfall exceeded 200 mm (8 inches)

The name Gonu was contributed by the Maldives, meaning 'bag made from palm leaves' in Dhivehi, the Maldivian language. Officials recommended citizens to evacuate from potentially affected areas, and about 7,000 people were forced to leave Masirah Island due to the threat of high surf and strong winds (Reuters, 2007). Overall, more than 20,000 people evacuated to emergency shelters (A.P., 2007). A state of emergency was declared for the nation (Reuters, 2007). The national weather service in Oman warned that the cyclone was expected to be worse than the destructive cyclone which hit Masirah Island in 1977 (Agencies, 2007). The Mina al Fahal oil terminal closed for over three days due to the threat of the storm (Noueihed, 2007). Omani officials closed government offices for two days, and declared a 5-day long national holiday due to the threat of the cyclone. Most businesses near the coastline were closed prior to the announcement. Authorities at the Seeb International Airport delayed all flights after 2000 UTC on June 5 due to the cyclone(Vaidya, 2007).

Gonu produced strong waves along much of the coastline (Vaidya et al, 2007), leaving many coastal roads flooded (Al-Nahdy, 2007). Strong winds knocked out power and telephone lines across the eastern region of the country, leaving thousands isolated until the lines were repaired hours later. The cyclone caused extensive damage along the coastline, including in the city of Sur and the village of Ras al Hadd at the easternmost point of the Omani mainland (Vaidya, 2007). In Muscat, winds reached 100 km/h (62 mph), leaving the capital city without power. Strong waves and heavy rainfall flooded streets and some buildings. In effort to prevent electrocutions, police workers sent text messages to residents which recommended residents away from certain streets. Little damage was reported to the oil fields of the nation (A.P., 2007) . The liquefied natural gas terminal in Sur, which handles 10 million tonnes of gas each year, was badly hit by the storm and could not be operated. According to the Oman News Agency, the cyclone killed 49 people in the country, with an additional 27 reported missing by four days after it struck the country. The damage in the country was estimated at around $4 billion (2007 USD), ranking it as the worst natural disaster on record in Oman.

3 AREA OF STUDY

Oman is located in the southeastern quarter of the Arabian Peninsula and, covers a total land area of approximately 300,000 square kilometers. Muscat is the capital and largest city of Oman; it is also the seat of government and the centre of Commercial activities in Oman. The city gave its name to the country until 1970, which was called Muscat and Oman. Muscat is located in northeast Oman, at 24°00′N 57°00′E / 24°N 57°E / 24; 57. The Tropic of Cancer passes south of the area. It is bordered to its west by the plains of the Al Batinah Region and to its east by Ash Sharqiyah Region. The interior plains of the Ad Dakhiliyah Region border Muscat to the south, while the Sea of Oman forms the northern and western periphery of the city. The

water along to coast of Muscat runs deep, forming two natural harbours, in Muttrah and Muscat. The Western Al Hajar Mountains run through the northern coastline of the city. The city is situated on a cove surrounded by volcanic mountains, and it is connected by road to the west and the south. The Al Sultan Qaboos Street forms the main artery of Muscat, running west-to-east through the city. The street eventually becomes Al Nahdah Street near Al Wattayah. Several inter-city roads such as Nizwa Road and Al Amrat Road intersect with Al Sultan Qaboos Road (in Rusail and Ruwi, respectively).

The metropolitan area spans approximately 1500 km² and includes six wilayats; Muttrah, Bawshar, Seeb, Al Amrat, Muscat and Qurayyat (figure 2). According to the 2003 census conducted by the Oman Ministry of National Economy, the population of Muscat is 632,073. (M.N.E, 2003) Muscat formed the second largest governorate in the country, after Al Batinah, accounting for 27% of the total population of Oman. As of 2009, the population of the Muscat metropolitan area was 855,507 (World Gazeteer, 2009).The population density of the city was 162.

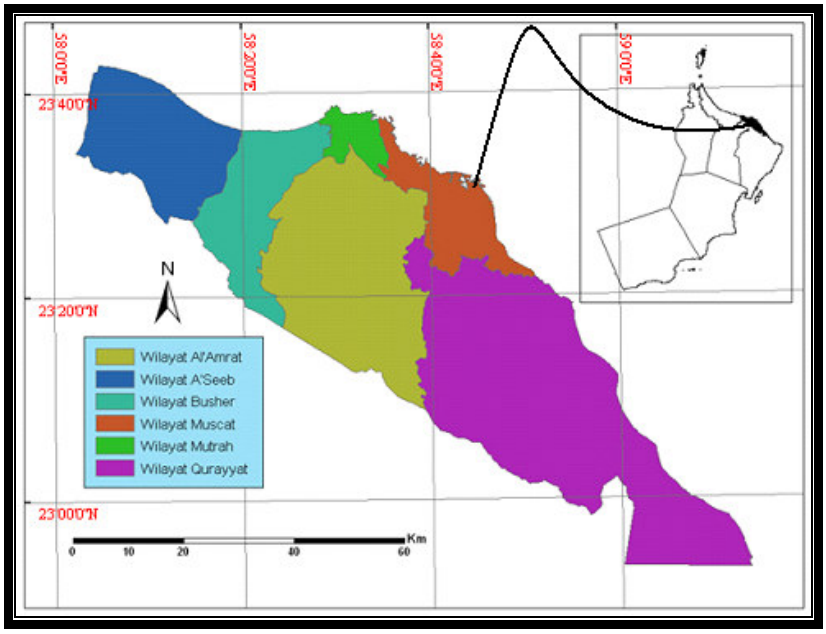

Fig. 2: Area of study (Al-Awadhi, 2009)

Since the ascension of Qaboos bin Said as Sultan of Oman in 1970, Muscat has experienced rapid infrastructural development that has led to the growth of a vibrant economy and continuous urban expansion. The city's unusual architecture shows Arab, Portuguese, Persian, Indian, African, and modern Western influences. Annual rainfall in Muscat averages 10 cm (4 in), falling mostly in January. The climate generally is very hot, with temperatures reaching 54°C (129°F) in the hot season, from May to September.

4 GIS AND REMOTE SENSING FOR DAMAGAE ASSESSMENT

4.1 GIS and damage assessment

A Geographical Information System (GIS) has a graphic database of geo-referenced or spatial information, which is linked to the descriptive database. A GIS uses high-powered graphic and processing tools that are equipped with procedures and applications for inputting, storing, analyzing and visualizing geo-referenced information. A GIS's capacity for data integration makes it possible to look at and analyze data in powerful new ways. A GIS is useful mainly because of its capacity to build models or representations of the real world from information in databases. It achieves this by implementing a series of specific procedures that generate still more information for spatial analysis and used to assist in problem - solving and planning. GIS is therefore important for aiding hazard prevention and for simulating the damage that would be caused in the event of a natural disaster. GIS can also be used to interpret information by creating thematic maps that show the spatial distribution of the information. These maps show spatial patterns, trends or relationships, making it easier to analyze the information. This is the case in the various successive stages of the process of assessing the damage caused by a disaster.

4.2 Remote sensing and damage assessment

Damage assessment by remote sensing can be categorized to the following phases:

4.2.1 Assessment of Flood Damage (immediately during Flood)

During floods, Remote sensing data provide timely and detailed information that are required by the authorities to locate and identify the affected areas and to implement corresponding damage mitigation. It is essential that information be accurate and timely, in order to address emergency situations (for example, dealing with diversion of flood water, evacuation, rescue, resettlement, water pollution, health hazards, and handling the interruption of utilities etc.). Some important spatial outputs produced and analyzed in real time. For example, flood extent maps, real time monitoring by remote sensing data and of damage to buildings and infrastructure Maps. Moreover, meteorological reports based on real-time remote sensing data are required to show intensity/estimates, movement, and expected duration of rainfall for the next 3 hours. Evaluation of secondary disasters, such as waste pollution can be detected and assessed during the crisis by remote sensing data as well. (Jeyaseelan, 1999)

4.2.2 Relief (after the Flood)

In this stage, re-building destroyed or damaged facilities and adjustments of the existing infrastructure will occur. At the same time, insurance companies require up-to-date information to settle claims. The time factor is not as critical as in the last stage. Nevertheless, both medium and high-resolution remote sensing images, together with an operational geographic information system, can help to plan many tasks. The medium resolution data can establish the extent of the flood damages and can be used to establish new flood boundaries. They can also locate landslides and pollution due to discharge and sediments. High-resolution data are suitable for pinpointing locations and the degree of damages. They can also be used as reference maps to rebuild bridges, washed-out roads, homes and facilities (Jeyaseelan, 1999).

5 OBJECTIVES

5.1 Identifying the damaged sites and its extent.

5.2 Assessment of the damaged sites.

5.3 Measurement the impact of disasters on the geographical environment of the affected areas.

6 METHODOLOGY

6.1 Data

In this study, two IKONOS satellite images of Muscat, Oman have been utilized; one image before the cyclone (8th January 2006) (Figure 3) and one after (12th June 2007) (Figure4). IKONOS is the world's first commercial satellite able to collect black-and-white (panchromatic) images with 82-centimeter resolution and multispectral imagery with 4-meter resolution. Imagery from both sensors can be merged to create 1-meter color imagery (pan-sharpened). Table 1 shows the characteristics of IKONOS system.

IKONOS SPECIFICATIONS	
Spatial Resolution	0.82 meter x 3.2 meters
Spectral Range	526–929 nm 445–516 nm (blue) 506–595 nm (green) 632–698 nm (red) 757–853 nm (near IR)
Swath Width	11.3 km
Revisit Time	Approximately 3 days
Orbital Altitude	681 km

Table 1: Characteristics of IKONOS (Geo-Eye 2009)

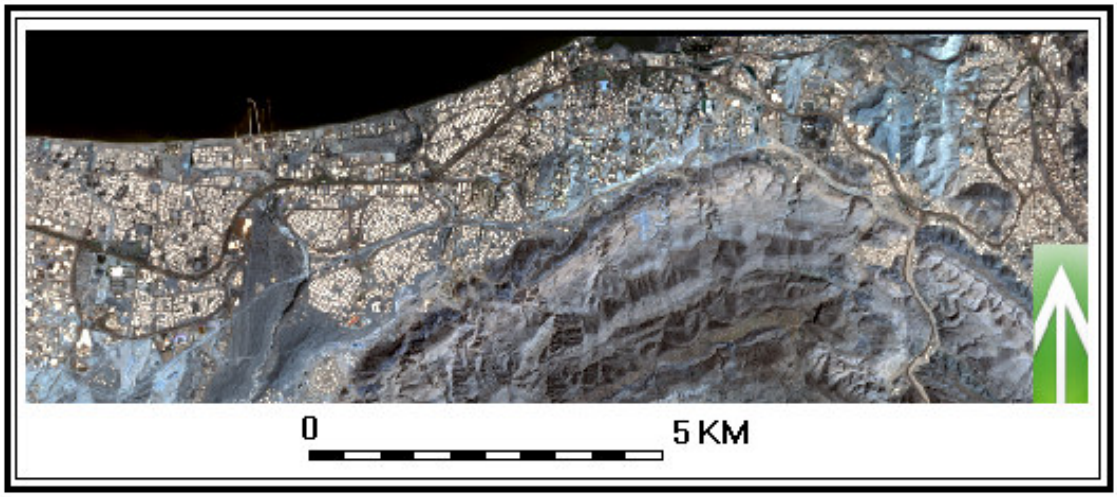

Fig. 3: Area of study before Gonu

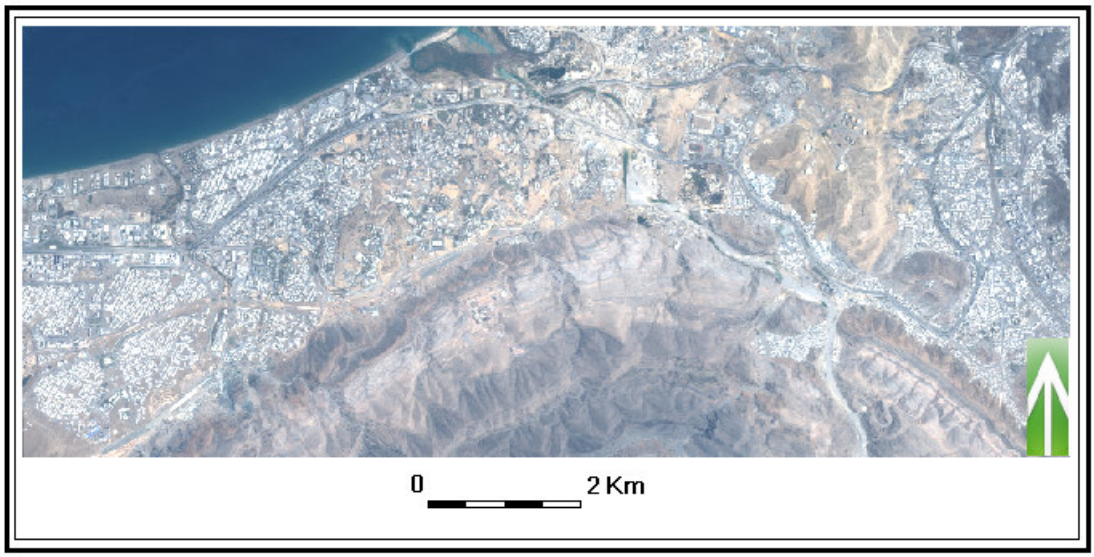

Fig. 4: Area of study after Gonu

6.2 Methods

Figure (5) summarizes the phases and methods used in this study. The two images have been geometrically corrected. Then, Areas Of Interests (AOIs) have been extracted from the images using (Subset function) in ERDAS Imagine 8.6 using visual observations depending on cyclone impacts from the recent image (after event image). Change detection technique used here to compare (AOIs) from (after event image) with their counterparts in the old image (before event image) using (Geolink function) in ERDAS Imagine. This technique can be included within "Visual Analysis" techniques where visual interpretation is used to identify the change by on-screen digitizing from images of different dates (LU et.al, 2004). This technique can be called "Geo-linking change detection" as the comparison between the images is based on their geographical locations. Areas of change were extracted and mapped using "Map Composition" tool. At the end, the area and perimeter of affected areas were calculated using "Measurement" tool in the same program.

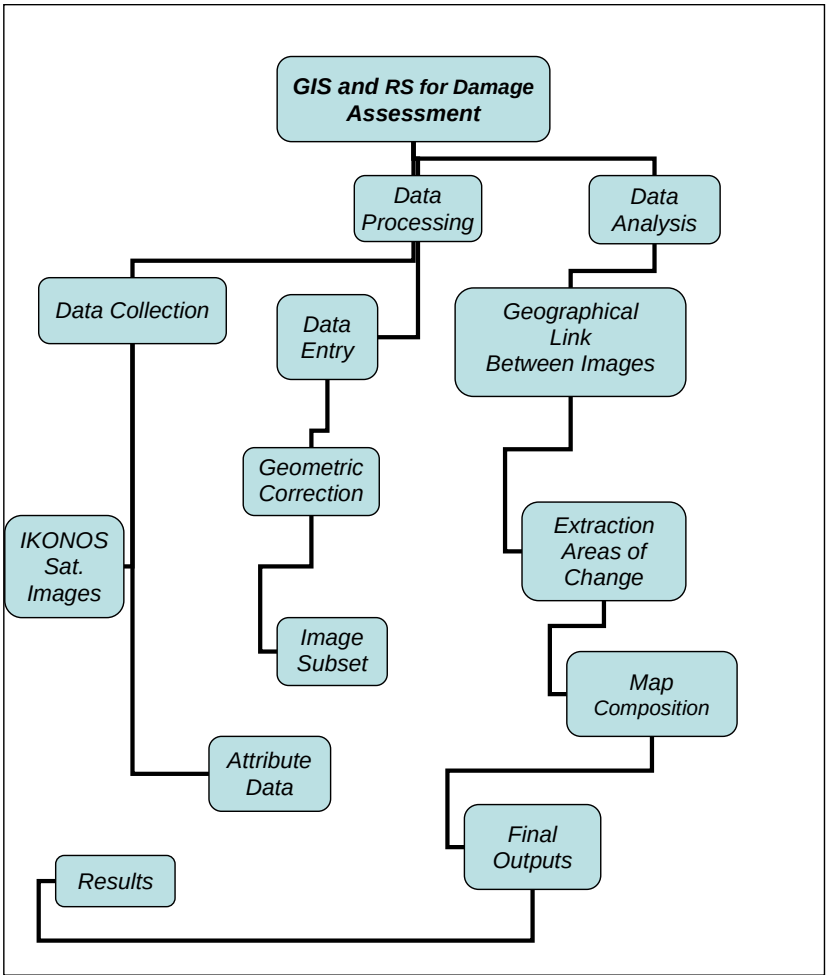

Fig. 5: The methodology used in this study

7 RESULTS

Many areas of interest (AOIs) have been extracted from the two images. However, only some of these areas will be presented on this study. Figure (6) and photo (1) illustrate a damaged part of a bridge on Alqurm area (after event image). On the second part of the figure, the bridge before the cyclone.

Fig. 6: a damaged part of a bridge on Alqurm area Bridge (left), the bridge before the cyclone (right)

Photo 1: the damaged part of the bridge

Figure (7) and Photo 2 show one of significant damages on Alqurm beach

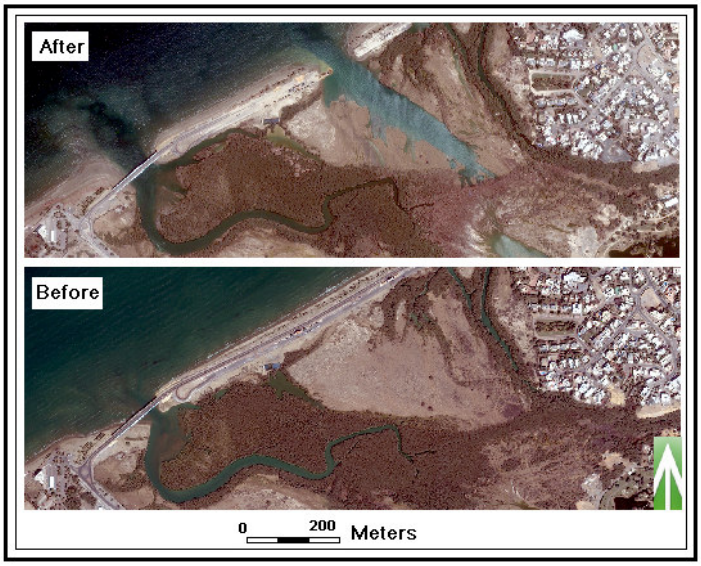

Fig. 7: significant damages on Alqurm beach

Photo (2) damages on Alqurm beach

Figure (8) shows inundated areas behind Sultan Qaboos Grand Mosque (Alghubra area).

Fig. 8: Inundated areas behind Sultan Qaboos Grand Mosque (Alghubra area)

Figure (9) shows another coastal area in Muscat

Fig. :9 Ezibah Coast

Moreover, the perimeter and total affected area were calculated as shown in table (2)

Area Name	Perimeter	Total affected Area Hectare/ (Square Meter)
Part of a danaged Bridge	163.43	0.0746 (745.70)
Alqurm Beach	1468.35	4.7285 (47285)
Behind Sultan Qaboos Mosque	1920.44	10.5153(105153)
Ezaiba Coast	383.63	0.7019 (7018.8)

Table (2) the perimeter and total area of affected locations

These quantiataive information can assist in damage assessment monitoring and it can be used to map the new situation and update the database used for the reconstruction of an area.

8 CONCLUSION

In this study, remote sensing data and techniques provided by GIS have proven their usefulness in disaster management plan especially in mapping the new situation after the disaster which help in updating the geographical database. This can be used for the reconstruction of the damaged area. GIS helped to interpret information by creating satellite based thematic maps that show the spatial diminsion of the effected areas. This will ease information analysis for successive stages of the process of assessing the damage caused by the disaster especially re-building damaged facilities and infrastructure. Insurance companies shall use this updated spatial information to settle claims. IKONOS images with its high-resolution proved usefulness for pinpointing locations and the degree of damages. Moreover, IKONOS images can be used as reference maps to rebuild bridges, washedout roads, homes and facilities.

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Verbesserung der thermischen Behaglichkeit innerhalb dichter Wohnkomplexe am Beispiel einer südkoreanischen Stadt

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1 ABSTRACT

Increasing urbanization and environmental problems become a challenge for big cities like the Asian Metropolitan City Daegu (35° 73` N.; 128° 34` E). Climatic conditions of a typical summer day will be presented by the means of the numeric simulation model ENVI-met. After a preceded urban climate analysis microclimatic processes were examined in a residential area characterized by high-rising multiple family dwellings. In spite of its advantageous position along the urban ventilation lane, the Sincheon River, this area lacks sufficient exchange and thus causes a local thermal discomfort. A simulation of alternative versions of the development pattern and vegetation structure will show up different ways of influencing the predominating microclimate. These investigations supply recommendations of a climate-adapted urban planning approach to ensure a better thermal comfort and to improve the bioclimate for the inhabitants.

2 EINLEITUNG

In den letzten Jahrzehnten rückt das Thema Umwelt- bzw. Klimaschutz in urbanen Räumen mehr und mehr in den Vordergrund, vor allem im Hinblick auf die negativen Auswirkungen stadtklimatischer Modifikationen auf das menschliche Wohlbefinden. Durch die globale Erderwärmung und die damit immer häufiger auftretenden Wetterkapriolen werden die Menschen zunehmend für dieses Thema sensibilisiert. Vielfach wurde mittlerweile der akute Handlungsbedarf auf der urbanen Ebene erkannt (Hupfer und Kuttler, 2006).

Die Verbesserung des Stadtklimas birgt ein großes Potenzial bezüglich zukünftiger Umweltschutzmaßnahmen. Eine klimagerechte Stadtplanung versucht der Problematik des Stadtklimas zu begegnen. Eine enge Verzahnung der angewandten Stadtklimatologie, die sich mit der Analyse des lokalen Klimas und der lufthygienischen Situation beschäftigt, ermöglicht es den Stadtplanern über synthetische Klimafunktions- und darauf aufbauende Planungshinweiskarten auf Problemfelder zu reagieren. Je nach geographischer Lage und Größe des zu untersuchenden urbanen Raumes, verbunden mit der Verhaltensstruktur ihrer Bewohner, kommt es zu unterschiedlichen stadtplanerischen Aufgaben. Von großer Bedeutung sind die Durchführung umfangreicher Klimauntersuchungen, sowie die fächerübergreifende Kooperation von der Verkehrs- bis zur Grünordnungsplanung (Baumüller, 1998).

3 PROBLEMSTELLUNG

Das Wirtschaftswachstum sowie das damit einhergehende Bevölkerungswachstum asiatischer Städte ermöglichten, dass sich innerhalb weniger Jahrzehnte urbane Agglomerationen entwickelten. Die Folgen dieser Urbanisierung werden in keinem Kontinent so wahrgenommen wie in Asien. Stadtklima und Lufthygiene spielen in dieser Entwicklung eine entscheidende Rolle. Vor allem die humanbiometeorologischen Wirkungskomplexe und ihre Wirkung auf den menschlichen Organismus treten dabei deutlich hervor. Die Gestaltung der Beziehungen zwischen Stadt, Bevölkerung und Umwelt wird zu einer Schlüsselfrage nicht zuletzt auch der asiatischen Raumordnungspolitik.

Um den Veränderungen der thermischen Behaglichkeit und dessen Auswirkungen auf die menschliche Gesundheit nachzugehen, beschäftigte sich diese Untersuchung mit den potentiell negativen Auswirkungen des Stadtklimaeffektes in Bezug auf die gegenwärtige Bebauungsstruktur in der südkoreanischen Stadt Daegu. Die Metropolitan City Daegu (35° 73’ n. Br.; 128° 34’ ö. L.; ~ 2,5 Mio. Einw.; A = 885,62 km²) befindet sich noch in der gemäßigten Klimazone. Die klimatischen Verhältnisse sind jedoch durch sommerliche Hitzewellen (bis 40°C), extreme Starkniederschlagsereignisse und feuchtwarme Monsunwinde charakterisiert. Zusätzlich verstärkt wird das lokale Klima durch die Kessellage der Stadt und die damit einhergehenden schlechten Austauschverhältnisse.

Neben Begrünungsprojekten spielt insbesondere der nächtliche Kaltlufteintrag eine große Rolle. Da im Sommer der Wind vorwiegend aus SSW kommt und das bewaldete Biseulsan-Gebirge optimale

Voraussetzungen eines Kaltluftentstehungsgebietes aufweist, sollten Leitbahnen, die in das Stadtzentrum führen, freigehalten werden. Eine hervorragende Ventilationsbahn stellt der Fluss Sincheon dar, der dem südlich gelegenen Gebirge entspringt und durch das Stadtzentrum fließt (Abb. 1, links). Dessen ungeachtet wurden entlang des Flusses jedoch parallel gegen Süden ausgerichtete Mehrfamilienkomplexe erbaut, welche die potenzielle Frisch- und Kaltluftzufuhr blockieren. Vor allem die sommerliche thermische Belastung lässt die Einwohner Daegus an der Wohnqualität ihrer Stadt zweifeln. Chronische Krankheiten und Müdigkeitsgefühle sind erste mögliche Vorboten einer zunehmenden Verschlechterung vor allem des thermischen Wirkungskomplexes (Kim et. al, 2004).

Die Vorstellungen koreanischer Raumplaner weichen von denen der deutschen inhaltlich ab. Insbesondere wenn es sich um die Bedürfnisse und Wohnwünsche der koreanischen Bevölkerung handelt, wird ersichtlich, dass recht wenige Sanierungs- und Umbaumaßnahmen unternommen werden. Verwahrloste, traditionelle Einfamilienhäuser müssen den dichten und überdimensionalen Massivbauten weichen. Die Hauptaufgabe der Planer besteht darin neuen Wohnraum in Städten zur Verfügung zu stellen (Son et. al., 2008). Daher ging es in der Analyse nicht vorrangig darum neuen Wohnraum zu schaffen, sondern den gleichen Wohnraum zu garantieren, gleichzeitig aber das Wohnumfeld und somit auch die Auswirkungen vor allem auf den thermischen Wirkungskomplex zu verbessern.

4 ZIELSETZUNG

Das nahe der Innenstadt befindliche Wohnviertel „Sincheon-View“ ist durch dichte Gebäude und weitläufige Straßenpflasterung außerhalb sowie innerhalb des Komplexes geprägt. Da die Hauptorientierung der Plattenbauten Richtung Süden weist, ist zwar eine optimale Aussicht auf den Fluss Sincheon gewährleistet, der Luftaustausch durch die Ventilationsbahn Sincheon wird dadurch jedoch unterbunden. Dies führt zu einem verminderten Eintrag kühler und frischer Luft in das Zentrum. Um in der Umgebung des Wohnkomplexes und inmitten des Stadtzentrums eine bessere Lebensqualität für die Bevölkerung zu erzielen, muss eine Reduzierung der Durchschnittstemperaturen vor allem im Sommer erreicht werden. Aus stadtplanerischer und klimatologischer Sicht ergeben sich zwei wesentliche Methoden. Zum einen die Verbesserung des Wärmeumfeldes durch Flächenentsiegelung und Begrünung. Zum anderen die Optimierung der städtischen Belüftung bzw. der Zirkulationsfunktion durch die gezielte Nutzung der Ventilationsbahnen mittels einer angepassten Anordnung und Form der Gebäude.

Ziel dieser Arbeit war es schließlich, die Temperatur- und Windverhältnisse, verbunden mit dem Kaltluftgeschehen, an unterschiedlichen Wohnformen zu analysieren und anhand der simulierten Planungsmodelle die thermische Behaglichkeit mithilfe des PMV-Indexes zu bewerten. Des Weiteren sollen Rückschlüsse für eine optimierte Durchlüftung des Wohngebietes und dem unmittelbar angrenzenden Bereich gezogen werden.

5 METHODEN

Stadtklimatologische Untersuchungen werden heute verstärkt mittels numerischer Simulationsmodelle vorgenommen. Diese sind in der Lage die komplexen Wechselwirkungen zwischen verschiedenen urbanen Elementen und der Atmosphäre zu untersuchen, um das Ausmaß des Ist-Zustandes und des Plan-Zustandes zu erfassen. Numerische Modelle stellen die meteorologischen Prozesse auf dem Erdboden sowie der Atmosphäre dar und beschreiben ihren Einfluss auf die zeitliche Entwicklung der Modellvariablen wie Temperatur, Niederschlag, Luftdruck, Windverhältnisse und Feuchtigkeit. Sie bedürfen einer entsprechenden Anzahl von Eingangsparametern wie auch einer Eignungsvalidierung. Verbunden mit verschiedenen Modellverfahren kommt es durch die Berechnung der Strömungsmechanik, Thermodynamik und Agrarmeteorologie zu umfassenden Ergebnissen (Bruse, 2000).

Die vorgeschaltete gesamt- und teilstädtische Klimauntersuchung erfolgte mit dem zweidimensionalen Kaltluftabflussmodell KLAM 21 des Deutschen Wetterdienstes (DWD). Auf Grundlage einer TK 1:25.000 (20 m Grid) und TK 1:5.000 (10 m Grid) konnte das Gebiet von Daegu nach den Anforderungen der VDI-Richtlinie für lokale Kaltluft (VDI-RL 3787, Bl. 5, 2003) mesoskalig simuliert werden (Abb. 1, links).

Das Plangebiet „Sincheon-View“ wurde mithilfe des Computerprogramms ENVI-met 3.1 auf mikroklimatischer Ebene untersucht. Damit war es möglich die für den Untersuchungsraum charakteristischen Faktoren wie unterschiedliche Oberflächen, Bebauungsstrukturen und Vegetationselemente dreidimensional zu erfassen und deren wechselseitige Abhängigkeit mit den

Klimaelementen zu berücksichtigen (Bruse, 2003). Das Plangebiet wurde als vierdimensionales (Raum und Zeit) gekoppeltes System verzeichnet. In diesem Stadtklimamodell wurden die Parameter Wind, Temperatur und PMV (thermische Behaglichkeit) analysiert und auf eine Gitterweite bzw. Auflösung von 5 m zurückgegriffen.

6 SIMULATIONSERGEBNISSE IM IST-ZUSTAND

Im Plangebiet „Sincheon-View“ befinden sich dreizehn hochverdichtete Wohnkomplexe mit 15 bis 18 Stockwerken. Da sie quer zur Sonne bzw. zur Ventilationsbahn ausgerichtet wurden, kann die abfließende Kaltluft nur eingeschränkt ins Stadtzentrum fließen (Abb. 1, rechts). Vielmehr staut sich die Luft vor den Wohnkomplexen und versorgt diesen nur unzureichend mit kühler Luft.

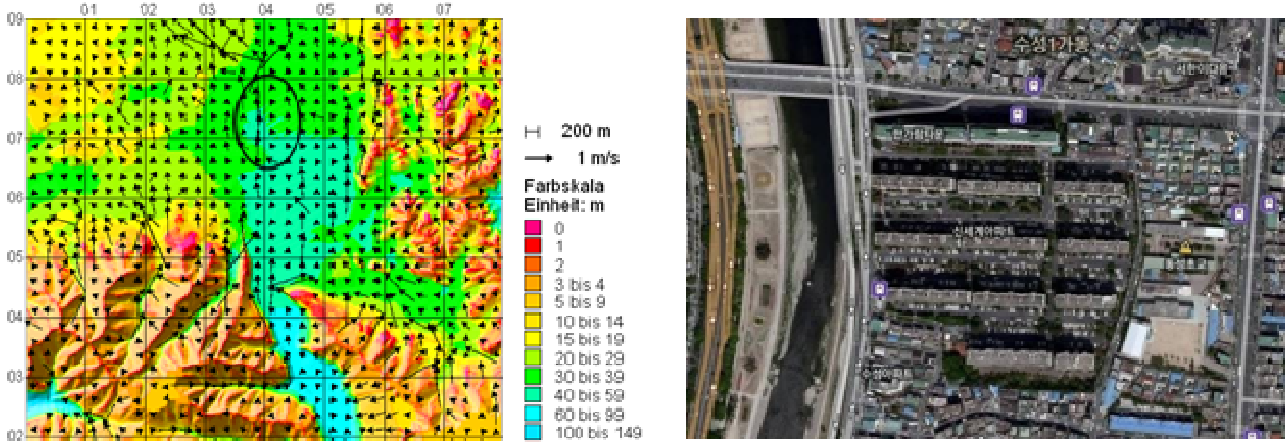

Abb. 1: Kaltluftabfluss um 0.00 Uhr in KLAM (links) und Luftbildaufnahme des Plangebietes (rechts)

6.1 Temperaturverhältnisse

Anhand der mikroklimatischen Simulation werden Konfliktbereiche des Kaltluftabflusses und der Belüftung innerhalb des Wohnbereiches identifiziert. Vor dem Hintergrund der thermischen Belastung in Daegu spielt die Untersuchung der Lufttemperatur eine wichtige Rolle. Die Ergebnisse in ENVI-met zeigen, dass es innerhalb und um das Wohngebiet „Sincheon View“ zu Temperaturunterschieden von bis zu 2,5 K kommt. Aufgrund von zusätzlich eingefügten „Nesting Grids“ werden die umgebende Bebauungssituation und Materialien nicht kalkuliert, wodurch an den Rändern des Modells geringfügig unrealistische Werte entstehen. Die Temperaturen wurden in 2 m ü. Gr. gemessen.

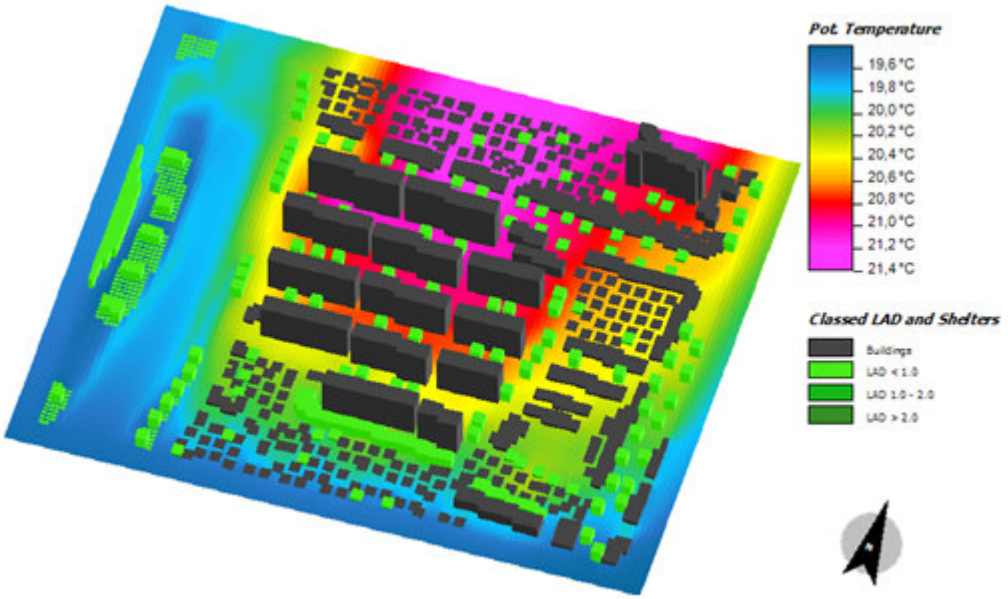

Abb. 2: 3D-Ansicht der Temperaturverteilung innerhalb des Plangebietes um 04.00 Uhr auf 2 m ü. Gr. (Ist-Zustand).

Abbildung 2 demonstriert die Temperatursituation des Ist-Zustandes („V0“) um 04.00 Uhr, der Zeit des höchsten Kaltlufteintrages. Im Süden sowie innerhalb der Park- und Flussanlage Sincheon treten die geringsten Temperaturen (19,4 °C) auf. Dahingegen wird deutlich, dass innerhalb und hinter dem Wohnkomplex die Luft nicht abkühlen kann, was sich in Werten von bis zu 21,4°C äußert.

Zum einen führt der hohe Versiegelungsgrad zwischen den Massivbauten zu nächtlicher Wärmeausstrahlung der Oberflächenmaterialien und zum anderen staut sich die Kaltluft vor den Gebäuden mit Höhen von bis zu 56 m und verzögert so die Abkühlung. Erst gegen 08.00 Uhr, wenn der Kaltlufteintrag aussetzt, kommt es im gesamten Gebiet zu einer Angleichung der Temperaturen.

In den Nachmittagsstunden setzt sich ein „Hitzesaum“ um den gesamten Wohnkomplex. Dies resultiert aus der intensiven solaren Einstrahlung sowie dem Wärmeeindringkoeffizienten des Asphalts. Aufgrund der gegenseitigen Gebäudeverschattung werden zwischen den Wohnkomplexen verhältnismäßig geringe Temperaturen im Vergleich zum Umfeld registriert. Sobald die Sonne in die Freiräume gelangt, kommt es binnen kurzer Zeit zu einem deutlichen Temperaturanstieg. Insgesamt ist zu bemerken, dass sich die geringsten Temperaturen des Untersuchungsraumes stets in der Parkanlage bzw. dem Fluss Sincheon feststellen lassen.

Der Vertikalschnitt in Abb. 3 lässt für die Mittagszeit das Phänomen der urbanen Wärmeinsel deutlich erkennen. Dabei zeigt sich, das die bodennahe Luftschicht um 2,8 K höher liegt als die Temperaturen in der Stadthindernisschicht (Abb. 3, oben). Nachts entsteht eine inverse Wärmeschichtung. Die aus S (0-Koordinate) einfließende Kaltluft wird aufgrund der Höhe der Plattenbauten gestaut und kann nur verzögert abfließen (Abb. 3, unten).

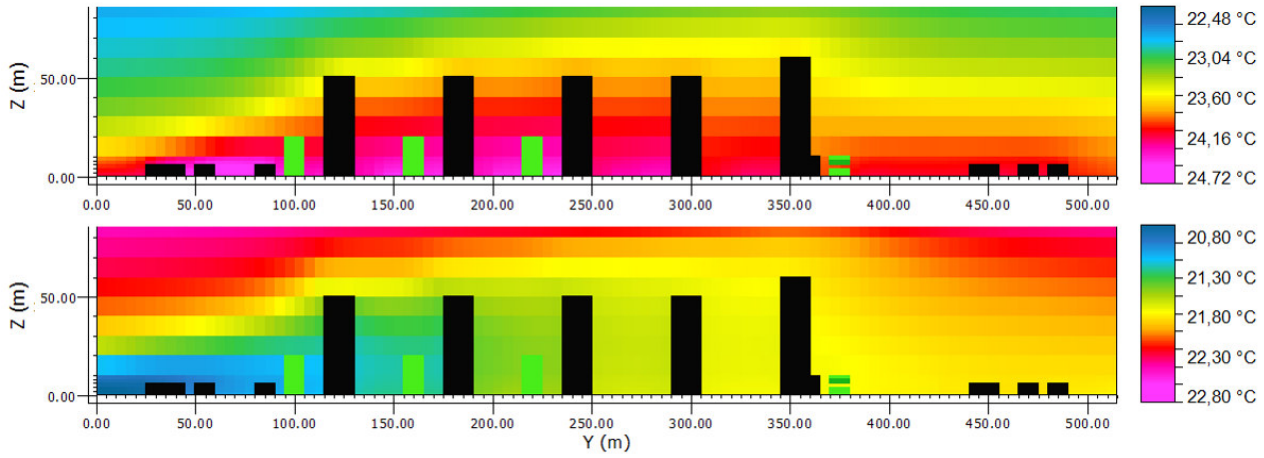

Abb. 3: „V0“ im Vertikalschnitt X = 300 m: Temperaturverhältnisse um 12.00 Uhr (oben) und 0.00 Uhr (unten)

6.2 Windverhältnisse

Während im Einzugsgebiet des Flusses und der beiden Hauptverkehrsstraßen (N-S-Verlauf) Windgeschwindigkeiten von 2,3 m s-1 erreicht werden, wird die Fließgeschwindigkeit im Plangebiet auf 1,2 bis 0 m s-1 abgebremst (Abb. 4, links). Ebenso wirkt sich der Vegetationsbestand auf die Windverhältnisse aus. Bei Blattflächendichten von 1 m2 m-3 verringert sich die Windgeschwindigkeit um 0,8 m s-1. Wenngleich die Windsituation in 2 m ü. Gr. wiedergegeben wird, fällt auf, dass die 18-stöckige Bebauung im Gegensatz zur 2-3-stöckigen die Windverhältnisse weitläufig auch danach noch hemmt. Des Weiteren zeigen die Trajektoren, dass die hohen Wohnkomplexe den Wind erheblich beeinflussen. Direkt an und zwischen den Gebäuden sind Luftverwirbelungen erkennbar, die in den seitlichen Hausspalten zu leichten Windböen führen (Abb. 4, links).

Bei der Modellierung im Vertikalschnitt in Abb. 4 (rechts) ist die Zirkulation der Luftströmungen zwischen den Häuserzeilen und der Rotor hinter der Bebauungsreihe zu erkennen; die Luft strömt an der südlichen Hausseite nach unten, bevor sie sich an der nördlichen des vorherigen Gebäudes wieder aufwärts bewegt. Diese Rotationsbewegung beeinträchtigt den Luftaustausch mit den umliegenden Bereichen.

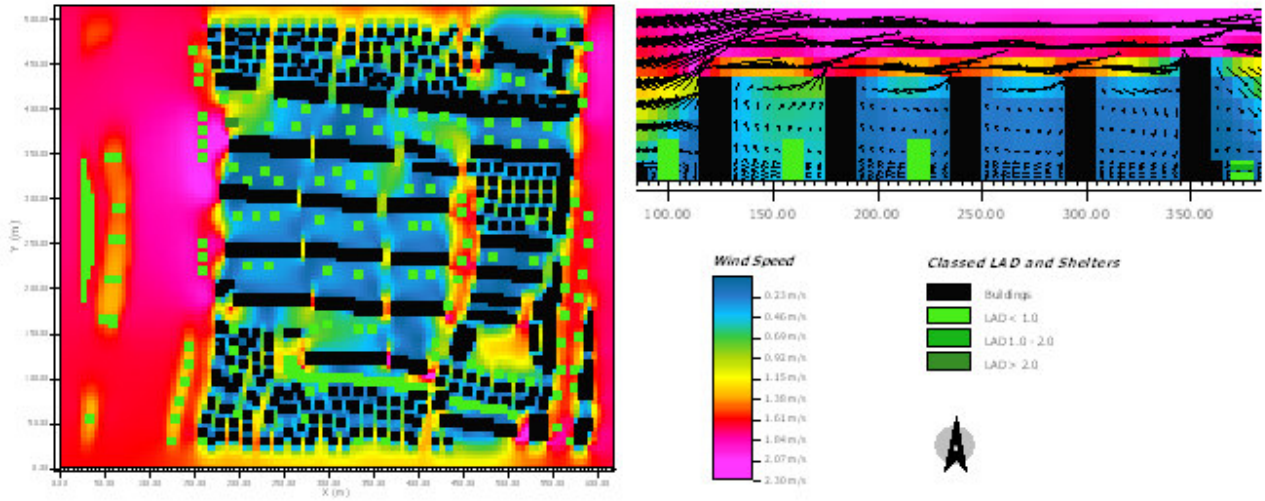

Abb. 4: Windgeschwindigkeit mit Trajektoren bei 2 m ü. Gr. (links) und detaillierter Vertikalschnitt mit Windvektoren (rechts) bei X = 300 m im Ist-Zustand des Plangebietes

7 SIMULATIONSERGEBNISSE IM PLAN-ZUSTAND

7.1 Entsiegelung und Begrünung

Um bessere Austauschverhältnisse zu generieren und zur Produktion kühler und frischer Luft innerhalb des Wohnkomplexes, wurde ein höherer Anteil an Grünfläche simuliert („VOgreen“). Zusätzlicher Vegetationsbestand sorgt für einen lokalen Kühlungseffekt, u.a. durch Evapotranspiration. Die versiegelten Flächen zwischen den Gebäuden wurden im Plan-Zustand „V0green“ durch vorwiegend lehmigen und grasbewachsenen Boden ersetzt. Ferner wurden neue Baumpflanzungen durchgeführt, deren Blattflächendichte > 2 m2 m-3 betrug und in Abb. 5 (rechts) dunkelgrün dargestellt ist.

Das Grünflächenangebot sorgt innerhalb des Wohnkomplexes für die Produktion kühler Luft während der frühen Morgenstunden. Der Vergleich von „V0“ und „V0green“ in Abb. 5 weist direkt an den Grünflächen eine Abkühlung von bis zu 3 K auf. Aufgrund der Gebäudestruktur kann sich diese in den frühen Abendstunden jedoch nicht weiter ausbreiten, insbesondere nicht in Richtung Stadtzentrum bzw. Norden.

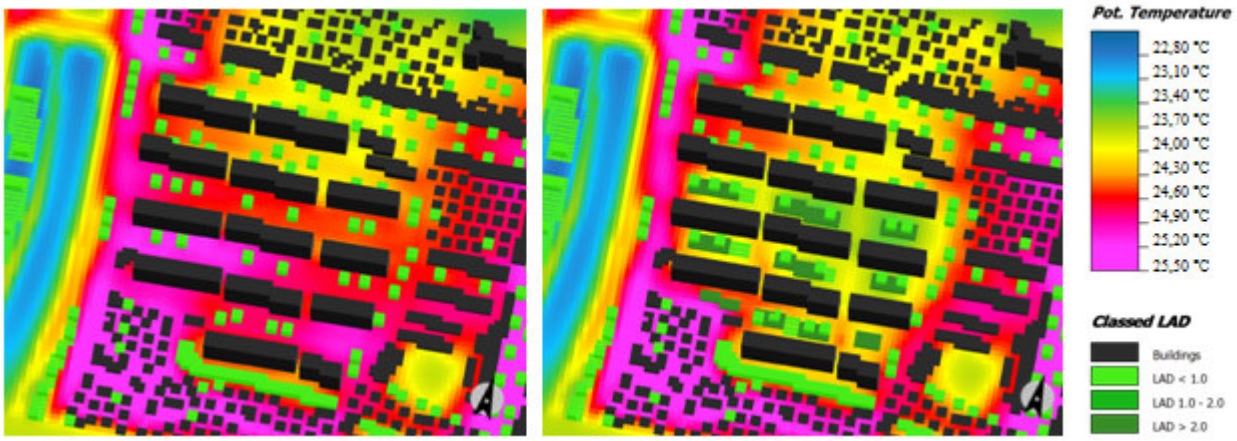

Abb. 5: Gegenüberstellung der Temperaturverhältnisse im Ist-Zustand „V0“ (links) und Plan-Zustand „V0green“ (rechts) um 12.00 Uhr in 2 m ü. Gr.

Die Windverhältnisse verändern sich durch die Begrünungsmaßnahmen nur marginal, wobei die Strömungsgeschwindigkeiten nochmals verringert und Luftverwirbelungen geschwächt werden. Die Austauschbedingungen innerhalb des Plangebietes werden durch diese Maßnahme eher verschlechtert, wenngleich sich die thermische Behaglichkeit verbessert. Dementsprechend wird der erwünschte Effekt nur teilweise erzielt. Daher ergibt sich im Umkehrschluss, dass es zur Verbesserung des Mikroklimas

erforderlich ist, zusätzlich eine alternative Bebauungsvariante in Betracht zu ziehen, die die Luftzirkulation verbessert und einen besseren Austausch mit den umliegenden Bereichen gewährleistet.

7.2 Alternative Bebauungsentwürfe mit zusätzlicher Begrünung

Zur Optimierung der genannten Problematik eignen sich zwei Methoden: die punktförmige Anordnung von Turmgebäuden („V1“) und die der Windrichtung angepasste Anordnung von parallelen Zeilenbauten („V2“). Anhand dieser Merkmale wurden die Oberflächentemperatur und die Windzirkulation im Plangebiet analysiert.

Bei „V1“ wurde zusätzliche Begrünung und ein deutlich geringerer Versiegelungsgrad mit in die Planung einbezogen (Abb. 6, links). Die neue Wohnform weist 13 Gebäude mit je 18 Etagen und 4 Wohneinheiten pro Etage auf; 6 Wohneinheiten mehr als zuvor. Aufgrund der höheren Blockbebauung ergibt sich nun eine größere Geschossflächenzahl bei gleichzeitig geringerer Grundflächenzahl. Des Weiteren wurden lediglich die erforderlichen Zufahrtsstraßen asphaltiert. Zur Überprüfung der Zirkulationsverhältnisse wurden in den nördlichen Gebäuden zwei Bauspalten von je 6 m Breite geöffnet.

Damit den lokalen Belüftungsverhältnissen Rechnung getragen wird, wurde in einer zweiten Alternativvariante („V2“) der Plan-Zustand durch eine parallel zum Fluss verlaufende, längliche Bebauung verändert (Abb. 6, rechts). Um die windspezifischen Voraussetzungen zu optimieren, wurde bei der Vegetationsgestaltung auf das gezielte Freihalten der Ventilationsbahn von großen Bäumen geachtet und somit verstärkt Grasbewuchs eingesetzt. Insgesamt wurde „V2“ aus diesem Grund mit weniger Baumbestand als „V0green“ oder „V1“ versehen. Die 22 Einzelgebäude mit je 18 Etagen weisen dabei 8 Wohneinheiten mehr auf als zuvor.

7.2.1 Temperaturverhältnisse

Anhand der neuen Bebauung wird in Abb. 6 (links) ersichtlich, dass im Plangebiet nun ein verstärkter Austausch stattfindet. Im Vergleich zu „V0“ und „V0green“ (Abb. 5) tritt der „Hitzesaum“ nun in leicht abgeschwächter Form auf. Der Wind wird nicht mehr blockiert. Die kühle Luft kann sich besser verteilen. Zusätzliche Vegetation, eine bessere Durchlüftung und die Gebäudeverschattung bewirken ein bis zu 3 K kühleres und für die Bewohner angenehmeres Mikroklima. Auch die Temperaturwerte nördlich des Plangebietes sind um 1 K geringer als bei „V0green“ (Abb. 5, rechts). Die in den nördlichen Gebäuden vorgesehenen Bauöffnungen weisen jedoch nicht die gewünschte Effektivität auf. Es zeigt sich, dass 6 m zu gering sind für Gebäude der vorliegenden Dimensionen und lässt daher keine nachhaltige Belüftung der angrenzenden Bereiche zu.

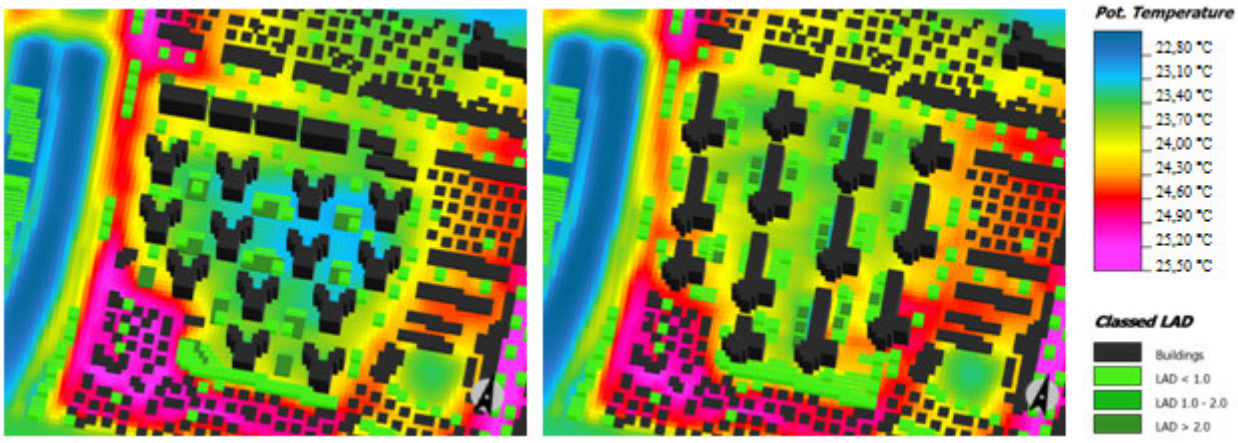

Abb. 6: Gegenüberstellung der Temperaturverhältnisse der Plan-Zustände „V1“ (links) und „V2“ (rechts) um 12.00 Uhr in 2 m ü. Gr.

Für die Mittagsstunden werden in „V2“ (Abb. 6, rechts) geringere Temperaturen als in „V0“ bzw. „V0green“ (Abb. 5) erreicht, jedoch höhere als in „V1“ festgestellt (Abb. 6, links). Die parallel zum Fluss verlaufende Bebauung ermöglicht hier eine bessere Durchmischung der Luft, was an den dezenteren Farbübergängen der Temperaturskala zu erkennen ist. Es herrscht ein deutlich verbessertes Mikroklima im Plangebiet; die Gebäude werfen Schatten, die Belüftungsverhältnisse sind verbessert und der „Hitzesaum“ hat sich im Vergleich zu den vorherigen Alternativvarianten reduziert.

7.2.2 Windverhältnisse

Abbildung 7 veranschaulicht die Windgeschwindigkeit sowie den Vektorenverlauf. Im Vergleich zu Abb. 4 lässt sich erkennen, dass die Strömungsgeschwindigkeit in „V1“ zugenommen hat (Abb. 7, links). Aufgrund der punktförmigen Bebauung, welche den Wind nicht vollständig blockiert, zeigen sich Windgeschwindigkeiten > 1 m s-1. Der Wind strömt rotierend um die Wohnblöcke, jedoch nur leicht verringert.

Bei „V2“ (Abb. 7, rechts) ist eine starke Zunahme der Strömungsgeschwindigkeit zwischen den Gebäudereihen zu erkennen, während mit rund 2 m s-1 ähnliche Spitzenwerte wie in der Luftleitbahn Sincheon oder der Hauptverkehrsstraße erreicht werden. Infolge des parallel zum Fluss ausgerichteten Wohnkomplexes wird der Austausch in keinster Weise blockiert. Vielmehr wird er umgelenkt und fließt in Richtung Stadtzentrum. Im Vergleich zu den vorherigen Simulationen (Abb. 5 und 6) wird deutlich, dass die Windgeschwindigkeit um 0,2 bis 0,6 m s-1 zunimmt. Die verbesserte Belüftung erzeugt eine angenehme Brise in den Mittagsstunden, wodurch die Bewohner die „gefühlten“ Temperaturen geringer und somit positiver wahrnehmen.

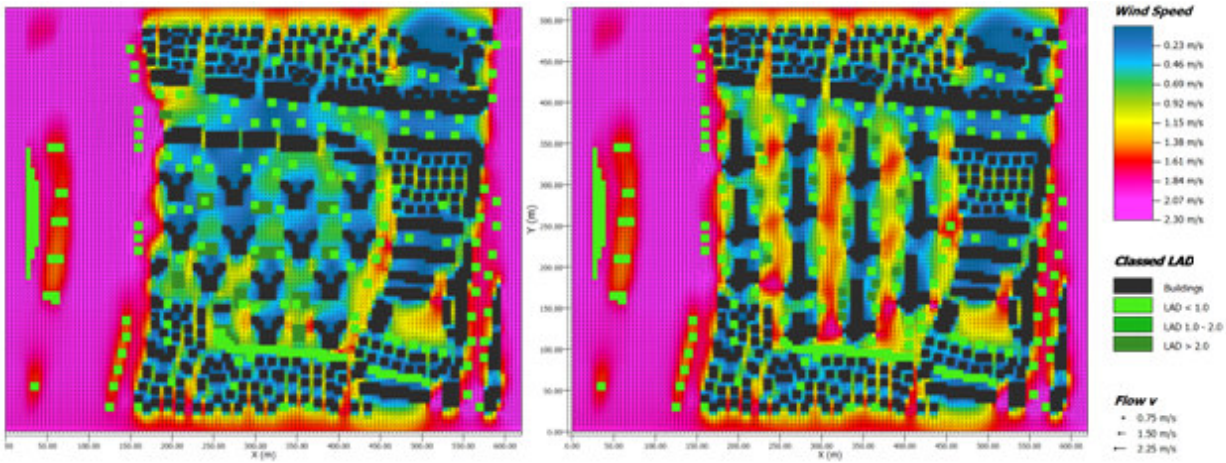

Abb. 7: Gegenüberstellung der Windverhältnisse von „V1“ (links) und „V2“ (rechts) mit Windvektoren um 12.00 Uhr in 2 m ü. Gr.

8 THERMISCHE BEHAGLICHKEIT IM PLANGEBIET

Eine Quantifizierung des menschlichen Temperaturempfindens wurde mit dem sog. PMV-Index (predicted mean vote – gefühlte Temperatur) vorgenommen. Die simulierten Werte beziehen sich auf einen Menschen, der mit 0,3 m s-1 im Plangebiet spazieren geht und leichte Sommerbekleidung trägt. Er wird durch die Funktion von Raumklima, Aktivitätsniveau und Bekleidung bestimmt. Für die Auswertung der Ergebnisse wurde auf eine 9-Punkte-Skala von -4 bis +4 (kalt bis heiß) zurückgegriffen. Wenngleich die Veränderung der Lufttemperatur und des PMV-Wertes ähnlich sind, so ermöglicht der PMV-Index eine Beurteilung der Simulationsergebnisse, da hier die Strahlung, Windgeschwindigkeit und das physiologische Verhalten einer Person in die Bewertung integriert werden. Nicht berücksichtigt wurde das subjektive Empfinden der individuellen Person und seine jeweilige Energiebilanz.

In Abb. 8 wurden die drei alternativen Plan-Zustände dem Ist-Zustand (Abb. 8, oben links) gegenübergestellt. Die Resultate bestätigen, dass Begrünungsmaßnahmen zu einer Verbesserung der thermischen Behaglichkeit führen. Dies gilt vor allem für „V0green“ (Abb. 8, oben rechts). Die zusätzlichen Begrünungsmaßnahmen zwischen den Wohnkomplexen bedingen einen Abkühlungseffekt der Temperaturen. Dementsprechend kann durch eine gezielte Bepflanzung der PMV von > 3,0 auf deutlich unter 1,8 reduziert werden.

Nahezu flächendeckend wird das Plangebiet durch „V1“, dem Modell der Turmbauten, modifiziert (Abb. 8, unten links). Der PMV liegt hier einheitlich bei rund 1,5. Die offene Flächengestaltung und die zusätzlich vorgenommene Begrünung sorgen dementsprechend für ein günstigeres Lokalklima. Die Zirkulation zwischen den Gebäuden wird weniger stark unterbunden, was folglich zu damit einhergehenden verbesserten Austauschverhältnissen führt; die erhitzte, abgestandene Luft kann abtransportiert werden.

Hingegen weist „V2“ nur geringe positive Veränderungen zum Ist-Zustand auf (Abb. 8, unten rechts). Zwar gelingt es auch hier den PMV von > 3,0 auf Werte zwischen 2,0 und 2,5 zu verändern, allerdings erweist sich

die Baustruktur als für das Wohlfühlklima nicht uneingeschränkt positiv. Der potentiell positive Effekt der Temperaturreduktion aufgrund einer offeneren Bebauung wird durch die nun deutlich höheren Windgeschwindigkeiten zwischen den Gebäuden kompensiert. Dies führt unweigerlich in der Betrachtung der möglichen lokalklimatischen Einflüsse zu einem negativen Effekt, da hohe Windgeschwindigkeiten dem Menschen einen thermischen Diskomfort suggerieren.

An diesen Beispielen wird deutlich wie sehr die bauliche Struktur Einfluss auf das lokale, kleinräumige Klima zu nehmen vermag. Durch eine korrekte klimaorientierte Ausrichtung der Gebäude, sowie eine bewusste Anordnung von Freiräumen bzw. Abstandsflächen besitzt der Planer die Möglichkeit gezielt auf teilstädtischer Ebene das Standortklima positiv zu beeinflussen und negative Effekte der Klimaelemente auszuschließen. Allerdings zeigt sich auch, dass eine vorher nicht exakt überdachte Schaffung von Freiflächen oder eine Umstrukturierung von Gebäudekomplexen das Wohlfühlklima nicht immer positiv verändern.

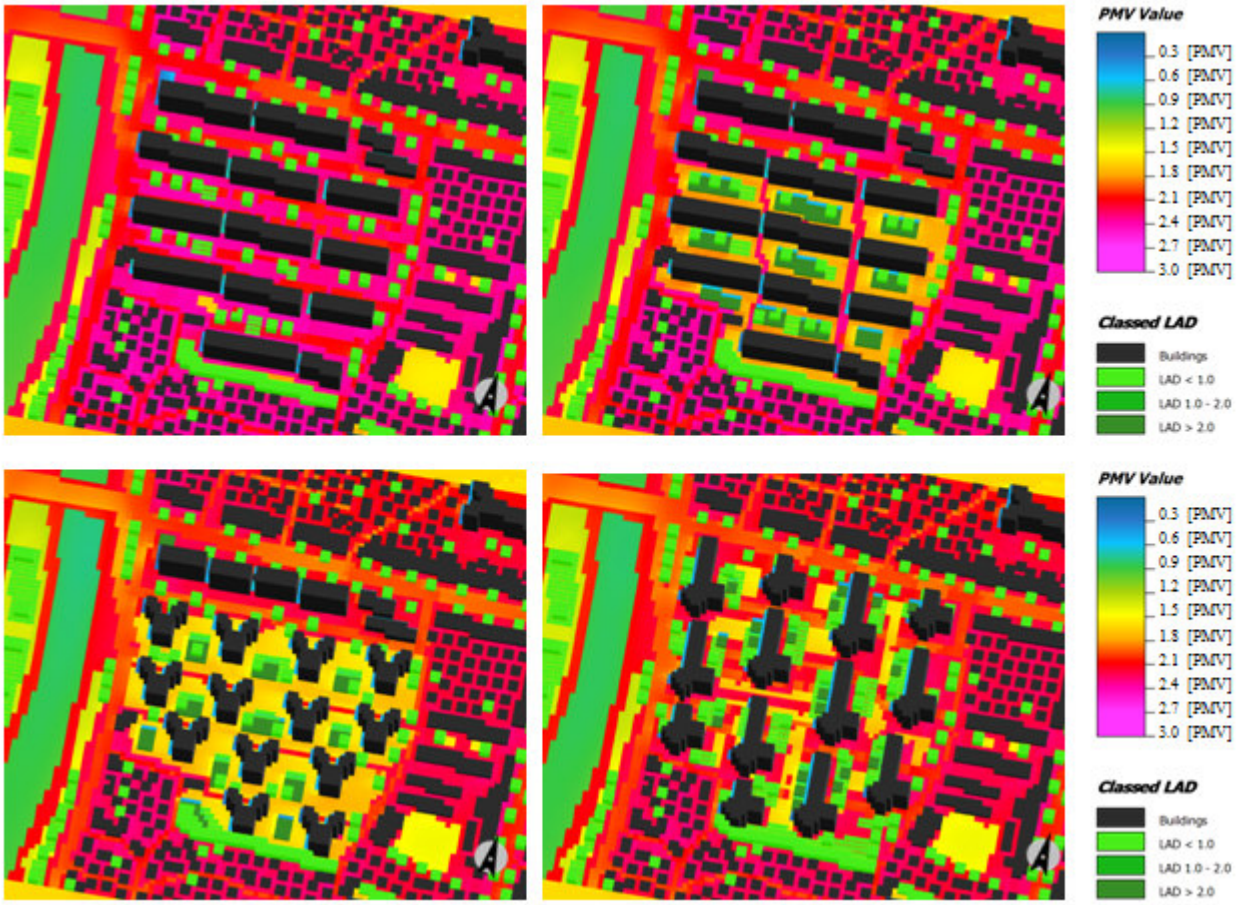

Abb. 8: Gegenüberstellung der thermischen Behaglichkeit [PMV] des Ist-Zustandes „V0“ (oben links), sowie der alternativen Plan-Zustände „V0green“ (oben rechts), „V1“ (unten links) und „V2“ (unten rechts) um 12.00 Uhr in 2 m ü. Gr.

9 FAZIT UND AUSBLICK

Verschiedene Planungsweisen, Bauformen und Freiflächengestaltungen in einem urbanen Raum wirken sich unterschiedlich auf das Stadtklima aus. Während einerseits der Planer versucht unerwünschte Faktoren abzuschwächen, muss er andererseits darauf bedacht sein, dass hierdurch nicht andere positive Eigenschaften verloren gehen. Bei der Planung von Wohnungskomplexen ist es unerlässlich, eine nachhaltige Wohnumwelt auch für die Zukunft zu garantieren. Vor dem Hintergrund des fortschreitenden Klimawandels und der zunehmenden Flächenbeanspruchung durch die Urbanisierung treten neue Herausforderungen an die Stadtplanung heran. Hier spielt vor allem eine klimagerechte Stadtplanung eine entscheidende Rolle. Umsetzungsorientierte Konzepte müssen entwickelt werden. Insbesondere in asiatischen Städten, wo stets ein Verstädterungsprozess mit meist unerwünschten Folgen einhergeht, ist es wichtig Wege zu suchen, wie auch schon mit kleinen Maßnahmen die Lebensqualität der Menschen gesteigert und die zahlreichen Brachflächen der ehemaligen Industriestandorte optimal genutzt werden können.

Die Anordnung von Gebäuden und die Art der Bodenbedeckung in Wohnungskomplexen stellt eine beträchtliche Variable für Luftaustauschprozesse und eine bessere thermische Behaglichkeit dar. Kühle und frische Luft kann in Wohnkomplexe geleitet werden, wo sie zur Verminderung der lokalen Überwärmung, vor allem während hochsommerlicher Temperaturen, führt. Anhand des Untersuchungsgebietes „Sincheon-View“ wird deutlich, dass Kommunen und Planer Flächen mit klimaökologischer Bedeutung (Luftleitbahnen, Kaltluftproduktionsgebiete und Grünflächen) als Klimaoasen in der entsprechenden Ausprägung schaffen müssen bzw. diese bei zukünftigen Um- und Neuplanungen freihalten müssen. Die Wirksamkeit von Ventilationsbahnen, wie im vorliegenden Fall der Fluss Sincheon, kann durch Abbau von Hindernissen, Verbesserung der Emissionssituation und Erhöhung der Durchlässigkeit in der Bebauung eine erkennbare Aufwertung erfahren. Die Einbindung wissenschaftlich fundierter Erkenntnisse ermöglicht es den Städten künftig strukturierter zu planen, um ein Mehr an Lebensqualität und nachhaltiger Umweltgestaltung zu erzielen.

DANKSAGUNG

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Vorsorge als Betrachtungsgegenstand der Raumplanung

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1 ABSTRACT

Die Raumplanung in ihrer Gesamtheit und als Teilbereich hierin die Stadtplanung haben die Aufgabe, raumrelevante Nutzungen in ihrer Ausprägung, Intensität und Lokalisierung so zu ordnen und zu gestalten, dass deren geeignete räumliche Zuordnung und raumverträgliche Kontingentierung erreicht wird. In diesem Sinne stellt sich eine Teilaufgabe der Raumplanung als der Umgang mit Risiken dar, die sich aus der unterschiedlichen Sensibilität bzw. Wirkungen von Nutzungen und ihrer räumlichen Überlagerung ergeben. Diese stellen sich im Wesentlichen als Risiken aus technischen und natürlichen Gefahrenquellen für die Umwelt dar, die durch eine gezielte planerische Beeinflussung minimiert, limitiert oder so weit wie möglich eliminiert werden sollen.

Der Begriff der räumlichen Vorsorge wird in den unterschiedlichen Planungsebenen durch inhaltliche, zeitliche oder raumbezogene Rahmenbedingungen und Instrumente jeweils konkretisiert und angewendet.

Im Gesamtzusammenhang lassen sich grundlegende Planungsfälle in Basismodellen zusammen fassen, deren Bedeutung nicht nur in der inhaltlichen Ausformung der Einzelfälle, sondern gerade auch in der Abfolge und Katalogisierung des Gesamtkontextes zu sehen ist.

In diesen Kontext reiht sich auch der Einsatz eines vor-, parallel- und nachgeschalteten Monitorings ein. Dieses soll, im Sinne einer gezielten Überwachung, dem Anspruch einer sowohl qualitativen als auch quantitativen fachbezogenen Optimierung genügen, somit u.a. Konflikte aus verschiedenen Raumnutzungen vermeiden bzw. vermindern und zur Risikobeherrschung beitragen.

In Bezug zum Konferenzthema Liveable, prosper, healthy CITIES for everyone stellt sich die geordnete und vorausschauende Planung zukünftige Nutzungsentwicklungen und -zustände als eine besondere Herausforderung innerhalb komplexer Systemzusammenhänge und deren Vernetzung zu Komplementärsystemen. Der Anspruch lebenswerte, florierende und gesunde Städte zu schaffen, zu erhalten oder zu fördern, steht in engem Zusammenhang mit dem systematischen, koordinierten Umgang der hierzu notwendigen Komponenten auf sozial- gesellschaftlicher, wirtschaftlicher und ökonomischer Ebene. Dabei sind räumliche Entwicklungen aufgrund der verschiedenen Kontexte und Beziehungen in ihrer tatsächlichen Ausstattung, in Art, Umfang und Zeitachse mit Unsicherheiten belastet. Diese gilt es im Sinne der Vorsorge mit in die strategischen Grundüberlegungen mit ein zu beziehen und somit dem dabei eingeschlossenen Risiko zu begegnen.

2 RAUMPLANUNG

Das Handlungsspektrum der Raumplanung basiert auf der Kernaufgabe der Organisation des Zusammenlebens. Dabei kommt der Koordination von Entscheidungen und Maßnahmen im Dienst der Bewältigung raumrelevanter Probleme und die Behandlung aller öffentlichen und privaten Interessen im und am Raum eine zentrale Bedeutung zu. Unterschiedlichste Werthaltungen treffen hier aufeinander und erlangen in Form differenzierter Nutzungsarten und –intensitäten, die eine Flächen- und Raumrelevanz entwickeln. Ökonomische, ökologische und soziale Belange formulieren hierbei Notwendigkeiten und Wünsche, die sich in einem Flächen- und Raumbezug als verortbare Nutzungen transkribieren lassen. Diese Nutzungen finden sich in räumlichen Mustern wieder und weisen, aufgrund ihrer einbeschriebenen Charakteristika, einen individuellen Bezug zur Flächen- und Rauminanspruchnahme auf. Dabei steht zum Einen die quantitative Inanspruchnahme von Fläche im Vordergrund. Diese betrifft die Grundlagen, um Nutzungen flächenbezogen zu realisieren. Zum Anderen wird damit auch die qualitative Inanspruchnahme des Raums eingeschlossen.

Dies trifft nicht nur auf die Art, das Maß oder den Umfang der Nutzungen zu, sondern auch auf die Wirkungen, welche von diesen auf ihr direktes und indirektes Umfeld ausgehen. Dabei kann es zu einem Nebeneinander von Nutzungen kommen, die unverträglich und somit inkompatibel sind. Solche Nachbarschaften sind in diesem Zusammenhang als besonders konfliktträchtig einzustufen. Dabei kommt

der Behandlung des Aufeinandertreffens - in diesem Sinne Überlagerung oder Verschneidung - bestimmter Sensitivitäten und Störgrade eine Schlüsselstellung zu. Hier treffen insbesondere immissionsrelevante Belastbarkeiten (einwirkungsbezogen) mit emissionsrelevanten Betrachtungen und Belastungen (auswirkungsbezogen) zusammen. Dabei rücken Nachbarschaften von Nutzungen ins Zentrum der Betrachtung, bei denen die Schutzbedürftigkeiten der Komponenten besonders heterogen ausgebildet sind.(vgl. Albers, Wékel, 2008).

Des Weiteren zielt die Raumplanung mittels ihrer Steuerungsfunktion auf eine Richtungsgebung und ggf. auch –veränderung der Raumnutzungen ab, die in engem Zusammenhang mit einer Umsetzungs- und Wirkungskontrolle der Maßnahmen steht. Hier treffen planerische Prämissen und Entscheidungen im Zusammenspiel mit raumrelevanten Akteuren und letztlich faktischen oder potentiellen Spannungsfeldern aufeinander.

Ein Steuerungsziel ist hierbei die Schaffung einer geeigneten räumlichen Zuordnung und raumverträglichen Kontingentierung der Nutzungen. Damit steht diese Optimierung der Inanspruchnahme endlicher Ressourcen die planvolle, da zukunftsbezogene, und systematisierte, da umfassend betrachtende, Dimensionierung und räumlichen Lokalisierung im Aufgabenkern. Diese Optimierung entspricht auf der einen Seite einer notwendigen Konsensfindung. Auf der anderen Seite wird hier eine restriktive Limitierung bzw. Kontingentierung eingesetzt, um eine einseitige Belastung zu vermeiden.

Die Raumplanung in Ihrer querschnittsorientierten, multithematischen Ausrichtung betätigt sich aus der inhaltlichen Definition und der daraus folgenden Charakterisierung ihres Aufgabenspektrums insbesondere in der Planung der Umwelt und ist in diesem Zusammenhang sowohl mittel- als auch unmittelbar als Schutz der belebten und unbelebten Umwelt zu verstehen.

In diesem Zusammenhang kann die Bedeutung der Raumplanung in ihrer hoheitlichen Aufgabenwahrnehmung im Bereich der systematischen Bodenordnung und der gezielten Einflussnahme auf die Bodennutzung angesehen werden. Dies entspricht dem ausgewiesenen Aufgabenbereich der Raumplanung, Gemeinwohlinteressen und damit den Ausgleich von öffentlichen und privaten Interessen zu suchen und auch im Rahmen des Prozess- bzw. Verfahrenfortgangs zu finden.

Das rechtsstaatliche Schutz- und Vorsorgeprinzip greift mittels einer gestuften, hierarchisch angelegten Planungssystematik dort ein, wo unerwünschte Zustände gelöst werden müssen. Das bedeutet in diesem Kontext die Verhinderung, Verminderung oder Ausschaltung von tatsächlichen bzw. möglichen Belastungen, welche aus bestimmten Nutzungen auf die Umwelt.

Die Langfristigkeit der im Planungsprozess gefällten Entscheidungen, deren Dauerhaftigkeit bezogen auf ihr raumrelevantes Auftreten und ihrer umweltbezogenen Wirkung. Dabei handelt es sich um die gezielte, koordinierende Beeinflussung eines zukünftigen Ereignisses oder Zustandes dessen

Verhinderung,

> im Sinne einer möglichst frühzeitigen Erkennung von Spannungen oder Konflikten sowie deren Behandlung im Sinne einer wirkungsbezogenen Vermeidung, Begrenzung oder Verlagerung, bzw.

Eintreten,

> als Förderung eines angestrebten, bislang nicht erreichten Zustands oder die Pflege einer nicht abgeschlossenen positiven Entwicklung

gefördert werden soll.

Hierbei spielt das Prinzip der Nachhaltigkeit, dessen inhaltliche Dimension und planerische Bedeutung eine ebenso wichtige Rolle, wie die zukunftsorientierte, umfassende Wirkung auf gesellschaftliche, politische, ökonomische und ökologische Systeme.

3 VORSORGE

Der begriffsbezogene Wesensgehalt der Vorsorge bezieht sich in den meisten Fällen auf eine unsichere, gefahrenbelastete Ausgangslage, die nach einen vorausschauenden Schutz verlangt. Es findet somit eine sowohl sach- als auch zeitbezogene Vorverlagerung von Entscheidungen statt, die das Auftreten bzw. das Ausmaß von negativen Entwicklungen oder Zuständen verhindern oder begrenzen sollen. Somit ist hier eine eindeutige zukunftsbezogene Sicht- und darauf abgestimmte Handlungsweise angesprochen, die zu

erwartende Zustände, Ereignisse oder Entwicklungen aufgrund verfügbarer Informationen und Erkenntnisse nur in einem sachlich begrenzten Umfang als eindeutig feststellen kann.

Vorsorge wird dann getroffen, wenn über zukünftige Zustände oder über ihre Entstehung keine konkreten Angaben, etwa hinsichtlich Art oder Maß, vorgenommen werden können. Diese Unsicherheiten tragen dazu bei, die Schutzfunktion der Vorsorge zu ihrer Beherrschung einzusetzen. Die Begegnung dieser ist das Treffen vorsorgebezogener Entscheidungen, die diesen Anteil in ihre Betrachtung für die kommende Entwicklung und Zustandsgenese inkludieren und somit dem vorverlagerten Schutz entsprechen. Dabei ist das dazu notwendige Vorgehen oftmals von einer gleichmäßigen Systematik gekennzeichnet. Diese erlaubt es, notwendige Vorsorgeregime in Art, Umfang und Reichweite situationsbezogen passend und flexibel zu erkennen, aufzubauen, zu installieren bzw. neu auszurichten.

Durch den Einsatz von Vorsorgemaßnahmen soll Risiken entgegengewirkt werden, die auf den Grenzen der menschlichen Erkenntnis, auf anderen, nicht zu beseitigenden Unsicherheiten der Bewertung von Immissionswirkungen oder auf der besonderen Situation eines Betroffenen beruhen (vgl. Wolf 1998).

Vorsorgemaßnahmen unterscheiden sich von Maßnahmen zur Gefahrenabwehr vor allem durch den mit ihnen eröffneten Ermessens- und Anpassungsspielraum, da die Vorsorgemaßnahme nicht in einem Regulations- bzw. Handlungszusammenhang stehen. Die Gefahrenabwehr reagiert mit ihren Maßnahmen auf eine konkrete Bedrohungslage, da keine Vorsorge mehr getroffen werden kann sondern dem entsprechend Maßnahmen eingeleitet werden müssen, um die Situationsbeherrschung und damit Steuerungsmöglichkeit nicht aufzugeben.

Die Dimensionen der Vorsorge werden dabei durch verschiedene Ausrichtungen bestimmt und geben Auskunft über ihren jeweiligen Charakter.

Gegenstand

> Hiermit wird der Wirkungsbezug der Vorsorge dargestellt. Es betrifft zum Einen die Richtung, die sich folgend auf bestimmte Maßnahmen konzentrieren muss. Grundsätzlich kann dabei zwischen der nach Außen und der nach Innen gerichteten Vorsorge unterschieden werden. Dabei entspricht die Vorsorge entweder dem Umgebungs- oder dem Eigenschutz und bedingt einerseits eine eigenzentrierte, introvertierte oder extrovertierte Sicht- und Herangehensweise, die die eigen- oder fremdbezogenen Bedürfnisse in den Mittelpunkt der Betrachtung stellt.

Umfang

> Dieser richtet sich vor allem an den vorsorgenden Akteuren aus und bestimmt sich aus dem Grad des jeweiligen Vorsorgeanspruchs und Eingriffrahmens. Dahingehend sind grundsätzlich staatliche, dem Gemeinwohl dienende Vorsorgeansprüche sachbezogenen, zeitlichen und aufgrund ihrer Wirkungsweise und –art anders einzuordnen als den privaten Bereich betreffende Vorsorge. In Abhängigkeit vom Vorsorgegegenstand und Mitteleinsatz kann dies Bestandteile eines Prozesses und Entscheidungen oder den Einsatz einer technische Maßnahme umfassen.

Zeit

> Dies betrifft einerseits den Einsatzzeitpunkt sowie die Dauer der Vorsorge. Dabei ist zu unterscheiden, ob Vorsorge mittels der Koordination und Zusammenfassung zu einem bereits frühen Zeitraum eine Schutzfunktion ausüben soll bevor eine faktische Gefahrenlage eingetreten ist oder ob diese kurzfristig eingesetzt wird, zur Abwendung einer eingetretenen Gefährdung notwendige Schritte einzusetzen.

Mittel

> Die einzusetzenden Mittel der Vorsorge werden verwendet, um ein angestrebtes Schutzniveau zu erreichen. Diese lassen sich dabei auch gemäß ihrem Charakter der Einflussnahme auf den zu erreichenden Zustand einteilen und stehen damit in engem Zusammenhang mit dem das Vorsorgeregime auslösenden Sachzusammenhängen. Dabei teilen sich die verfügbaren Mittel zwischen den unterschiedlichen Ebenen und Akteuren mit individuellen Pflichten und Rechten zur Vorsorge auf und schaffen somit als Instrumente den Umsetzungsbezug.

4 RISIKO

Im Zusammenhang mit Unsicherheiten und der damit verbundenen Vorsorge innerhalb einer stetigen Fortentwicklung von Zuständen unter labilen bzw. instabilen Bedingungen, trägt das dabei zu benennende Risiko einen erheblichen Anteil an der Notwendigkeit zur Vorsorge. Dies entspricht der Auffassung, dass eine Weiterentwicklung des derzeitigen Zustands gewiss, hinsichtlich ihrer Richtung und ihres Umfangs jedoch nicht einzugrenzen ist.

Die DIN 31000 legt den Begriff Risiko formal als eine Produkt von Höhe des Schadenumfangs und der Wahrscheinlichkeit des Eintretens dieses Schadens fest (vgl. Greiving 2002). Diese Feststellung beinhaltet einerseits das risikobezogene Wissen aufgrund bereits bestehender Erfahrungen und andererseits die Möglichkeit des Umgangs mit diesen Risiken durch ein zukunftsorientiertes, geplantes Handeln. „Somit setzt die Beschäftigung mit Risiko ein Mindestmaß an Gestaltbarkeit der Zukunft und damit Vermeidbarkeit von unerwünschten Ereignissen durch vorsorgendes Handeln voraus“, (Renn 2007: 20; vgl Greiving 2002). Diese Bestimmung gleicht der Definition auf technischer bzw. ingenieurwissenschaftlicher Ebene (vgl. Plate et al. 2001).

Die Begriffe Gefahr, Gefährdung und Risiko können je nach Fragestellung und wissenschaftlichem Kontext unterschiedlich definiert werden.

Als Gefahr bzw. Gefährdung wird ein Prozess definiert, der dann zu Schäden führt, wenn sich Risikoelemente in seinem Wirkungsbereich befinden. Bei weiterer Differenzierung zwischen Gefahr und Gefährdung wird Gefahr als die Möglichkeit eines Schadens bezeichnet. Eine Gefährdung berücksichtigt zudem „die Wahrscheinlichkeit für das Auftreten von Ereignissen, die zu Schäden führen“ (Plate et al. 2001: 17).

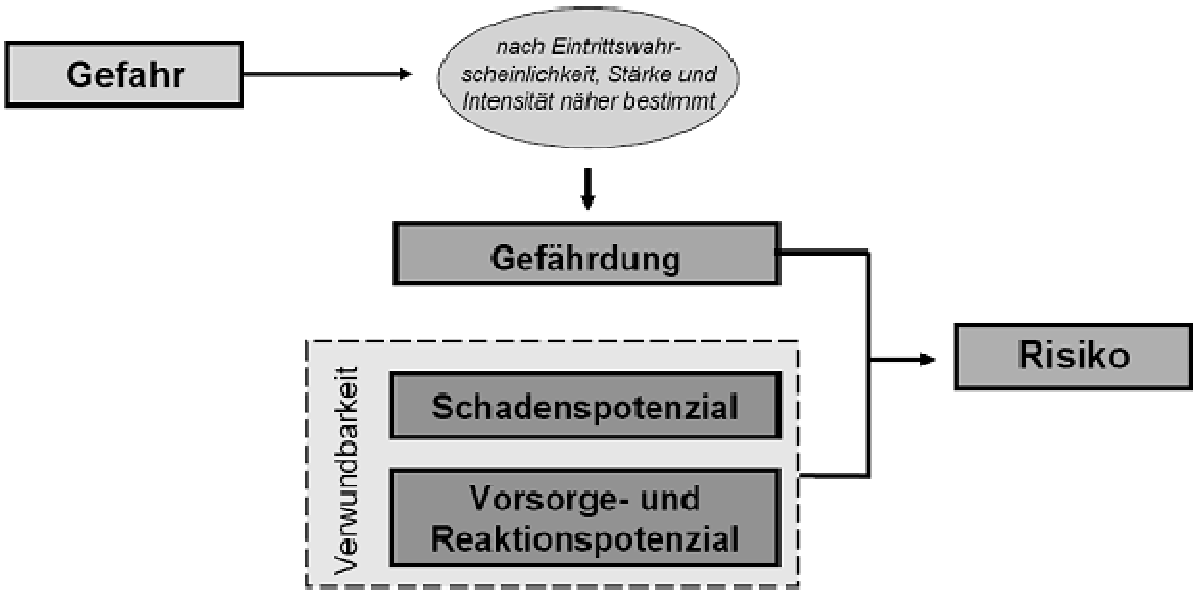

Abbildung 1: Risikomodell

Im Verhältnis der Begriffe Gefahr und Risiko zueinander stellt das Risiko eine „bestimmte Form der Praxis des Umgangs mit Gefahren [dar] […], die über Handlungstechniken, Methoden und Institutionen versucht, Gefahren abgrenzbar, berechenbar und zurechenbar zu machen“ (Greiving 2002: 15).

Hierbei erlangt die Zurechnung ein besonderes Gewicht, da sie eine akteursbezogene Bewertung enthält und somit als Risiko oder als Gefahr wahrgenommen wird. Gefahren treten ein, sobald die damit in Verbindung stehenden auslösenden Momente außerhalb der Kontrollreichweite liegen und damit als nicht beeinflussbar und somit auch nicht in ihrem Umfang und ihrer Wirkung abschätzbar, gelten (vgl. Greiving 2002).

In der Sicherheitswissenschaft wird der Risikobegriff als qualitative oder quantitative Charakterisierung eines Schadens hinsichtlich der Möglichkeit des Eintreffens und der Tragweite der Schadenswirkungen verstanden. Risiko kann demnach definiert werden als Verknüpfung von Gefährdung, also der Möglichkeit des Auftretens und Intensität des Ereignisses und Verletzbarkeit bzw. Vulnerabilität. Diese umschließt die

Bestimmung der dem Risiko ausgesetzten Elemente, deren Exposition und des dabei anzunehmenden quantitativ wie qualitativ zu bemessenden Schadens.

Im Gegensatz zum Gefährdungsbegriff gibt der Risikobegriff also bereits Informationen über die möglichen Schäden an konkreten Risikoobjekten. Das erkannte Risiko wird in der Regel durch Abschätzung als Grundlage für Entscheidungen eingesetzt (Plate et al. 2001: 12).

Ein Schaden beschreibt die Folge des Einwirkens eines Ereignisses auf ein Objekt.

Die Begriffe Vulnerabilität, Verletzlichkeit und Verwundbarkeit werden oftmals synonym verwendet. Bislang existiert kein einheitlich verwendeter Vulnerabilitätsbegriff, da sich die verwendeten Ansätze, Skalen und Methodik zum Teil erheblich unterscheiden.
Je nach Betrachtungsweise werden eher naturwissenschaftliche oder eher sozioökonomische Konzepte berücksichtigt. Naturwissenschaftliche Konzepte der Vulnerabilität betrachten in erster Linie potenzielle Verluste an Menschenleben, potenzielle ökonomische Schäden an Bauwerken und Infrastruktur, potenzielle direkte und indirekte Ausfälle der Produktion sowie potenzielle ökologische Auswirkungen.

Sozioökonomische Konzepte der Vulnerabilität untersuchen dagegen politische, ökonomische, gesellschaftliche und psychologische Aspekte, die sich auf die Anfälligkeit der Gesellschaft gegenüber Natur- und Technikgefahren auswirken und deren Möglichkeiten der Vorsorge und Bewältigung einschränken (Weichselgartner 2002: 127 ff).

Zudem existieren Konzepte, die den Begriff aus einem übergreifenden naturwissenschaftlich-soziologischen Kontext verstehen. Weichselgartner definiert die Vulnerabilität als „den Zustand einer Person, Gesellschaft, Infrastruktur, System oder […] eines bestimmten Raumes gegenüber einer spezifischen Naturgefahr […] mit einer bestimmten Ereignisstärke“ (Weichselgartner 2002: 106).

Demnach beschreibt die Vulnerabilität die Kapazität, mit einer bestimmten - natürlichen oder technischen - Gefahr umzugehen. Aus der Definition geht bereits hervor, dass eine Vielzahl von Indikatoren diesen Zustand beschreiben können. Hierzu zählen beispielsweise die Fähigkeit bzw. das Vermögen zur Bewältigung von Schäden und sozioökonomische Variablen.

Demgegenüber beschreibt ein Schaden ein tatsächlich eingetretenes Ereignis (Plate et al. 2001: 12). Der erwartete Schaden steigt folglich mit zunehmender Vulnerabilität der Risikoelemente.

Hierbei setzt sich das Risiko grundsätzlich aus einer Funktion aus Eintrittswahrscheinlichkeit und Schadensausmaß zusammen, die in ihrem Verhältnis zueinander ein Maß des für das Risiko für die jeweils Betroffenen darstellen können. Dabei pendelt diese Klassifikation grundsätzlich zwischen Zuständen des singulären Auftretens von Ereignissen mit großen Ausmaßen und der Häufigkeit von Ereignissen mit begrenztem Wirkradius. In diesem Zusammenhang steht eine gesellschaftspolitisch beeinflusste Diskussion über die Akzeptanz von Risiken der Erreichung von Zielen gegenüber.

5 VOROSRGE IN DER RAUMPLANUNG

Wie bereits dargestellt gibt es einen inhaltlichen Zusammenhang zwischen den Begriffen Gefahr, Risiko und Vorsorge. Auf den Bereich der Raumplanung bezogen steht hier zunächst die Typisierung der Gefahrenarten, die einerseits den Risikogegenstand hinsichtlich seiner Herkunft kategorisieren. Hierzu zählen Risiken, die aus Natur- und Technikgefahren resultieren und durch das Siedlungsverhalten eine Raumrelevanz erhalten (Greiving 2002: 23 f.). Die Erkennung und Begegnung der Gefahrenquellen, sowie deren Beeinflussbarkeit durch mögliche Interventionen unterscheidet die erkannten Typen erheblich. Während aus der Natur resultierende Gefahren in Auftretenswahrscheinlichkeit, Häufung und Schadensausmaß nur schwer einzugrenzen sind, bestehen zur Abschätzung und Eingrenzung von Gefahren aus der Anwendung von Technologien bewährte Methoden und Erkenntnisse.

In diesem Zusammenhang unterstützt die Aufgabenorientierungen der Raumplanung den Vorsorgecharakter. Dabei lassen sich diese in Kategorien zusammenfassen.

Fachlich- inhaltliche Aufgaben, die sich aus der thematischen Querschnittsorientierung und den damit verbundenen sachlich- räumlichen Verbindungen ergeben. Diese rühren aus dem direkten Umweltbezug der Raumplanung, die sich in der flächen- und im Weiteren auch in den raumrelevanten Wirkungen der Planung zeigt. Der möglichst umfassende und weitreichende Umgriff soll die dabei angestrebte strategische

Orientierung der Planung sichern. In diesem Zuge kommt der Integration einer breiten Informationsbasis unter dem Aspekt ihrer raumrelevanten Wirkungen eine besondere Bedeutung zu.

Staatlich- hoheitliche Aufgaben, die als öffentliche Aufgabe vom Träger der Raumplanung wahrgenommen werden und in unterschiedlichen hierarchisch organisierten Planungsebenen mittels Prinzipien, Konzepten, Strategien und den hieraus formulierten Leitbildvorgaben und Zielentwicklungen, die durch den Einsatz rechtlicher Planungsinstrumente in normierten Verfahren in Pläne und Programme umgesetzt werden. Die Grundaufgabe der Ordnung, Sicherung und Gestaltung raumbezogener Nutzungen und Funktionen trägt dazu bei, raumstrukturelle Konflikte zu erkennen, zu analysieren und ihnen unter Vorsorgeaspekten zu begegnen. Der Einsatz eines abgestimmten und erprobten Instrumentariums versucht, Sicherheit in der Planung zu schaffen, da auf bewährte, in ihren Wirkungen bekannte Bestandteile zurückgegriffen wird und so Risiken hinsichtlich der inhaltlichen und prozessbezogenen Wirkung beherrscht werden können.

Im Rahmen räumlicher Planung wird der Vorsorgebegriff auf Basis der Flächen- und Raumrelevanz bestimmter Raumfunktionen und -nutzungen konkretisiert und die darauf ausgerichteten Maßnahmen entsprechend eingekreist. Diese Bedeutung setzt einerseits den fachlichen Rahmen hinsichtlich der Verfügbarkeit und Nutzung von Fläche und Raum. Andererseits werden auch die damit verbundenen Ansprüche auch Konflikte und Hemmnisse aufgezeigt, die zu Restriktionen und daraus notwendigen Anpassungen weiterentwickelt wird.

Aus diesem Spannungsfeld ergibt sich die Vorsorge als Aufgabe der Raumplanung, die in ihrer Weiterentwicklung den Schutz der Umwelt durch eine gezielte Umweltplanung betreibt. So lassen sich folgende Klassifizierungen zu den vorsorgenden Maßnahmen im Rahmen der Raumplanung vornehmen, die im jeweiligen Vorsorgekontext situativ und individuell anzuwenden sind und teilweise auch in Kombination verwendet werden. Diese wird im engeren Sinne als Raumnutzungssteuerung bezeichnet (vgl. Greiving 2002).

Flächenbezogene Handlungsmöglichkeiten

Dies betrifft die Flächenvorsorge zur Sicherung bestimmter Raumfunktionen und Raumnutzungen bzw. von Flächen zur Abwehr, zum Auffangen oder zur Vermeidung von Risiken durch gezielten planerischen Eingriff. Dieses Vorgehen kann durch Risikoeinschätzungen erweitert werden, die die Einordnung von Gebieten nach einer Risikoklassifizierung vornehmen und so den Gefährdungsgrad verdeutlichen. Zudem kann über Rechtsinstrumente eine Regelsetzung zum Umgang mit schützenswerten Gebieten vorgenommen werden. Dies fällt vornehmlich in den Bereich des Bauplanungsrechts auf kommunaler Ebene, dass durch vorbereitende und verbindliche Bauleitplanung Anforderungen und Restriktionen an die Nutzung bestimmter Flächen binden kann.

Objektbezogene Handlungsmöglichkeiten

Der Objektschutz fällt originärer Weise zwar nicht in den Bereich raumplanerischer Eingriffsmöglichkeiten, kann jedoch über die Anwendung bauordnungsrechtlicher Vorschriften mittelbar einfließen. Diese kommen dann zur Anwendung, wenn Risiken nicht anders verhindert oder minimiert werden können. Dies betrifft im Wesentlichen technische Maßnahmen an oder in der Nähe baulicher Einrichtungen.

Verfahrens- und Prozessbezogene Handlungsmöglichkeiten

Hierbei handelt es sich um die Aktivierung, Installation oder Überwachung von Verfahren oder Prozessen im Sinne der Vorsorge in und für die Planung. In diesem Sinne soll die Ergebnisqualität einerseits durch die Vorsorgeorientierung der normierten Verfahren gestärkt und andererseits durch die Prozessbegleitung validiert und reflexiv gestaltet werden.

Diese Unterscheidungen münden in eine grundsätzliche Einteilung in Maßnahmen zur Prävention und Reaktion. Hierbei kommt das Regime der Vorsorge bei beiden Bereichen zum Tragen: Im Sinne der Vorsorge, als der Verhinderung eines unerwünschten Zustands oder Ereignisses, kommen präventive Maßnahmen im Vorfeld zum Einsatz, die vorgenannte Entwicklungen verhindern oder deren Auswirkungen minimieren sollen. Der Einsatz reaktiver Maßnahmen beschränkt sich auf die Bewältigung konkreter Gefahrenlagen operativen im Sinne einer konstanten Maßnahmenvorhaltung und deren Einsatz (vgl. Greiving 2002).

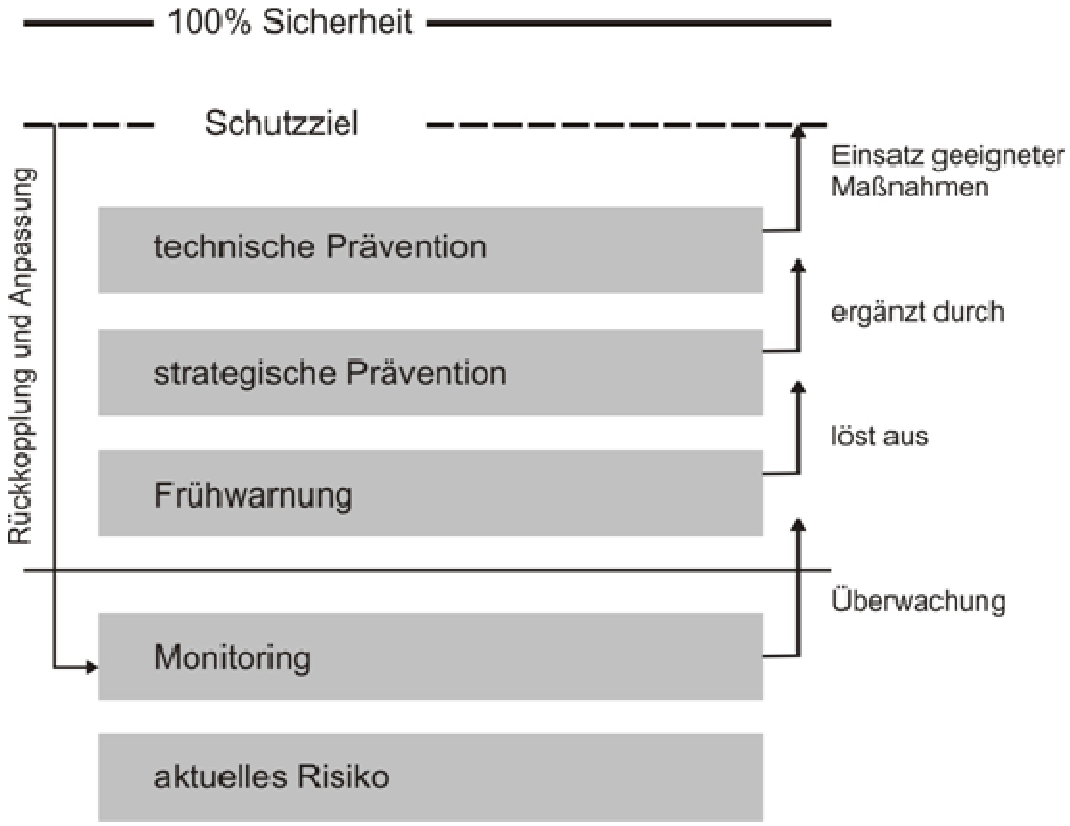

Abbildung 2: Risikobasiertes Entscheiden

Die Überlagerung verschiedener Ansprüche durch Nutzungen oder Funktionen führt, im Zuge der nur begrenzt zur Verfügung stehenden Ressourcen Boden und Raum, zu Konkurrenzen und Spannungen hinsichtlich der Art und des Umfangs der Realisierung.

Diese Ansprüche pendeln einerseits zwischen den tatsächlichen Raumbedürfnissen, die eine Bezugsgröße darstellen, um den nutzungsinhärenten Umsetzungserfordernissen gerecht zu werden. Andererseits treten diese auch in Raumambitionen auf, die über den quantitativen funktionalen Bedürfnishaushalt hinausgehen. Die gezielte Steuerung der Flächennutzung ist somit eine vorsorgende Maßnahme, um so jeweilige Bedürfnisse und Ambitionen in Einklang mit anderen Nutzungen zu bringen, so dass eine raumstrukturbezogene Ordnung und Gestaltung erreicht und langfristig gesichert werden kann.

Als öffentliche Aufgabe wird die Raumplanung maßgeblich durch ihren Rechtsbezug geprägt und steht somit in einem „direkten Bezug zu allen raumwirksamen staatlichen, zwischenstaatlichen und supranationalen Aufgaben, von der Landwirtschafts- bis zur Verkehrs- und Umweltpolitik, die ihrerseits zur räumlichen Entwicklung beitragen“ (Lendi 1998: 25). Wie bereits geschildert, bezieht die Raumplanung aus ihrem arbeits- und betrachtungsbezogenen Querschnitt ihren Aufgabenbereich, der unter anderem auch die fachliche Koordination verschiedener Nutzungen und Funktionen im Raum berührt, die mittels Rechtsanwendung begründet und gesichert wird. Als Teil dieser unterstützt die Harmonisierung materieller Ziele und formeller Verfahren durch eine sachgerechte Abwägung konkurrierender öffentlicher Interessen sowie zwischen öffentlichen und privaten die räumliche Entwicklung.

Im Zusammenhang mit raumbezogener Vorsorge subsumiert die Planungspartizipation sowie nachstehend die Abwägung der eingebrachten Belange im Planungsprozess als integrativer Planungsverfahrensbestandteil alle Anstrengungen, um zu einem frühen Zeitpunkt und Verfahrensstand über eine planungsrelevant möglichst umfassende Informationsbasis zu verfügen. So können im Vorhinein Konflikte, Spannungen oder planungsrelevante Restriktionen erkannt, beseitigt, verlagert oder minimiert werden. Ein weiterer Vorsorgebezug der Raumplanung kann durch die Anwendung des Planungsermessens hergestellt und begründet werden. Die in Folge seiner Anwendung geregelte Nutzung von Planungsinstrumenten in normierten Verfahren schafft einerseits Sicherheit hinsichtlich der Rechtmäßigkeit der Planung und des Rechtsschutzes, andererseits erhält der Träger der Planung die Möglichkeit, seine räumlichen Entwicklungsvorstellungen zu verwirklichen (vgl. Lendi 1998).

In engem Zusammenhang dazu steht der Einsatz von Prognosen und Szenarien. Im Mittelpunkt befinden sich dabei die „künftig möglichen oder beabsichtigten räumlichen Strukturen und Prozesse […]“ (Stiens 1998: 113), die durch eine in die Zukunft orientierte Weiterentwicklung verfügbarer Informationen geprägt sind. Unter raumplanungsbezogenen Gesichtspunkten unternehmen dabei sowohl die quantifizierende Prognostik als auch die Szenariomethode den Versuch, in der Zukunft liegende Zustände zu ermitteln, nachvollziehbar zu begründen und als Grundlage für Entscheidungen im Planungsprozess zur Verfügung zu stellen. Durch den Einsatz sollen nicht nur weitere planerische Schritte gesichert und legitimiert, sondern das Risiko der räumlichen Fehlentwicklung verringert oder weitestgehend ausgeschaltet werden. Planerisch notwendige oder sinnvolle Entwicklungen sollen so durchgesetzt oder unterstützt, planerisch relevante Entwicklungen beachtet und in ihren Ausmaßen und Wirkungen eingeschätzt werden.

Hiermit verknüpfen sich der Einsatz von Bewertungs- und Entscheidungsmethoden in der räumlichen Planung, deren Bedeutung sich in den Komponenten der Entscheidungsvorbereitung bemessen lässt und zum Ergebnis die Auswahl der besten Lösung aus unterschiedlichen Alternativen hat. Durch den Einsatz dieser Methoden soll gewährleistet werden, dass die Beurteilung einen Maßstab bildet, in dem sich der Grad der Zielerreichung und Umsetzung hinsichtlich des monetären, personellen oder nutzwertbezogenen Einsatzes oder Rücklaufs quantifizierbar - und damit vergleichbar – machen (vgl. Jacoby; Kistenmacher 1998).

Letztlich können auch das Monitoring im Sinne der Planungskontrolle zur Vorsorge in der Raumplanung gezählt werden. Dies bezeichnet zum einen den Vergleich zwischen den erreichten Ergebnissen eine Entwicklung und den erwarteten Zielen, zum anderen wird damit die gezielte Beeinflussung eines Verhaltens, dessen Steuerung, Lenkung und Führung. Sie soll zur Legitimation der Planung und Ihren Ergebnissen beitragen, da sie diese bestätigt oder kritisiert (vgl. Benz 1998).

Daneben soll im Monitoring als systematisierte Erfassung und Auswertung vorliegender Ergebnisse ein Rückschluss und Nachsteuerung möglich, um so Prozesse zu optimieren und damit zu verbessern. Im Bereich der Raumplanung wird hiervor der Planungsprozess betroffen, der sich im Weiteren durch die komplexe Zusammensetzung aus Interessen und verfahrensrechtlicher und institutioneller Zuständigkeiten sowie Beteiligungs- und Abwägungsregelungen auszeichnet. Daneben wird steht die Kontrolle des Plans und dessen Vollzugs, die zum einen dessen materielle und formelle Vollständigkeit betrachtet und zum anderen Implementationsdefizite aufdeckt.

Es ist erkennbar, dass einen Kernbestandteil der Raumplanung die Vorsorge im Sinne eines natur-, technik- und sozialbezogenen Umweltschutzes darstellt.

Somit entspricht der Vorsorgegrundsatz der Erkenntnis, dass die ökonomischen, sozialen und ökologischen Entwicklungen in einem unauflöslichen Zusammenhang stehen. Als materielles Leitbild des modernen Umweltschutzes zielt es darauf ab, durch frühzeitiges und vorausschauendes Handeln mögliche Umweltbelastungen und -gefahren von vornherein auszuschließen oder zu minimieren. Dazu zählt aber nicht nur die Vorbeugung möglicher Risiken, sondern auch ein schonender Umgang mit den Ressourcen.

6 ZUSAMMENFASSUNG

Erkennbare Parallelen und inhaltliche Verbindungen zwischen den Begriffen Vorsorge und Raumplanung sind offensichtlich und nahezu zwangsläufig. Das Aufgabenfeld der Raumplanung besteht einerseits aus einem Geflecht unterschiedlicher Raumnutzungen mit diversen Ansprüchen und Wünschen. die in sich und in ihrer Überlagerung Vorsorgemaßnahmen zum Schutz notwendig bzw. sinnvoll machen und somit zur Grundhaltung der Raumplanung gehören. Hierbei treffen unterschiedliche Unsicherheiten hinsichtlich zukünftiger Entwicklungen und erkenn- bzw. vermutbare Gefahren auf Vorsorgeabsichten und -pflichten durch planerische Tätigkeit, die innerhalb dieser bewältigt werden müssen.

In diesem Kontext kann der Gesichtspunkt der Vorsorge zweigeteilt beurteilt werden, die einem individuell zu beurteilenden Standpunkt entspricht.

Der Raumplanungsbezug der Vorsorge ergibt sich aus der beschriebenen Systematisierung und Langfristigkeit der Vorsorge sowie durch Art und Umfang der entsprechenden Maßnahmen, da sich diese in einem raumplanungsrelevanten Kontext befinden. Dieser folgt aus dem direkten bzw. indirekten Wirkungsbezug vorsorgender Maßnahmen, deren Grad sich an der materiellen Komponente und inhaltlichen Ausrichtung der Vorsorge bemisst.

Der Vorsorgebezug der Raumplanung wird durch die Hoheitsstaatlichkeit der Raumplanung und die damit verbundene hierarische Durchdringung und Verbindung zu vielen die Umweltschutzbelange durchsetzenden bzw. berücksichtigenden Planungsvorschriften zum Ausdruck.

Ohne ein systematisches, koordiniertes Vorgehen kann räumliche Risikovorsorge nicht wirken. Dies betrifft bereits den Bereich der Vorbereitung und Organisation von Nutzungsplanungen und deren Lokalisierung vor deren Realisierung.

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Wanderungsströme der Bevölkerung in der Stadtregion Wien

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1 EINLEITUNG

Die Bundeshauptstadt Wien und ihr Verdichtungsraum zählen zu den dynamischen Wachstumsregionen in Europa. Nicht nur in den letzten Jahren wuchs die Stadtregion durch Zuwanderung von außen kontinuierlich, auch für die kommenden Jahrzehnte wird für weite Teile der Stadtregion und für die Stadt Wien eine Zunahme der Bevölkerung prognostiziert (z.B. Hanika et al. 2004). Aus diesem Grund beauftragte die Planungsgemeinschaft Ost (PGO), bestehend aus den drei Bundesländern Wien, Niederösterreich und Burgenland, im Jahr 2008 unter dem Projettitel „Strategien zur Räumlichen Entwicklung der Ostregion" verschiedene Institute und Planungsbüros, um Szenarien und Handlungsempfehlungen zu entwickeln, die als Vorschläge und wissenschaftlich fundierte Basis für eine künftige Raumordnungspolitik dienen können. Das Institut für Stadt- und Regionalforschung der Österreichischen Akademie der Wissenschaften war in diesem Kontext unter anderem mit der Analyse des Status Quo in der Stadtregion beauftragt. In Bezug auf die Demographie, den Siedlungs-raum, die Wirtschaft sowie den Verkehr wurden umfassende Erkenntnisse über die Entwicklung der letzten Jahre in einem hochdynamischen Ballungsraum gewonnen und in einem „Atlas der wachsenden Stadtregion Wien" (Fassmann et al. im Erscheinen) dokumentiert.

Ein Aspekt umfasst dabei die Analyse der Wanderungsströme und deren altersspezifisch differenziertes Verhalten in Teilräumen der Stadtregion. Weiters wurden auf Basis der beiden Beobachtungszeitpunkten 2002 und 2007 Schlussfolgerungen über deren Dynamik gezogen. Wesentliche Erkenntnisse werden im folgenden Artikel skizziert und diskutiert.

Summa summarum konnte nachgewiesen werden, dass auch in einer Stadtregion des 21. Jahrhunderts, die durchaus „post-suburbane" Charakteristika aufweist, immer noch die „klassischen" Wanderungs-ströme für Wachstum in den einen bzw. Schrumpfung in den anderen Teilgebieten sorgen. Diese Ergebnisse stimmen mit anderen Untersuchungen überein. So kamen etwa Helbich und Leitner (2009) sowie Helbich und Görgl (im Erscheinen) hinsichtlich der Driving Forces der Zuzüge in die Umlandgemeinden zum Schluss, dass allgemein Suburbanisierung und speziell „harte" Standortfaktoren (wie Erreichbarkeit und Bodenpreis) nach wie vor die Entwicklungsprozesse im Umland prägen.

2 WACHSTUMSDYNAMIK IN DER STADTREGION OST

Stadtregionen lassen sich auf unterschiedlichste Art und Weise abgrenzen. Dies kann morphologisch, auf Basis eines Verdichtungs- und/oder Gravitationskonzeptes u.ä. erfolgen. Die „Stadtregion Ost" ist ein pragmatischer Zugang und wurde von den Raumordnungsabteilungen der Bundesländer Niederösterreich, Burgenland und Wien definiert. Diese im Vergleich zu älteren (z.B. Fuchs 1997) relativ großzügige Variante hat den Vorteil, dass sie den österreichischen Teil der sogenannten CENTROPE-Region berücksichtigt und somit auch auf transnationale Entwicklungen reagiert. Denn schon allein der Verkehrsinfrastrukturausbau nach Tschechien und in Richtung Slowakei wird einen Entwicklungsschub auch in den weiter entfernten Teilen des Wiener Umlands bewirken.

2.1 Bevölkerungsentwicklung in der Stadtregion seit 1980

Verglichen mit deutschen Stadtregionen, setzten Suburbanisierungstendenzen im Umland der Bundeshauptstadt Wien erst relativ spät ein. Auch wenn Lichtenberger (2000) den Beginn der Suburbanisierung in Wien etwa auf die 1960er Jahre datiert, so nahm er erst Mitte der 1970er Jahre auch ein quantitativ bedeutendes Ausmaß an – bis zu diesem Zeitpunkt fand Wachstum eher auf einzelne Gemeinden beschränkt entlang der großen Verkehrsachsen wie der Südbahn bzw. Südautobahn statt (Musil/Pindur 2008).

Mit den 1980er Jahren dynamisierte sich die Entwicklung im Wiener Umland zusehends und neben den stadtnahen bzw. den an den großen Verkehrsachsen gelegenen Gemeinden bewirkten Suburbanisierungsprozesse immer mehr auch Wachstum im weiteren Umland: Gemeinden im attraktiven

Siedlungsgebiet des Wienerwalds (z.B. Purkersdorf, Mauerbach, Neulengbach) erfuhren in der Zeitspanne von 1980 bis 2001 ein starkes Bevölkerungswachstum von teilweise über 30%.

Die letzte Dekade des vergangenen Jahrtausends (1990-2000) zeichnete sich durch eine weitere Ausdehnung des Wachstums in nördliche, östliche und westliche Teilgebiete aus, so dass sich (z.T. neue) Siedlungsschwerpunkte wie Korneuburg, Groß-Enzersdorf, Gänserndorf oder Tulln herausbilden konnten. Diese Entwicklung wurde und wird immer noch ergänzt durch einen weiteren Trend: Neben dem sich immer weiter vom Zentrum der Stadt Wien entfernenden Wachstum entlang der Hauptverkehrsachsen prägen Periurbanisierungsprozesse immer deutlicher die Siedlungsstrukturen in der Stadtregion Wien. Unter Periurbanisierung verstehen wir hierbei nicht nur die soziökonomische Umformung räumlich weiter von der Kernstadt entfernter Gebiete, sondern auch die Besiedelung von Gebiete zwischen den leistungsfähigen Achsen des öffentlichen Nahverkehrs und des motorisierten Individualverkehrs (Fassmann 2004). Der Prozess der Periurbanisierung ist keinesfalls ein österreichspezifischer, sondern in so gut wie allen westlichen Stadtregionen beobachtbar (z.B. Kagermeier 1997 für München). Peri-urbane Gemeinden verfügen zwar über ungünstigere Erreichbarkeitsverhältnisse, aber über eine Reihe anderer Standortqualitäten, wie etwa vergleichsweise günstige Bodenpreise bei gleichzeitig reichlicher Baulandverfügbarkeit. Diese Pull-Faktoren tragen, vor allem in Kombination mit einer (oftmals erzwungenen) hohen Bereitschaft zur Mobilität maßgeblich zum Wachstum in diesen „Zwischengebieten“ bei. Im Untersuchungsgebiet sind die Gemeinden Oberwaltersdorf und Ebreichsdorf Beispiele für diese Entwicklung.

Die hier skizzierten Entwicklungstrends bestimmten auch in den letzten zehn Jahren die Entwicklung in der Stadtregion. Bemerkenswert ist ein neuer Siedlungs-Hotspot, der im nördlichen Burgenland in der Nähe der Autobahn A4 in stetigem Wachstum befindet: die Gemeinden Parndorf, Neusiedl am See und Bruckneudorf verbuchen seit Jahren massive Wachstumsgewinne – sowohl in Bezug auf deren Einwohnerzahl, aber auch in Bezug auf die Ansiedlung von (oftmals großflächigen) Gewerbebetrieben. Aufgrund der immer stärker wirksamen Sättigungserscheinungen im südlichen Umland, verlagert sich das Wachstum in der jüngsten Vergangenheit darüber hinaus nun auch immer deutlicher in den Nordwesten und Nordosten der Stadtregion – und setzt dabei Wachstumstrends fort, die sich in diesen Teilgebieten schon in den 1990er Jahren angekündigt hatten (vgl. Abb. 1). Die Einwohnerzahl der gesamten Stadtregion betrug im Jahr 2008 rund 2,6 Millionen Einwohner, wobei rund 900.000 auf das Wiener Umland entfallen.

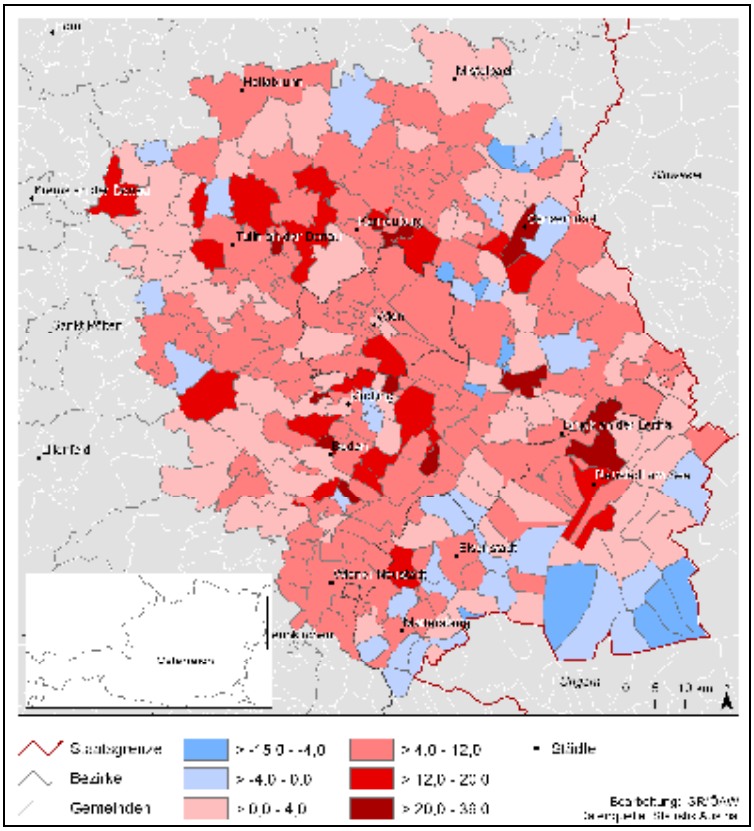

Abb. 1: Bevölkerungsentwicklung 2001-2008 (in %)

2.2 „Hotspots“ und „Coldspots“ von Wanderungen

Analysiert man die unter Punkt 3.1 beschriebenen Wachstumstrends wie Periurbanisierung exemplarisch anhand der Wanderungsbilanz für das Jahr 2007 mittels der lokalen Moran’s I Statistik (Anselin 1995), lässt sich quantifizieren, wie sich eine Entität im Vergleich zu ihrer räumlichen Nachbarschaft verhält, sprich ob eine räumliche Clusterung von ähnlichen Attributwerten vorhanden ist. Im Falle eines „Hotspots“ bedeutet dies, dass eine Gemeinde mit hoher positiver Wanderungsbilanz von Gemeinden mit ebenso hoher Wanderungsbilanz umgeben ist. Für „Coldspots“ gilt konträres, eine Gemeinde mit niederer Wanderungsbilanz weist Nachbargemeinden mit ebenso niederen Wanderungsbilanzen auf. Als räumliche Ausreißer werden Gemeinden bezeichnet, die entweder eine hohe Wanderungsbilanz aufweisen und von niederen Wanderungsbilanzen umgeben sind oder vice versa. Abbildung 2 zeigt die Ergebnisse der Statistik und bestätigt obige Ausführungen, dass gegenwärtig vor allem Gemeinden im Norden, Osten und Westen, aber auch jene in Achsenzwischenräumen (im südlichen Wiener Umland) profitieren und statistische Hotspots formen. Coldspots sind primär an der Demarkation im südlichen und nordwestlichen Teil des Untersuchungsgebietes anzutreffen.

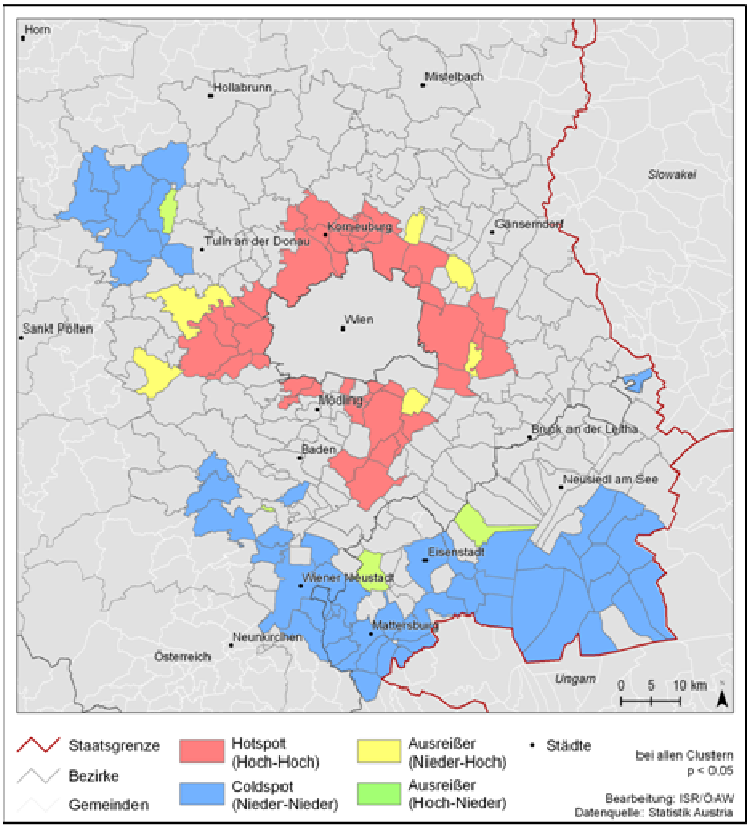

Abb. 2: Hot- und Coldspots der lokalen Moran’s-I-Statistik

2.3 Bevölkerungswachstum durch Geburten oder Wanderung?

Die Antwort auf diese Frage ist auf stadtregionaler Ebene dieselbe wie auf nationaler: Nirgendwo reichen die Geburten mehr aus, um für Bevölkerungswachstum zu sorgen und man ist auf Zuwanderung „von außen“ angewiesen. Der Großteil der Umlandgemeinden um Wien weist eine leicht negative Geburtenbilanz auf, viele davon sind aber dennoch eindeutig die „Wachstumsgewinner“ der letzten Jahre. Die positivste Geburtenbilanz der gesamten Stadtregion findet sich im 22. Wiener Gemeindebezirk, doch auch hier stehen 1.799 Geburten 8.900 Zuzügen im Zeitraum von 2002 bis 2006 gegenüber. Allgemein hat die Großstadt Wien die höchsten Werte bei der Geburtenbilanz. Das legt den Schluss nahe, dass dort auch junge Familien geeigneten Wohnraum finden, die nicht „ins Grüne“ an die Ränder der Stadt ziehen wollen – oder können. Dies gilt oft vor allem für Haushalte mit Migrationshintergrund. Und daher überrascht es auch nicht, dass die Bezirke mit hohen Anteilen an ausländischen Staatsbürgern (z.B. Rudolfsheim-Fünfhaus) auch oftmals sehr positive Gebur-tenbilanzen aufweisen.

3 ANALYSE VON WANDERUGSSTRÖMEN

Die Analyse von Wanderungsströmen, bei der Geburten- und Sterbefälle vernachlässigt werden, bringt eine Vielzahl von interessanten Erkenntnissen über die Wanderungsdynamiken und ihre, die räumlichen Strukturen der Stadtregion prägenden, Konsequenzen. Wer wandert? Wohin und in welchem Alter wandern die Menschen? Die Abbildungen 3 bis 5 zeigt die Wanderungsfälle nach Alter für die beiden Zeitpunkte 2002 und 2007 in Prozent differenziert nach „Ursprungsregionen“ und „Zielregionen“.

Abbildung 3 verdeutlicht folgenden Sachverhalt: Die Wanderungsbeziehungen zwischen der Kernstadt und ihrem Umland sind auch gegenwärtig noch eindeutig lebenszyklusorientiert. Während junge Menschen nach Abschluss ihrer schulischen Ausbildung relativ rasch im Alter von 19-23 Jahren für eine weiterführende akademische Ausbildung oder Lehre nach Wien ziehen, da dort das entsprechende Angebot zu finden ist, ziehen junge Familien hinaus aus der Stadt ins Umland. Diese Trends werden in der Abbildung 3 anhand der maximalen Prozentwerte bei den 21-Jährigen bzw. bei den 34-Jährigen repräsentiert. Bei ersteren beträgt das Maximum rund 4 Prozent und bei zweiteren etwa 3 Prozent. Die deutlichen Anteile an „mitwandernden“ Kleinkindern bestätigen die These, dass es sich um familienorientierte Zuzüge ins Umland handelt. Die Wanderungswahrscheinlichkeit ist also kurz vor der Geburt eines Kindes bzw. kurz danach am höchsten. Ein kleiner Anstieg ist wiederum bei den Wanderungen 10 und 11-Jähriger festzustellen, was für die These spricht, dass in der Biographie einer Familie der Schulwechsel eines Kindes auf eine weiterführende Schule eine andere günstige Situation für einen Wohnungs- bzw. Wohnortwechsel bedeutet.

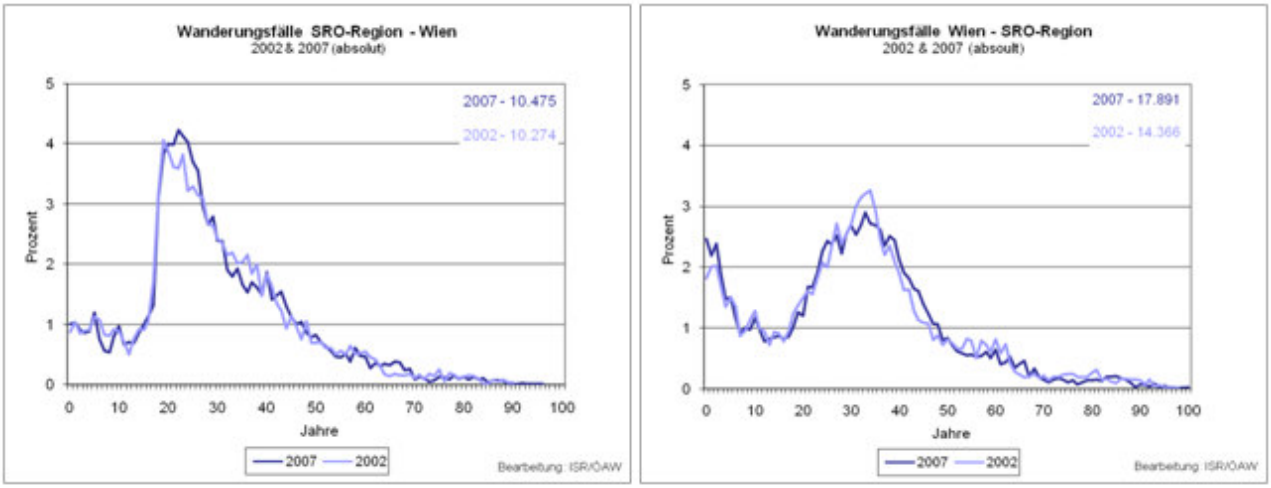

Abb. 3: Wanderungsfälle nach Alter 2002 und 2007 (in %) von der SRO-Region nach Wien (links) und von Wien in die SRO-Region (rechts)

Die „Bilanz“ beider Wanderungsströme ergibt, dass die Stadt jedes Jahr gut 8.000 Menschen mehr ans Umland verliert, als sie durch Zuzügler von dort gewinnt. Diese hier skizzierten Sub- und Reurbanisierungsströme entsprechen dem „klassischen“ Muster stadtregionaler Wanderungsdynamiken und haben sich seit der Blütezeit der Suburbanisierung in den 1970er und 1980er Jahren offenbar kaum verändert. Abbildung 3 zeigt klar, dass ein Trend, der in Medien und von manchen Sozialwissenschaftlern seit einigen Jahren als eine der künftig prägenden Wanderungsbewegungen eingeschätzt wird, für die Stadtregion Wien momentan noch keine Rolle spielt: Die Reurbanisierung der älteren und alten Bevölkerungsgruppen (Höpflinger 2004). Personen die in die Stadt wandern, sind in Bezug auf ihr Alter eine sehr junge und homogene Gruppe (vgl. Abb. 3 und 4), die Anteile an Menschen über vierzig sind sehr gering und gehen bei noch älteren Menschen bald gegen Null. Auch wenn es Städte in den letzten Jahren immer besser verstanden haben, neuen Wohnraum für ein sehr breites Spektrum an Lebensstilen und Altersgruppen anzubieten, bleiben ältere Personen offensichtlich überwiegend an ihrem angestammten Wohnort und folgen dem allseits so genannten „aging in place“. Somit ist Glasze und Graze (2007) Recht zu geben, wenn sie die Reurbanisierung älterer Bevölkerungsgruppen als „Potenziale“ für die Zukunft, aber keinen „Massentrend“ bezeichnen.

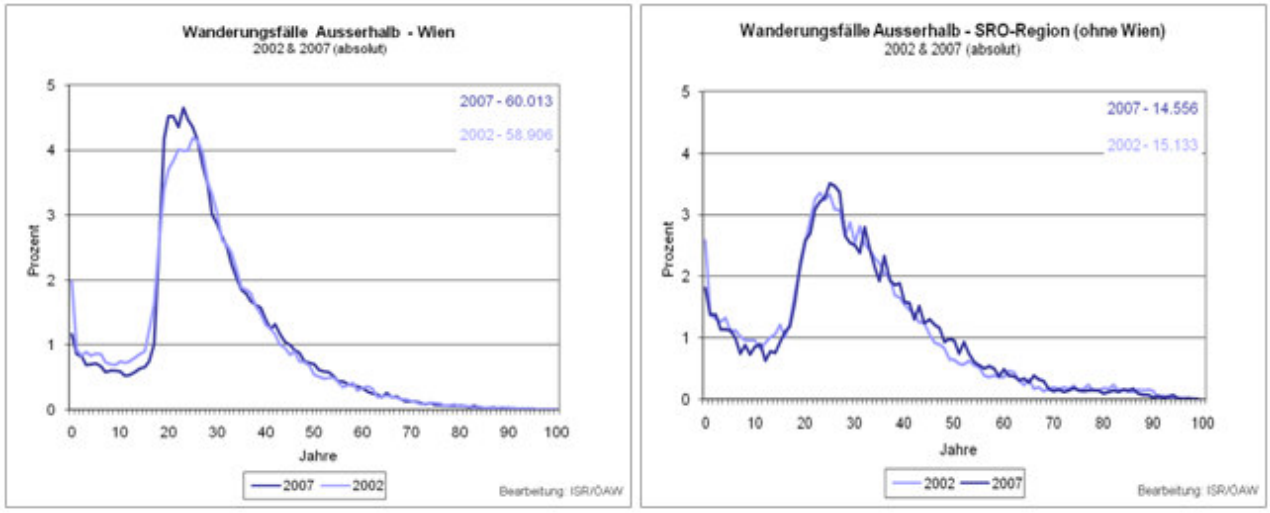

Abb. 4: Wanderungsfälle nach Alter 2002 und 2007 (in %) von Außerhalb nach Wien (links) und von Außerhalb in die SRO-Region (exkl. Wien) (rechts)

Die Kurven in Abbildung 4 zeigen die Wanderungsfälle von außerhalb der Stadtregion (sprich restliches Österreich uns Ausland) nach Wien (links) bzw. in die Umlandgemeinden (rechts). Die große Attraktionskraft der Metropole Wien spiegelt sich hier in der Menge der Zuwanderer wider: Gut 60.000 Menschen wandern jedes Jahr zu. Neben den jungen Menschen, die aufgrund einer weiterführenden Ausbildung in die Großstadt ziehen, machen auch Zuzüge aus dem Ausland einen Großteil dieser Wanderungsfälle aus – die Metropole bietet Menschen in erwerbsfähigem Alter vielfältigste Chancen. Doch auch die Umlandgemeinden verbuchen jährlich um die 15.000 Zuzüge von außerhalb der Stadtregion und das Altersspektrum der Wandernden lässt auch in diesem Falle auf Bevölkerungsbewegungen schließen, die im Zuge einer Familiengründung stattfinden. Somit ist es auch wenig überraschend, dass Binnenwanderungen, d.h. innerhalb der Umlandgemeinden bzw. innerhalb des Stadtgebiets von Wien in ihrer Mehrheit wiederum im Zusammenhang mit einer Haushaltsgründung bzw. der Geburt von Kindern stehen (vgl. Abb. 5).

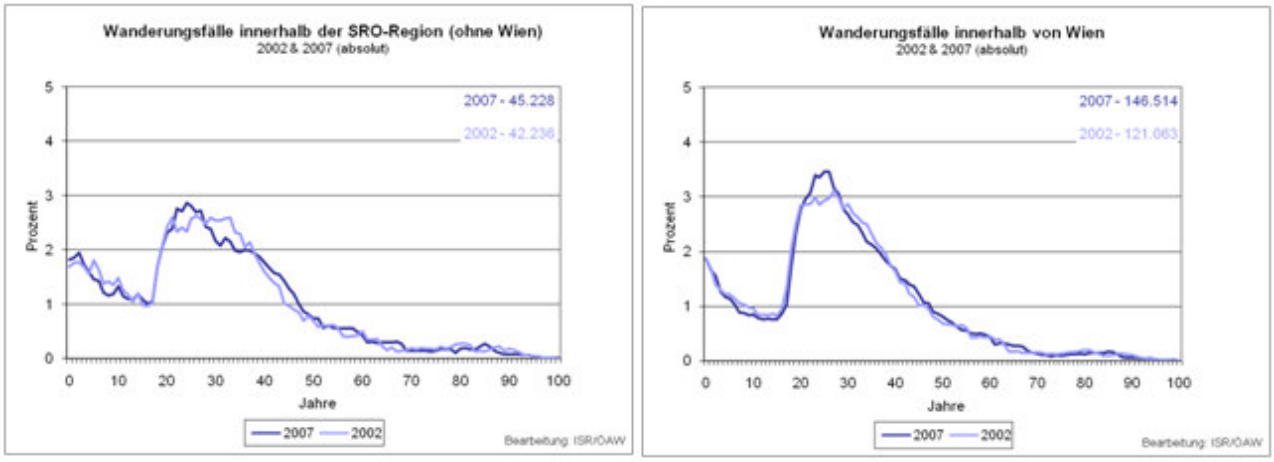

Fig. 5: Wanderungsfälle nach Alter 2002 und 2007 (in %) innerhalb der SRO-Region (links) und innerhalb Wien (rechts)

Die sehr hohen Werte bei den Binnenwanderungen passen nicht ganz zur Vorstellung einer „immobilen“ Gesellschaft – denn immerhin wechselten in der Stadtregion im Jahre 2007 insgesamt fast 200.000 Menschen ihren Wohnort und auch die Werte im Jahre 2002 sind sehr hoch.

4 FAZIT

Vorliegender Artikel diskutierte gegenwärtige Wanderungsströme in der Stadtregion Wien. Diese wurden aufbauend auf der Bevölkerungsentwicklung differenziert nach einzelnen Teilgebieten wie etwa der Kernstadt oder dem Umland und unterschiedlichen „Flussrichtungen“ analysiert.

Zweifelsohne handelt es sich bei der Stadtregion um eine hochdynamische, die in vielerlei Hinsicht bereits post-suburbane Charakteristiken aufweist und sich in der funktionalen und qualitativen Anreicherung des Umlands, neuartigen Verkehrsinteraktionsmustern und immer breiter gestreuten Lebensstilen in den vormaligen „Schlafstädten“ auszeichnet (Görgl 2005, Burdack 2008). Diese Entwicklungen sind sowohl allgemein (vgl. Bölling et al. 2004), als auch für die Stadtregion Wien (vgl. Helbich 2009, Fassmann et al., im Erscheinen) ausgiebig analysiert und interpretiert worden. Was die Autoren in diesem kurzen Beitrag zeigen wollten, ist, dass sich aber trotz dieser neuartigen Entwicklungstrends im Umland einige Determinanten nicht verändert haben. Anhand der Bevölkerungsentwicklung konnte gezeigt werden, dass die Stadtregion um Wien, trotz einer im Vergleich zu deutschen Verdichtungsräumen um gut zehn bis fünfzehn Jahre später einsetzenden Suburbanisierung, einen Entwicklungsverlauf genommen hat, dessen übergeordnete Strukturen und Prozesse sich kaum von Suburbanisierungsprozessen in anderen Ballungsräumen unterscheiden.

Ebenso erstaunlich ist, dass auch die Wandernden, die den Suburbanisierungsprozess tragen, nach wie vor Haushalte sind, die sich kurz vor oder nach der Geburt eines Kindes befinden – während die Stadt immer schon ein Ziel für Menschen darstellt, die eine weiterführende Ausbildung anstreben. Somit scheint Lichtenbergers „Lebenszykluskonzept“ (1998) nicht gänzlich überholt zu sein. Dennoch muss stets eine Erweiterung desselben mitgedacht werden, denn die Gründung einer Familie und der Wohnsitzwechsel „ins Grüne“ muss nicht mehr zwangsweise das bedeuten, was er vor fünfzehn oder zwanzig Jahren bedeutet hat. Auch im suburbanen Bereich finden sich heute viele Familien, die nicht mehr dem klassischen Bild einer suburbanen Familie entsprechen, beispielsweise weil die junge Mutter so schnell wie möglich nach der Geburt des Kindes wieder zurück in ihren Beruf kehrt. Ebenso bedeutet „Wohnen“ im Umland der Großstadt heute anderes als vor 20 Jahren, Wohnformen, Woh-nungstypen etc. sind inzwischen genauso vielfältig wie die Menge an individuellen Lebensentwürfen und Lebensstilen (Görgl 2008).

Insofern ist es vielleicht besser, davon zu sprechen, dass es nach wie vor dieselben „biographischen Einschnitte“ sind, die Wanderungen verursachen – diese aber in Hinblick auf die „post-suburbanen“ Entwicklungstrends der Gegenwart (bzw. dem sie bedingenden gesellschaftlichen Wandel) in einem völlig anderen sozio-kulturellen Kontext zu sehen sind, als in den 1970er oder 1980er Jahren.

5 DANKSAGUNG

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Web 2.0 Applications for Collaborative Transport Planning

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1 ABSTRACT

Web 2.0, shorthand for Internet applications that rely on users to generate content and information, has the potential to significantly improve transport systems and operations. However, Web 2.0 applications are not being introduced as quickly in the transportation planning process as in other sectors. The goal of this paper is to encourage greater use of Web 2.0 applications in the transport planning process. The paper begins with an introduction to Web 2.0 and identifies four categories of applications. Next it describes each of these categories and provides transport-related examples. Finally it presents recommendations for developing Web 2.0 applications designed to improve public participation in the planning process and describes a conceptual Web 2.0 application designed to improve public transport operations.

2 INTRODUCTION

2.1 Overview

The Internet has revolutionized the world. It has changed the way people work, socialize, shop, and travel; it has changed the way companies operate, where they locate and how they manage production; it has changed the way government provides services, how we communicate with government and how we influence public policy.

This paper argues that, while most transportation organizations have entered the Internet age, many are barely scratching the surface of the Internet's potential. Almost all transport organizations use the Internet to disseminate information (e.g. public transport schedules), many use the Internet to collect feedback and as part of public involvement programs, but there are very few who use Web 2.0 applications effectively to engage the public in a collaborative process designed to improve planning, construction and operation of transport systems.

The goal of this paper is to introduce some key Web 2.0 concepts and outline how these concepts could be used to improve transportation systems and operations. Web 2.0 refers to Internet applications in which users (help) develop content and/or perform activities. Examples include Wikipedia, blogging, and Facebook.

The rest of this chapter presents a structure for categorizing Web 2.0 applications. Chapters 3 through 6 describe these four categories of Web 2.0 application and provide transportation-related examples. Chapter 7 presents recommendations for creating Web 2.0 applications to improve transportation systems and a conceptual Web 2.0 application that could be used to improve public transport operations. A longer version of this paper is available at: http://www.andynash.com/projects/web2transport.html

2.2 Categorizing Web 2.0 Applications

In order to provide a structure for understanding the key types of Web 2.0 applications this paper classifies applications into one of the following four categories:

- Information Provision – these applications are designed to provide information. A common transport application is public transport schedule information.
- Planning and Administrative Process – these applications are designed to enable users to complete a task, for example provide specific information to a government agency.
- Social Networking – these applications allow users to create interest groups, share information and 'meet' like-minded people. Common applications include Facebook and LinkedIn.
- Analysis and Evaluation – these applications enable users to use website based tools to analyze data. Common applications include 'cloud-based' applications such as Google Documents.

However, it must be emphasized that most specific Web 2.0 applications combine these categories by, for example, including both social networking and information provision in a single application. The following chapters describe each of the categories in more detail and present transport related examples.

3 INFORMATION PROVISION APPLICATIONS

Information provision applications are designed to communicate information to their users. In Web 2.0, third parties can add information to an organization's website and/or application developers can use data made available on the Internet to create their own informational websites. This section describes three main types of Web 2.0 information applications: wikis, personal information sharing, and mash-ups.

3.1 Wikis

A wiki is a website that provides special tools enabling anyone to edit the website pages and to create new pages. The word wiki comes from the Hawaiian word wiki (quick), which was used in the initial wiki-based applications. [1] The most familiar Web 2.0 wiki application is Wikipedia, the open source on-line encyclopedia.

The idea behind wikis is that "crowd sourcing" (i.e. the idea that everyone together knows more than one person alone – even if that person is an expert) can provide accurate information.

There are problems with the open approach used in wikis. For example popular Wikipedia pages have been "hijacked" for political purposes. Therefore most wikis now have a series of safeguards including 'moderators' responsible for helping control the information.

In terms of results, the information quality in Wikipedia is similar to traditional encyclopedias (e.g. Encyclopedia Britannica), but the amount, breadth and accessibility of Wikipedia information is much higher. The Wikipedia story is a fascinating example of development of new socio-technical systems. [2]

3.2 Personal information sharing: Blogs, YouTube, Photo Sharing, Twitter

The second category of Web 2.0 information provision websites are applications that enable users to create their own personal platforms for providing information. These applications allow users to create websites and share various types of media – with practically no limitations. The most important examples are Blogs (applications that enable anyone to create webpages), video sharing sites like YouTube and photo sharing sites like Flickr.

The latest development in the field of personal information sharing is Twitter. Twitter uses short message system (SMS) technology to broadcast 140 character messages from people to websites and directly to other users who 'follow' the broadcaster. Other users can also see messages related to a specific subject by entering the subject in a search box. Messages can be sent and read via the Internet or using mobile telephones. Twitter is growing rapidly and has developed an interesting series of web pages that describe how it can be used in business. [3]

All these personal information applications have tools that enable other users to comment and add information (a must for Web 2.0 applications), so they are a two-way street. The applications also provide tools enabling users to find related information, link to other websites and rate the quality of information (which helps provide some order in the system).

The applications also are designed to enable easily linking user-generated information between applications: for example embedding YouTube videos on your blog or adding links to favorite websites or creating Really Simple Syndication (RSS) feeds of your blog. It is also possible to use features like Google Maps to geographically tag (i.e. locate) information. All these features are (relatively) easy to use and are provided for free (at least for now).

Finally, it is important to note that companies and organizations are now using these Web 2.0 information applications to promote their views. In fact, smart companies have embraced the idea of Web 2.0 and are using these applications to improve their products and services. [4] The best approach is to think of developing Web 2.0 applications as you would starting a business, namely aim to be the best in your field. [5]

3.3 Mash-ups

A third type of Web 2.0 information provision application is a "mash-up". A "mash-up" is an application that combines information from several sources to create some new information. Most of the information used in

a mash-up application comes from data made available on the Internet and often mash-ups are created by developers from outside the data-providing organization.

For example, an independent application developer might combine data from BART with data from a business locations database to map the closest coffee shops to all BART stations on Google Maps. (Or Starbucks might map all its stores and include special information about each store.) These examples show the importance of data access for mash-ups.

Some government agencies have been very innovative in the providing data for mash-up applications. Great Britain initiated a program called Show Us a Better Way (www.showusabetterway.com) in which people described the application they wanted to develop and the data they needed to create it. In Washington DC, the Apps for Democracy (http://www.appsfordemocracy.org/) program held a similar competition to identify the best 3rd party applications that could be developed using public data (the city offers a data feed of almost all the data collected: over 400 different data sets). It is interesting to note that many of the applications developed in both the Show Us a Better Way and Apps for Democracy programs were transport related.

4 PLANNING AND ADMINISTRATIVE PROCESS APPLICATIONS

Planning and administrative process applications are designed to enable users to "help" the application owner complete a specific task.

In Web 1.0, users could provide input to processes by sending e-mail or filling out comment forms. Another approach was completing government forms on-line using applications including Adobe Acrobat. Many of these systems are not very creative, simply mimicking the traditional paper-based planning process, which shows that there is room for innovation.

Web 2.0 applications ask users to provide more detailed information and actually process this information to complete a task. Many of these applications fall under the general term "crowd sourced" meaning that the information they provide comes from many independent people acting together.

The best way to understand these applications is to describe examples of how they are being used, therefore the following sections outline several types of planning and administrative applications and present examples of transportation related sites.

4.1 SeeClickFix – Crowd sourced problem identification

SeeClickFix (http://www.seeclickfix.com) is a Web 2.0 application that enables people to identify non-emergency issues (e.g. potholes), describe them in detail (e.g. include photos) and place them on a map (from Google Maps). Once the issues are identified and placed on the map, other users can 'vote' for the issue (i.e. give their opinion on how serious the issue is) and add more information. The application's goal is to attract attention from the responsible public agency, which would then address (fix) the issue.

4.2 Cyclopath: Crowd-sourced Recommendations

One of the most common Web 2.0 applications are websites that encourage users to provide recommendations. For example rating restaurants or videos. Furthermore, incorporating the ability to rate information quality is fast becoming an important tool for all types of Web 2.0 applications (e.g. Amazon's star system). According to Noveck, many organizations are using bubble-up techniques like rating to improve the quality of information they collect and make available. [6]

An interesting transportation application of crowd sourced recommendations is Cyclopath. Cyclopath was developed by the University of Minnesota to help users "Find bike routes that match the way you ride." According to their website, "Cyclopath lets you enter personal bikeability ratings for roads and trails. This unique rating system helps find the best routes for you, while also supporting the community with your individual knowledge.

Cyclopath is a geowiki: an editable map where anyone can share notes about roads and trails, enter tags about special locations, and fix map problems - like missing trails. Hundreds of Twin Cities cyclists are already doing this, making Cylopath the most comprehensive and up-to-date bicycle information resource in the world." (www.cyclopath.org) [7]

4.3 Crowd-sourced planning applications

A third type of planning and administrative process application are websites that enable people to assist in the process of actually preparing a plan. There are two basic approaches: providing tools to help improve the input process, and providing tools that enable users to actually participate in the "plan writing" process.

The first approach, facilitating public input, uses Web 2.0 tools to extend many traditional ideas for obtaining public input into the Internet age. This is not a trivial achievement since Web 2.0 tools enable a much broader participation in the fullest sense. There are two key advantages: first, the tools are available for everyone who has Internet access; and second, they give planners the ability to collect and analyze detailed information from many people. The main problem is ensuring Internet access for all, but there are solutions for this problem including public library access etc. Finally, as outlined below in the recommendations, websites must be very carefully designed to encourage participation (using strategies like incentives, easy to use interfaces, breaking work into small segments, etc.) and to make the information gathered useful for planners.

A good example is San Jose's Wiki Planning Project. San Jose California is using a set of tools called wikiplanning to increase and improve citizen input for development of the city's Envision 2040 general plan project. [8] The Wiki Planning name is somewhat misleading since there is no Wiki per se involved, but rather a series of Web 2.0 applications linked into a convenient package. Wikiplanning's creators call the approach "The Virtual Design Charrette" and describe Wikiplanning as "... an online solution for improving civic engagement, an important component of most urban planning initiatives. ... [9] The site is a good attempt to put several Web 2.0 applications together in a user friendly way to encourage participation in developing this plan. It will be interesting to see how this works out from a practical perspective.

The second approach, tools that enable users to help actually prepare plans, extends the concept of public participation even further. The clearest example is to create the plan using a wiki; anyone could enter information. A good example is the Pittsburgh Regional Integrated Transportation Plan. Here, the crowd is actually writing the plan. A group called Pittsburgh CitiWiki Project has developed a wiki that focuses on improving the quality of life in Western Pennsylvania. CitiWiki is viewed as "an experiment in collaborative creativity conceived and created in the community." (http://www.pghwiki.org/wiki/index) CitiWiki's first project is to draft a crowd-sourced regional transportation plan using a wiki template. As with many of the applications discussed in this paper there is a great deal of idealism involved in the CitiWiki project.

5 SOCIAL NETWORKING APPLICATIONS

Social networking applications are the most familiar Web 2.0 application. The most popular include Facebook, MySpace, LinkedIn and XING. There is even an application called Ning (http://www.ning.com/) that enables people to create their own social networks.

Social networking applications are still in their infancy. It's clear that they are important, but unclear exactly how they can be used most effectively. However, in spite of this problem, social networking is a powerful tool that can improve two-way communications with all types of users and thereby help improve the development and operation of all types of transport systems.

There are three main types of social networking applications: purely social, professional and social networking tools that are provided on application websites designed to create a "community" around the application-specific purpose (e.g. a social network of people contributing to the StreetsWiki website). This chapter describes each type of application using an example site.

5.1 Facebook

Facebook (www.facebook.com) is the most popular social networking application. Facebook was originally designed for truly social connections (i.e. friends, classmates, etc.) but is expanding to include more and more business relationships. It currently has over 300 million members, 70% of whom are from outside the United States. More than 8 billion minutes are spent on Facebook every day and surprisingly, the fastest growing demographic group on Facebook are people over 35-years old. Facebook's growth and impact is impressive especially considering that it did not even exist several years ago.

One key feature of all social networking applications is the ability to join and create groups of people with similar interests. There are "more than" 500 groups found in a search of Facebook groups under the term "Transportation Planning".

It is easy to see how a Facebook group could be used effectively to generate interest in transport planning. However, the group would need to be actively managed and need to have something to generate interest, e.g. a major government planning process or policy issue.

5.2 LinkedIn

LinkedIn (www.linkedin.com) is a professionally-oriented social networking site (another popular example in Europe is Xing). Professionally oriented social networking sites are designed to help users make connections with other professionals with whom they can trade information such as job opportunities, technical data and news. As of February 2010, LinkedIn has over 60 million members in over 200 countries around the world with approximately half the members from outside the U.S. [10]

An important part of professional social networking sites are professional groups. These consist of people who are in the same general profession or have similar interests. Any member can start a group and there are groups (often multiple groups) in almost any profession imaginable (there are also interest groups such as college alumni associations etc.). LinkedIn currently has almost 529,500 groups, the largest has over 235,000 members. Many of the largest groups are human resources professionals and much of the activity in all groups is employment-related. There are currently 927 groups listed under the subject of transportation (February 2010).

It is fairly easy to imagine how professional social networking sites could be used to help in the employment process. On the other hand, the effectiveness of non-employment related information exchange is highly variable depending on the group. As with many organizations often a few people do most of the work starting discussions and posting items. Others participate intermittently.

There are two main problems with using the LinkedIn groups to exchange information. First, there are just too many groups. Participation is scattered. Oddly, even with so many groups, many are not really specialized: there are often several groups on the same subject. Second, most groups do not have enough people willing to help lead and control discussions.

Both these problems rise from the lack of time available to fully participate in activities that are not directly targeted to an individual's specific objectives (e.g. job responsibilities). If groups were more focused on specific areas it might be possible to generate a more constructive dialog and better information exchange.

5.3 Integrated social networking tools

Integrated social networking tools are applications that are included as part of a Web 2.0 Internet website that enable those using the site to create an application-specific social network. In this case the social network is highly focused on the goals and objectives of the specific application. These tools encourage social networking on several different levels – depending on the degree of social networking they are designed to foster.

At the highest level (i.e. in situations where the application developers want to stimulate a great deal of social networking), application developers offer a full suite of tools are designed to faciliate two-way communications and information sharing. A good example is the LivableStreets Initiative Community (part of the Livable Streets Initiative www.livablestreets.com). Currently there are almost 5,200 members of this social network (as of February 2010). The LivableStreets Initiative also compiles blog postings from almost 350 'members' to a website and this community gets involved in discussions on various topics.

At the medium level, application developers include tools that enable users to recommend news articles or websites such as del.icio.us, digg, or StumbleUpon. These websites all allow people to comment on comments made by other users and enable people to 'follow' recommendations made by users they select.

At the lowest level of social networking are subscription tools. Subscription tools enable people to directly receive internet-based information when it is posted. The best analogy is a periodical subscription. Good examples include really simple syndication (RSS) for blogs and 'following' in Twitter. These are classified

as simple in the sense that they are not (necessarily) two-way (I may follow you, but you might not follow me).

The trend is for Web 2.0 Internet websites to use all three types of social networking website tools, thus providing something for any level of social networking engagement that the user desires.

6 ANALYSIS AND EVALUATION APPLICATIONS

Analysis and evaluation applications are applications that enable users to enter data and use website-based tools to evaluate and manipulate that data.

There are many types of Internet websites that fall into this category. They range from very simple websites that, for example, allow you to calculate currency conversions (www.xe.com), to more complicated websites that provide users with business applications like spreadsheets, word processing and presentations as well as the ability to save data and collaborate with others on the same documents (e.g. Google documents).

Websites that provide access to applications and enable users to store and share data are often referred to as "cloud" based computing (the data and analysis tools are stored 'in the cloud' rather than on your computer). The model is software as a service rather than a product that comes wrapped in a package. A huge advantage of cloud-based systems for companies and people working in groups is that everyone is using the same program version and IT maintenance is done centrally – reducing the need for local technical support.

Cloud-based computing can be either free (e.g. Google documents) or subscription-based (e.g. Salesforce.com) in which users pay to use the applications and data storage provided by the application vendor. Salesforce.com is a popular customer relationship management (CRM) application that was among the first companies to embrace the concept of cloud-based computing. Today most subscription-based applications are oriented towards the corporate market, but there is continuing speculation that programs widely used by individuals (e.g. Microsoft Office) will be replaced by cloud-based subscription systems.

In addition to traditional business-oriented applications such as spreadsheets, there is another type of complex analysis and evaluation application on the cloud: games. While games may strike some as trivial, it is argued below that games can, in fact, be a key element in Web 2.0 applications used to improve transport systems and operations.

Games are especially useful since they can attract users and encourage them to participate. For example, some marketers are now using on-line games to analyze and evaluate data. Furthermore, games can serve as a good educational tool. One application that uses games to help understand transport planning is the University of Minnesota's Gridlock Buster game.

6.1 Transport related analysis and evaluation applications

Transport managers and planners can use all types of analysis and evaluation tools that are available on the Internet. These tools could be used, as in other businesses, to replace existing systems, encourage collaboration, increase efficiency and reduce costs. These types of uses fall under the category of general management and therefore will not be further discussed here.

In addition to the general business applications, many transport services already provide analysis and evaluation applications on the Internet, for example public transport schedule and direction finding websites. Many of these direction/schedule websites currently fall in the very simple category (returning a specific result based on the user input) although they are being extended to provide more information (e.g. real time, multimodal, etc.), to accept more varied user inputs, and to be available on more devices.

The San Francisco Bay Area Metropolitan Transportation Commission's transportation information website (www.511.org) is an excellent example of a website that has been continuously improved to include more features and applications (including information on transportation data feeds, 3rd party applications and information about public participation). One shortcoming is that the website does not include real interactive tools to help improve transportation planning.

Another extension of transport applications is their integration with user-provided information, for example driving instructions from Google Maps. These maps can also show user-provided photos, reviews of businesses and comments.

While it is clear that these analysis and evaluation applications can be extended, their main function is providing relatively simple information designed to answer questions from users. The next section describes more complex applications intended to enable users to perform more complex analysis and evaluation tasks.

6.2 Using on-line games to improve transport systems and services

Many people consider computer games to be a waste of time, but there is growing recognition among Web 2.0 application developers that computer games may provide an excellent source of information and could be used to generate creative problem solutions. In this sense it's important to remember that transport simulation programs are essentially games, so maybe the idea that games can be useful is not so far fetched.

In fact, there are already many on-line games that include transportation planning elements (even players of the very popular Worlds of Warcraft on-line game have access to many forms of transport including riding various creatures (mounts), boats, zeppelins and an underground tram, there is even a public transport page). [11]

As mentioned above, some marketers are using computer games to collect information and to create excitement for their products (e.g. games related to new motion pictures). There are also a large number of games designed for educational purposes. There is also a whole series of simulation games for transport system and city building. Finally there are the alternative reality websites which are not really games, but share some game features and can be used to help complete analysis and evaluation tasks.

Since computer games are essentially simulations, it should be possible to extend games so that the players can simulate real-life rather than pretend situations. Alternatively, transport simulation programs could be made simpler so that anyone could use them, or the two could meet in the middle. In fact, according to Wired magazine, Mark Gorton (a key LivableStreets Initiative supporter) is also developing applications for open source citizen based planning (although the article did not give details). [12]

It would be very interesting to develop games based on real transportation simulation models and enable users to use these games with actual data that they collect. This could make everyone a transportation planner just as blogging can make everyone a news reporter. The technology is available. Such a system would totally change the nature of public participation in transport planning process.

This section presents several examples of on-line transport planning games that could serve as models for creating games that analyze real-world transportation systems and help the public identify innovative new ideas.

6.2.1 Gridlock Buster

Gridlock Buster is an online traffic control game developed by the Intelligent Transport Systems Institute at the University of Minnesota's Center for Transport Studies. [13] The game was developed based on standard traffic engineering tools and techniques.

In Gridlock Buster players control traffic and receive feedback based on vehicle delay and the length of queues formed at traffic signals. Players move through different levels of challenges and 'compete' to improve their scores.

Gridlock Buster is designed as a teaching tool to help explain how traffic is controlled on roadway networks. This will be helpful to citizens wanting to learn more about traffic congestion. Furthermore, the website includes an invitation for high school students to visit the ITS Institute labs and learn more about transportation planning. As such it's a great way to attract young people into the profession.

6.2.2 Urban Planning and Transportation Simulation Games

There is a whole category of on-line computer games that allow users to design imaginary cities and transport systems. Perhaps the first was SimCity, which has now grown to include various different games and modules. [14]

6.2.3 Portland Oregon Metro: Build your high capacity system

The Portland Oregon area's regional government, METRO, (http://www.oregonmetro.gov/) developed the "Build your high capacity system" tool to help citizens understand the trade-offs involved in planning high

capacity public transport systems (e.g. budget constraints!). It was developed during preparation of the region's High Capacity Transit System Plan.

According to the Metro website: "The build-a-system tool lets you compare each of the transit corridors being evaluated by the project team. The corridors could, individually or in combination, connect places within the region with high capacity transit. With this tool you can compare how each corridor performs and learn about the benefits and costs of the system you've created." [15]

It is perhaps unfair to consider this a “game” since it falls in a gray area; it’s a game in the sense that it is a fun way to learn about an important subject, and it’s reality in the sense that it’s backed up with real data for a specific area. Furthermore it was used to help Portland develop a plan for improving their public transport system; over 4,200 visited the website (and over 600 answered a survey associated with the page).

The build-a-system tool is a relatively simple application in the sense that users can only choose between specific routes, so it works by simply summing the data on cost, ridership, and environmental benefit in its database for the lines selected by the user to be included in their network. Still, it enables users to compare lines and networks and clearly illustrates the concept of a limited capital budget.

Finally, in true Web 2.0 fashion the site creators have also incorporated outside (3rd party) applications into the website. Users can click on a neighborhood center icon to get a pop-up with tabs for “map” (which displays a Google satellite map) and “info” which has a link to the walkscore website described above. (www.walkscore.com).

7 CONCLUSIONS: CREATING WEB 2.0 APPLICATIONS TO IMPROVE TRANSPORT SYSTEMS AND OPERATIONS

The previous sections describe the fundamental principles used in Web 2.0 and several trailblazing transport related applications. This section presents recommendations for creating Web 2.0 applications that will improve transport system planning and operations.

7.1 Public involvement, the guiding principle

The innovation that differentiates Web 2.0 from early Internet sites is user involvement. The previous chapters have described some of the main types of user involvement including commenting, sharing photos and videos, rating quality and playing games, but the main point is that in Web 2.0 users are involved in the process of creating information.

While the standard public involvement program for transportation planning projects has been significantly improved over the years since these programs were mandated, it is hard for anyone involved in the process to believe that it works well. Here, then, is the opportunity for Web 2.0 applications.

Noveck calls the problem “the single point of failure”, specifically, decision-making systems based on the belief that government experts can identify the best solutions to problems. Today the public can become involved in the deliberative part of this process by talking at public meetings etc., but new technology means that they could, in fact, really collaborate in the process of developing the solutions, rather than simply commenting. She emphasizes that citizens have a great deal of expertise that they could contribute to this process, if there was a way. She goes on to describe an application called Peer-to-patent, which enables people to help provide information to the US Patent Office that helps them make decisions. [6]

In summary, the goal is to improve the quality and operation of transport systems by creating collaborative public processes using Web 2.0. While it is possible to establish collaborative public involvement processes without using Web 2.0 applications, these applications make collaboration much easier. The next section presents recommendations for developing these types of applications.

7.2 Recommendations for Web 2.0 transport applications

The most important thing to understand about Web 2.0 is that it will revolutionize your business. Old ways of doing business simply don’t work when information is more easily shared.

Some businesses have tried to fight change, for example, record companies suing people for sharing music. Others, like newspapers, are watching as their business models are destroyed. But clever companies are embracing change, building new business models based on using new technologies to build better products

and offer improved services. It's not so different from other technical revolutions, although it's happening faster.

The following recommendations are intended to help those involved with government planning agencies begin thinking about how Web 2.0 applications can help them develop new business models.

- Embrace Web 2.0 – This means making your data easily available to the public, encouraging developers from outside the organization to use your data to create applications, and creating applications that engage the public in a collaborative process designed to improve your business.
- Design counts – good design is needed to attract and keep people using your website.
- Don't reinvent the wheel – There are many attractive, well designed and reliable Web 2.0 applications already available. These applications can be used as is or modified for specific uses.
- Use an integrated approach – An organization's Web 2.0 presence should include all the types of applications needed to achieve its goals. Figure 1 presents a model for an integrated approach to creating a website for collaborative transportation planning.
- Maintenance matters – Almost everyone underestimates the time and effort required to maintain an attractive website.
- Provide free access to information
- Carefully consider information organization – Tools are needed to make organization of information easier and for consistent editing (by users and application developers).
- Obtain sufficient funding
- Provide incentives for participation

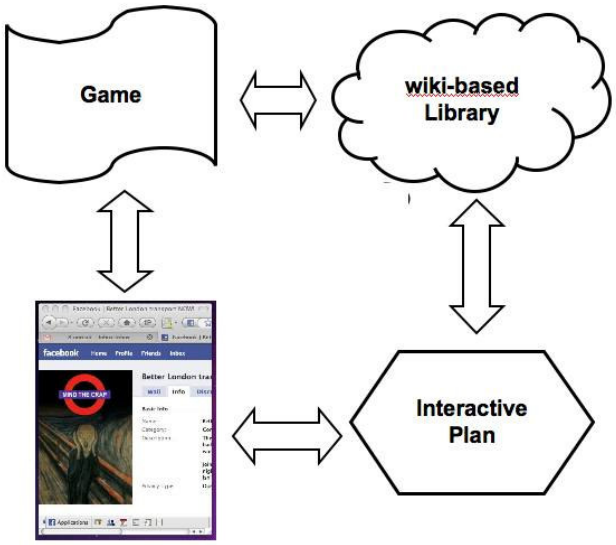

Fig. 1: Four element model for collaborative transportation planning website.

The next chapter presents a concept for a website based on these recommendations.

7.3 Improving public transport operations: Bus Meister

This section presents an example Web 2.0 application called Bus Meister. Bus Meister is designed to test the concept of developing an integrated Web 2.0 application that enables citizens to collaborate in the process of improving the operation of buses and trams that run on the street. If the application is successful it could be expanded to include other modes of transport and actual street design.

Bus Meister was developed using many of the principles discussed in this report. It consists of a game allowing players to understand how operating changes can improve public transport service and enabling them to test ideas for improving service on their own routes. The game is based on data from a wiki documenting public transport operations best practices. Finally, Bus Meister helps get good ideas

implemented by providing social networking tools designed to help users generate political support for improvements. [16]

Bus Meister focuses on public transport priority measures. These are cost effective measures designed to increase public transport attractiveness by speeding-up buses, streetcars and trains. Public transport priority measures are excellent ways to improve transport because they are inexpensive and can be implemented quickly. [17] [18]

7.3.1 Research Database

Bus Meister's foundation is a crowd sourced wiki database presenting best practice information on three levels: detailed, technical summary and public summary. At the detailed level, researchers and transport professionals would enter information about their projects (abstract, contacts, links, etc.). The technical summary pages would focus on a specific subject area (e.g. bus stop design), researchers and professionals would edit these pages based on results of their projects.

The public summary pages would describe research in plain language. Moderators would maintain the summary pages and create the initial public summaries. These pages would include links to various media including videos, photos and presentations. As a wiki, all registered users could contribute to the information.

In addition to its educational purpose, the database will improve research quality by providing a single location for information on public transport priority. The wiki format means that the database will be a real-time state-of-the-art summary enabling researchers to identify fruitful areas for research and providing them with an effective dissemination platform (which will provide an incentive for them to participate).

7.3.2 Bus Meister Game

The Bus Meister game allows players to examine the impacts of public transport improvements on their own public transport routes. The game will both teach users about public transport operations and help them assess the value of their ideas.

First players would enter information (e.g. travel time, location of bus lanes, etc.) about their public transport route into the game using an interfaces developed with Web 2.0 applications (e.g. Google Maps). Applications would be developed for smart phones to facilitate this process. Players would collaborate in creating these route maps. As more information is added, the maps will become quite accurate. Progressive government agencies would make route and street data available immediately.

Once route information was on-line, players could test their improvement ideas by dragging improvement widgets on to the route map and the game would estimate the benefits and impacts. For example, the player could add traffic signal priority by dragging the "public transport priority signalization widget" onto the route map at the intersection.

The improvement widgets would be based on the research in the database (e.g. traffic signal priority reduces time spent at traffic signals by 20%). The game would apply data from the widget to the specific route (e.g. buses spend an average of 60 seconds waiting at this intersection) to estimate the benefit and impacts (e.g. on cross traffic).

The description above sounds simple, unfortunately it's not. A complicated transportation simulation model would be needed to accurately evaluate the full impact of an improvement and this is probably too much to expect, at least initially. Therefore, the game will be designed at different levels; the first level would be very simple, focusing only on the change in bus performance. As the application became more sophisticated more detail could be added (e.g. impact on cross traffic). This is not a problem as long as the quality of game results at each level are clearly communicated and understood.

7.3.3 Bus Meister Social Networking Tools

A full suite of social networking tools would be integrated into Bus Meister so that users could create communities to further their goals. Bus Meister would have two main types of users: people interested in making their public transport systems work better and professionals working in public transport (operators and researchers).

The first type of user, people interested in making their public transport work better, will typically be public transport advocates in specific regions. They would use Bus Meister's social networking tools to share information, collaborate on identifying improvements for routes, encourage others to participate by providing feedback on ideas and organize events like contests to develop the most effective measures for a given route.

An important role for these communities is providing feedback to fellow users – many websites fail because no one ever responds to comments. [4] Since it would be impossible for public agencies to respond to all the ideas generated by users, these communities would evaluate ideas and only recommend the best ones for further study.

Finally, these local communities will also generate political support for improving public transport. These communities would be similar to those currently organized around the Livable Streets Initiative and SeeClickFix, but it is also easy to see someone starting a Facebook group dedicated to improving a particular public transport route with information from the latest Bus Meister game evaluations.

The second type of user, transport operators or researchers, will use Bus Meister's social networking tools to improve public transport services and research quality. More specifically, public transport operators could contact researchers with questions, and researchers could ask professionals to evaluate the practicality of research ideas and/or to field test ideas.

Since, the non-professionals will generate totally new ideas for improving public transport. This type of customer-driven innovation is likely to develop innovative ideas that professionals don't see because they are too close to the subject. Bus Meister's social networking tools will also allow these promising ideas to be considered for more detailed study.

7.3.4 Developing and Implementing Bus Meister

Bus Meister is currently a research concept developed by the author of this paper. A more detailed description is available at www.andynash.com/busmeister/. There are two potential approaches to implementing the concept.

The first approach would be to develop Bus Meister as part of a research study. The research would have two main objectives: first, providing a useful Web 2.0 application for improving public transport service; and, second, developing a better understanding of how Web 2.0 applications can be used to improve transportation systems and operations. This second objective would be completed by paying close attention to the process of developing the actual application. A formal research proposal will be developed once a suitable funding opportunity is identified.

The second approach would be to test individual components of Bus Meister in more focused projects. These projects might be part of a public transport operator sponsored project. For example, a simple Bus Meister game could be developed as part of the public involvement process for identifying transit priority improvements on a given corridor (analogous to Portland Metro's Build-your-own-high-capacity-system game discussed above).

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Web 2.0 in Lehre und Forschung – Chancen und Potenziale für die räumliche Planung

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1 ABSTRACT

Das vergangene Jahrzehnt wurde geprägt durch das Entstehen eines neuen Modus des Internets – dem Web 2.0. Von den vielen Bereichen, welche durch diese Umwälzung betroffen sind, stellt die Planung auch keine Ausnahme dar. Eine große Chance besteht darin zu erkennen, in wie weit eine Inwertsetzung und Nutzung dieser kollaborativen Inhalte für planerische Zwecke erreicht werden kann. Diese neuen Anforderungen an die Daten- und Kommunikationsorganisation eines beidseitigen Informationsflusses stellen auch ein interessantes Untersuchungsfeld in universitärer Lehre und Forschung dar. Das dargelegte Beispiel zeigt eine Idee, wie Blogs samt ihrer flexiblen und modularen Funktionalität (Twitter, mobile Applikationen, Google Earth etc.) zu einer effektiveren Schnittstelle zwischen Studierenden und Hochschule werden können und damit auch ein hilfreiches Instrument in der Publikation wissenschaftlicher Arbeit. Hierbei wird ein beispielhafter Wandel im universitären Lehr- und Lernumfeld aufgezeigt. Zudem wird eine Win-win-Situation geschaffen, denn nur durch Offenheit gegenüber neuen Entwicklungen (Geoweb, Web 3.0 etc.) sowie die Einbindung der Studierenden und deren Ideen in Lehre und Forschung kann ein produktiver Umgang mit sich neu entwickelnden Methoden erreicht werden.

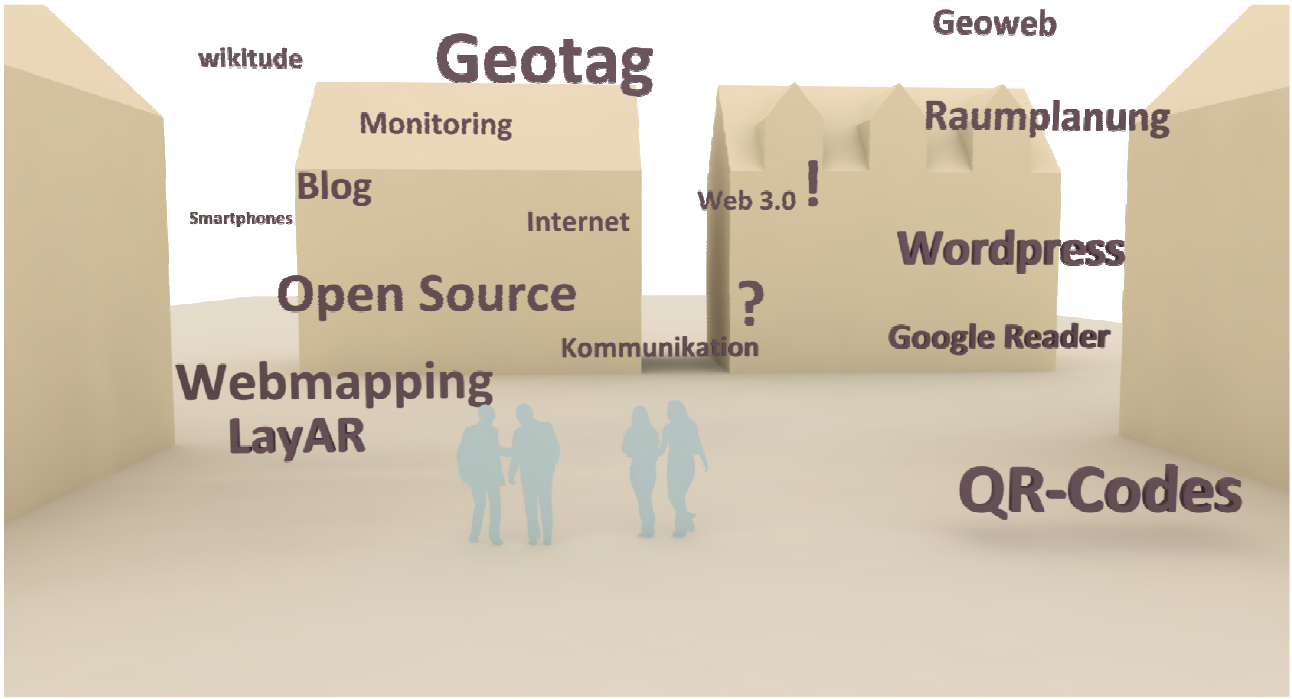

Fig. 1: Spannungsfeld von Web2.0 in Lehre und Forschung

2 EINLEITUNG

Warum sollten Studierende, Lehrende und Forschende das sogenannte Web 2.0 nutzen, beziehungsweise, was macht den Reiz aus, traditionelle Pfade der Wissensvermittlung zu verlassen und neue – in manchen Augen auch vielleicht „falsche“ – Wege einzuschlagen bei der Bearbeitung und Publikation von Projekten und der Präsentation deren Ergebnissen? Die Idee, Studierende„bloggen“ zu lassen, ist nicht neu. Der Medienwissenschaftler Stefan Büffel lässt seine Studierenden schon seit 2007 den Blog als Instrument der wissenschaftlichen Arbeit nutzen. Büffels Theorie dahinter, auch wenn sie trivial erscheinen mag: „Wer drüber (wissenschaftlich) fundiert reden will, muss an die Front, es selbst (er)leben und nicht nur in

(halb)schlaue Bücher gucken. Möglicher Einspruch: Distanz zum Gegenstand geht verloren. Möglicher Widerspruch gegen den Einspruch: Wer den Gegenstand nicht kennt, kann auch keinen Abstand gegenüber "Unbekannt" aufbauen. Nein, Involvement ist gefragt und es geht darum zu erleben…[Büffel 2007]". Büffel argumentiert aus seiner Lehrerfahrung heraus, dass durch den Einsatz von Weblogs in der Lehre verblüffende Erkenntnisse entstehen können, wenn z. B. die Studierenden plötzlich Kommentare zu ihren Wissenschaftsblogs von extern in den „Elfenbeinturm" geschickt bekommen, dass innerhalb der Seminare aussagekräftige Tagclouds entstehen können und auch das Wissen zu einem Thema in sogenannten Wikis von allen zusammen getragen wird. Das Arbeiten mit Blogs bringt vor allem „Zeit zum Diskutieren" und stärkt die Diskussionskultur, die teilweise an den Universitäten – zumindest in seinen Augen – schon sehr zum Erliegen gekommen ist. Seiner Meinung nach bringt das Arbeiten mit Blogs ein Zugewinn am Spaßfaktor in der Materie [Büffel 2007]. Auch hier zeigt sich, dass der „homo ludens" – der spielende Mensch, eine Triebfeder für Innovation ist, die, im Kontext mit digitalen Methoden eine neue Auffassung von Planung- und Planungskultur mit sich bringen kann und wird [Streich 2005:190].

2.1 Web 2.0?

Doch was verbirgt sich hinter diesem ominösen Label „Web 2.0"? Wie ist es Studierenden oder auch Kollegen aus der Planung einfach und verständlich zu erklären, was dieses „Web 2.0" ist? Fakt ist, dass jeder, der sich heute im Internet bewegt, bewusst oder unbewusst mit Web 2.0 in Berührung gekommen ist. Sei es unbewusst durch die im Hintergrund laufende AJAX –Technologie (Asynchronous Javascript and XML), die es erlaubt, Inhalte permanent auf dem neusten Stand zu publizieren, oder durch die Benutzung einer der Social Communities wie FlickR oder auch Facebook.

Unglücklicherweise wird das Label „Web 2.0" oftmals auch einfach als innovatives Verkaufsargument benutzt, weil es in aller Munde ist und es nach neuer Technologie und Innovation klingt. Fakt ist jedoch, dass der Begriff in seiner ursprünglichen Form eine Zustandsbeschreibung der Dienste im Internet beinhaltet, und welche Dienste oder Geschäftsmodelle zukünftig erfolgreich sein könnten [vgl. dazu O'Reilly 2005]. Für den Benutzer selbst sind vor allem die sogenannten Weblogs, kurz Blogs, Podcasts und Wikis interessant, da sie es jedem erlauben, schnell und mit einer potenziell großen Reichweite eigene Inhalte zu erzeugen. Diese, auch „User Generated Content" (ugc) genannte Möglichkeit der Publikation ist das Herzstück des Webs 2.0.

Das Entstehen des Weblogs gehört wohl zu den wichtigsten Entwicklungen [Höffken 2009b] im Web 2.0. Geprägt wurde dieser Begriff, der eine Kreation aus den Worten „Web" und „Logbuch" ist, 1997 von Jørn Barger geprägt [Schmidt 2006]. Gekennzeichnet ist der Blog durch die „häufig aktualisierte Webseite, auf der Beiträge in chronologischer Reihenfolge erscheinen, wobei die jeweils neuesten Beiträge an oberster Stelle erscheinen. [...] Diese Beiträge können dann von den Besuchern eines Weblogs kommentiert werden. Zudem zeichnen sich Blogs dadurch aus, dass sie untereinander stark vernetzt sind" [BMI 2008]. Alle Blogs zusammen, die untereinander vernetzt sind, werden auch die „Blogosphäre" genannt [Höffken 2009b].

Einhergehend mit den Blogs müssen auch die sogenannten RSS-Feeds genannt werden. RSS-Feed steht als Abkürzung für Really-Simple-Syndication, und kennzeichnet automatisch generierte Dateien von neu entstandenen Inhalten, die von den Webseiten bzw. Blogbetreibern über Feeddienste zur Verfügung gestellt werden. Ist ein User an einer bestimmten Website besonders interessiert, so abonniert er diesen RSS-Feed, und bekommt dadurch mithilfe eines RSS-Readers automatisch die neusten Beiträge der Webseite oder des Blogs zugestellt, ohne diesen speziell aufrufen zu müssen [Ruffing 2009:79]. Reader Technologien sind in verschiedenen Ausführungen verfügbar: Als eine im Internet verfügbare Anwendung, die mittels Browser aufgerufen werden kann (z. B. der Googlereader[1]) oder softwareseitig, bei der die RSS-Feeds auf dem PC, einem Smartphone oder im E-Mail-Client angezeigt werden. Zusätzlich ermöglicht die RSS-Technik die Übertragung einfacher und standardisierter Datenformate auf andere Webseiten sowie Applikationen und ermöglicht dadurch Neuigkeiten über verschiedene Webseiten schnell zu verteilen [Ruffing 2009:79].

„Die RSS-Technologie ist wichtiger Bestandteil des Social Web. Inhalte verschiedenster Webseiten oder Blogs werden dezentral bereitgestellt und können anderweitig (z. B. in Mashups) genutzt werden. Darüber hinaus unterstützt diese Technologie die Vernetzung verschiedener Webseiten durch die Verknüpfung der Inhalte zu „Strängen". Neue Einträge des Destinationsblogs lassen sich per RSS-Feeds auch in einer Social Community, wie z. B. Facebook, mittels einer Anwendung veröffentlichen [Ruffing 2009:80]".

[1] http://www.google.de/reader/

2.2 Einsatz von Blogsystemen

Der Vorteil von Blogsystemen liegt auf der Hand: Sie sind sehr schnell verfügbar, wenn der User sich für einen Blogdienst entscheidet[2] bzw. lassen sich auf dem eigenen Server bei Verfügbarkeit von Apache und MySQL innerhalb von fünf Minuten installieren[3]. Fundierte Kenntnisse in HTML, PHP oder auch über Funktionsweise eines Servers werden nicht benötigt. Prinzipiell wird erstmal kein eigener Server mehr für Blogsysteme gebraucht, das Administrieren von Servereinheiten fällt für viele Nutzer weg. Dies erklärt auch den Erfolg von Blogs als Distributionskanal, denn sie sind leicht zu bedienen, Inhalte werden in sekundenschnelle im Internet veröffentlicht.

Bedient man sich eines Blogsystems auf einem eigenen Server, so sind diese, ähnlich einem Content Management System, individuell anpassbar. Unabhängig davon, wo der Blog gehostet ist, ist die Idee, in fünf Minuten zur eigenen Homepage zu kommen, damit umsetzbar.

Momentan werden Blogs grob in drei verschiedene Arten von unterteilt: Das Blog privater User als eine Art „Online Tagebuch“, das Corporate Blog [vgl. Zeit 2006] und Blogs für den sogenannten Grassroot Journalism (Graswurzeljournalismus) [vgl. hierzu Gillmor 2004]. Hinzu kommen neue Tendenzen wie das sogenannte „Micro Blogging“, gekennzeichnet durch Dienste wie „Twitter“ oder „identi.ca“. Durch den Vorsatz „Micro“ wird auf die Größe der Textnachricht mit 140 Zeichen verwiesen. Dies können reine Textnachrichten oder ein Link[4] sein. „Vorteil dieser Dienste ist die hohe Publikationsfrequenz, da eine solch kurze Nachricht viel schneller verfasst ist. Jeder Nutzende kann die Nachrichten anderer Nutzer abonnieren (wird dann ein sogenannter Follower) und kann diese dann lesen. Aufgrund der Kürze können die Nachrichten auch mobil von unterwegs per SMS verfasst und publiziert werden, sodass der Nutzende nicht mehr an seinen Rechner gebunden ist“ [Höffken 2009b:12].

Werden Inhalte auf Blogs gerade im Wissenschaftsbereich noch teilweises als „nicht zitationswürdig“ klassifiziert [z. B. bei Wiltinger Wiltinger 2006:24, gegenteilige Meinung z. B. Scheloske 2007], so gibt es dennoch Entwicklungen, die den Blog als ernst zu nehmende, wissenschaftliche Quelle ansehen. Die deutsche Nationalbibliothek bezeichnet den Blog als eine Form der Publikation (Internetpublikation), sofern die Artikel fachlich informativ und daher öffentlich interessant sind [Schwens & Wiechmann 2009]. Wichtig ist also, wer hinter der Publikation steht. Internetquellen und elektronische Ressourcen können, bei entsprechender Dokumentation durch Screenshots oder das Erstellen von PDF’s als Quellennachweis als wissenschaftlich korrekte Quelle angegeben werden [vgl. hierzu Streich 2005:13 und Urban-IS 2005, sowie Hinweise zur korrekten Zitierweise von Webressourcen University of Alberta 2002].

Um bei der verfügbaren Vielfalt des World Wide Webs wissenschaftlich seriöse Blogger besser zu erkennen, wurden zum Beispiel die „Hard Blogging Scientists“[5] gegründet. Die Bloggin‘ Scientists verpflichten sich, Inhalte auf ihren Blogs nur unter gewissen Voraussetzungen zu publizieren, um einen Qualitätsstandard zu erfüllen. Beispielhaft ist hier zu nennen, dass Inhalte des Blogs aus dem eigenen Forschungsumfeld kommen, das Blog als Forschungsinstrumentarium angesehen wird und dass die Forschungsarbeit des anderen geachtet wird und dementsprechend auch im Blog so zitiert wird [für das komplette Manifest siehe: Hard Blogging Scientists 2006/10].

3 BLOGS IN DER LEHRE

Nach den Richtlinien der „Hard Blogging Scientists“ wird dementsprechend auch die Internetpräsentation der Studierenden aufgebaut. Ein Schritt weiter gehen die Bestrebungen im Lehrgebiet cpe an der TU Kaiserslautern: Der normale, statische Internetauftritt wird zugunsten eines Blogsystems aufgegeben. Die Vorteile liegen hierbei auf der Hand: Schnelle Administration, ähnlich dem eines modularen Content Management System mit der Möglichkeit, auch verschiedene Nutzungsrechte für einzelne Personen einzurichten. Als System wird das schon oben beschriebene Wordpress eingesetzt, das um einige Plug-ins erweitert wurde. Für die Anbindung von Google Earth das XML Google Maps Plug-in [Matusz 2009], die Integration eines Event Kalender, die Anbindung an Social Media Dienste wie Facebook und Twitter und vieles mehr. Alles in allem sind dies noch 30 zusätzliche Plug-ins, die das Blogsystem fast ebenbürtig neben

[2] Z. B. http://wordpress.com/ oder http://www.blogger.com
[3] http://wordpress.org/download/
[4] Zur Reduktion der Linkadresse kann ein Dienst wie http://bit.ly, http://tinyurl.com/ oder http://is.gd eingesetzt werden.
[5] http://www.hardbloggingscientists.de/

einem traditionellen CMS aussehen lassen. Die Umstellung auf ein Blogsystem erleichtert den Workflow, war aber anfänglich mit Skepsis von außerhalb verbunden. Mittlerweile greifen andere Lehreinheiten auch auf diese Technik zurück, weil sie aktueller und einfacher ist.

Die Idee ist nun die, die Studierenden ihre im Semester erbrachten Arbeiten nicht mehr analog als Plan oder auf CD gebrannt abliefern zu lassen, sondern dass die Studierenden lernen, ihre Leistungen so im Internet aufzubereiten, dass Externe genauso gut über die Fähigkeiten eines jeden einzelnen informiert sind, wie die Betreuenden an der Universität. Zu jeder Übung wird die Methodik schriftlich noch einmal aufbereitet. Dies dient zum einen der Vorbereitung für die späteren Prüfungen, zum anderen aber auch als eine Art Entwurfstagebuch, das später auch als digitale Visitenkarte genutzt wird. Mehr als 50 % der Studierenden führen ihren persönlichen Blog weiter und geben ihn als Referenz bei Bewerbungen an. Der Vorteil für die Studierenden legt in der stetigen und chronologischen Aufbereitung ihre Leistungen.

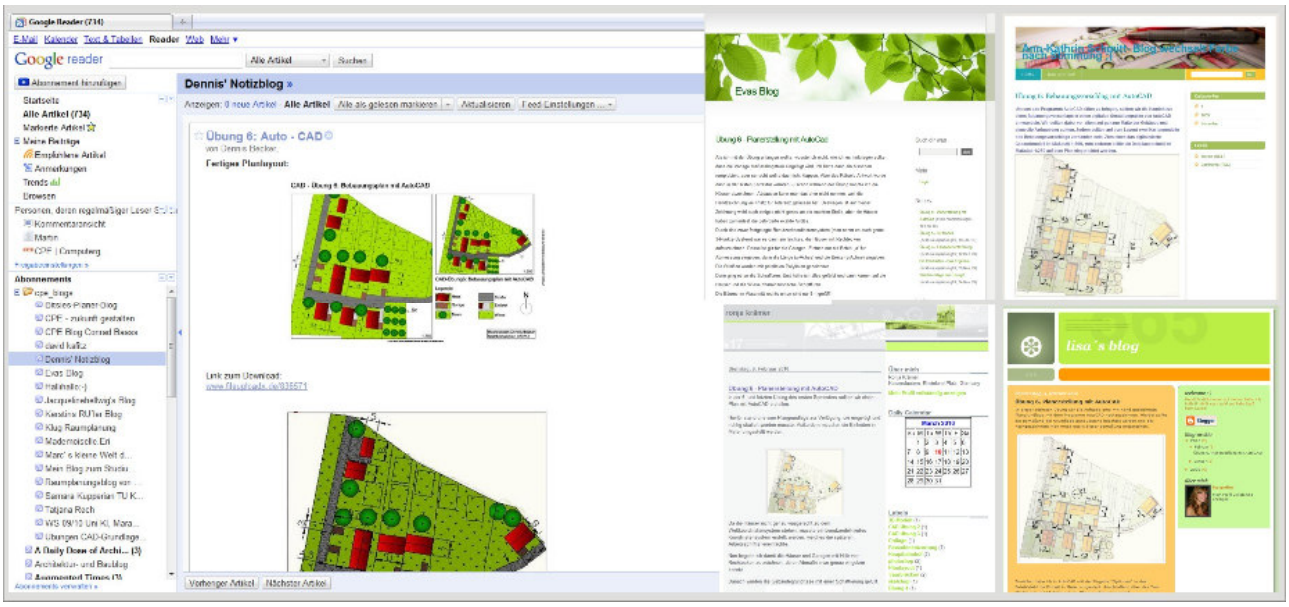

Fig. 2: Organisation aller Blogs über die Feed Crawling Funktion im Google Reader und beispielhafte Ausschnitte der studentischen Blogs

Neben dem Nutzen für die Studierenden hat das Arbeiten und Publizieren der Blogs auch für die Korrektur der Arbeiten mehrere entscheidende Vorteile. Jede Übungsaufgabe ist so prinzipiell an jedem Ort und zu jeder Zeit zu korrigier- und zu überprüfbar. Auf jede Arbeit kann individuell über die Kommentarfunktion eingegangen werden, und, interessanterweise „verirren“ sich teilweise sogar nichtuniversitäre User auf die Blogs, und kommentieren die Übungen. Andrerseits sehen auch über die vom Semester eingerichtet Blogroll (der Linkliste zu anderen Blogs), wie sie ihre eigenen Arbeiten im Vergleich einzuschätzen haben.

Um die 80 pro Semester anfallenden Blogs gut verwalten zu können, werden alle Blogs mithilfe des Google Readers abonniert und mit den jeweiligen Google Accounts der Betreuenden synchronisiert. Der Vorteil bei dieser Methode liegt darin, dass zeitgleich alle Übungen betreut werden können, ohne dass redundante Arbeit getätigt wird. Die Ergebnisse der Übungen werden normal auf dem Blog gepostet, die Studierenden sehen über den abonnierten Feed sofort, wenn sich etwas ändert. Zusätzlich werden die Posts automatisiert über Twitter publiziert, so dass die Studierenden, die lieber über Twitter das Geschehen verfolgen, genauso zeitnah über Aktualisierungen informiert werden.

4 FORSCHUNGSBEGLEITENDE BLOGS

Neben dem Einsatz in der Lehre liegt ein weiterer Fokus auf dem Einsatz von Blogs in der Forschung. Dabei steht nicht nur die Publikation der Ergebnisse im Mittelpunkt der Betrachtung, sondern auch das innovative Arbeiten mit den Möglichkeiten, die ein Blog bietet. Gerade die Integration von dreidimensionalen Inhalten oder das Arbeiten mit digitalen Karten wird durch die Verbindung mit Plug-ins derart vereinfacht, dass der Planer nur ein Minimum an Programmierkenntnissen besitzen muss, um seine Karten zwei- oder sogar auch dreidimensional im Web verfügbar machen zu können [vgl. hierzu Zeile 2009]. Die direkte Einbindung virtueller Globen eröffnet hier dem Planer eine Vielzahl an potenziellen Nutzungsmöglichkeiten für die Planungspraxis [Höffken 2009a]. In diesem Kontext kann das Planen mit virtuellen Globen im Geoweb

einen Beitrag zu Partizipationszwecken und zur Akzeptanzsteigerung von Planung erwirken und wird in Zukunft an Bedeutung gewinnen. Durch diese Aspekte wird ein Fokus auf die Wissensgenerierung gelenkt, was demzufolge auch neue Impulse für die Wissensgesellschaft mit sich bringt. Deren Bezug zur Planung ist elementar, denn die wichtigste Voraussetzung für planerische Aktivität war und ist Wissen, welches gesammelt, geordnet, ständig erneuert und aufbereitet wird, um für konkrete Planungsaktivitäten in komplexer und verdichteter Form zur Verfügung zu stehen [Streich 2005:11]. Anhand des Projektes "Planen im Geoweb – Partizipation und Akzeptanzsteigerung durch Projektvisualisierung am Beispiel des Kaohsiung Advanced Intelligent Science Parks" [Exner 2009], werden die Potenziale und der konkrete Nutzen aufgezeigt, wie virtuelle Globen in Verbindung mit Blogs einen Mehrwert in der Planungspraxis generieren können. Anhand der taiwanesischen Hafenstadt Kaohsiung zeigt das Projekt, wie die Planungen für den Universitätspark nördlich der Stadt so visualisiert werden könnten, dass die Modelle in einen Partizipationsprozess eingebunden und zur Qualifizierung von Entscheidungen herangezogen werden können. Dabei wird überprüft, ob solche Visualisierungstechniken zur Qualifizierung von Entscheidungsgrundlagen dienen können [Exner et al 2009]. Das komplette Projekt ist über einen Wordpress Blog abgebildet. Auf ein weiteres Projekt soll hier nur am Rande verwiesen werden, da diese ausführlich in einem anderen Paper auf der RealCORP 2010 vorgestellt wird. Das Projekt „Alexplore" lotet die Möglichkeiten von ortsbezogenen Diensten und Arbeiten und Abbilden der Daten und Information über Blogs aus [vgl. dazu Pich 2009 und Körnig Pich et al. 2010].

Fig. 3:Einbetten von 3D-Inhalten über das XML Google Maps Plug-in [Matusz 2009], am Beispiel des Blogs von Exner [Exner 2009]

5 TESTEN VON NEUEN TECHNIKEN – WEB 3.0

Blogs bieten eine hervorragende Möglichkeit, Geoinformationen zu integrieren. Im Gegensatz zum klassischen Webmapping Services, die auch schon seit Jahren Informationen mit Ortsbezug im Internet publizieren, ist jedoch die Möglichkeit der Kommunikation und des Interagierens von einzelnen Anwendungen untereinander über die sogenannten Mashups innerhalb von Blogsystemen verhältnismäßig einfach umzusetzen. Einen weiteren Vorteil beinhaltet das neuartige „Verorten" von Geoinformationen im Internet, denn neben der URL, die die Information im Internet eindeutig klassifiziert, erhalten die Informationen zusätzlich einen Geobezug, den Geotag. Die Verknüpfung aller bisherigen Daten mit Geokoordinaten sowie deren jederzeitige Verfügbarkeit und Austauschmöglichkeit mit mobilen, handlichen

Endgeräten kennzeichnet damit einen neuen evolutionären Schritt der Technik im Internet. Darauf basierende Anwendungen werden mit dem Schlagwort der Laocation-Based-Services (LBS) bezeichnet. Wenn auch einige Fachleute das sogenannte „Semantic Web“ als die neue Revolution im Internet bezeichnen und mit „Web 3.0“ etikettieren, so steht unseres Erachtens eben diese Verknüpfung von Geoinformation und virtueller Information für eine neue Entwicklungsstufe im Internet, und diese sollte, wenn überhaupt diese Begrifflichkeit benutzt wird, als Web 3.0 bezeichnet werden [nach Zeile 2010].

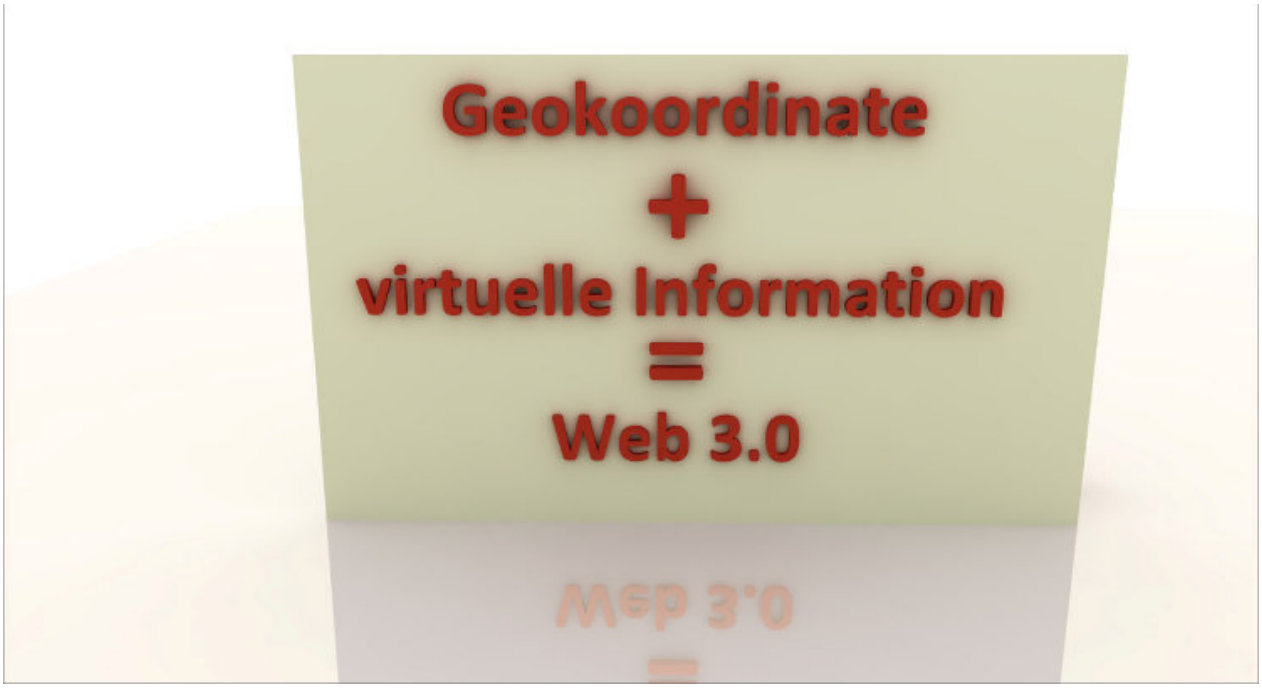

Fig. 4: „Web 3.0“: Verknüpfung von virtueller Information und Geokoordinate [Zeile 2010:102]

5.1 QR-Codes

In Verbindung mit ortsgebundenen Informationen können in Zukunft auch die sogenannten QR-Codes (Quick Response) eine interessante Alternative sein, da mit ihnen im übertragenen Sinne ein Objekt eine eigene Internetadresse bekommen kann. In QR-Codes werden Daten – wie auf bekannten Strichcodes auf Produkten – in den schwarz-weißen Informationen gespeichert. Möglich sind binäre, numerische und alphanumerische Zeichen. Der Code kann von verschiedenen Softwareapplikation[6] zum Beispiel auch auf mobilen Endgeräten mithilfe der eingebauten Kamera entschlüsselt werden. Neben dem Ansprechen einer URL, wie es seit langem schon im Semapediaprojekt[7] zu Wikipediaeinträgen getätigt wird, sind auch einfache Textnachrichten, Telefonnummern oder SMS Templates als Inhalte des Quick-Response Codes möglich. Gerade im touristischen Bereich sind diese Techniken sehr sinnvoll, da Touristen bei Verfügbarkeit eines schnellen mobilen Internetdienstes nach Bedarf Informationen in Form von Texten, Video- oder Audiodateien zur jeweiligen Sehenswürdigkeit abrufen können. Dies wird momentan in einem studentischen Projekt zum Thema Baukultur Monitoring an der TU Kaiserslautern in Kooperation der Lehrgebiete Stadtplanung und cpe ausgelotet [Baukulturmonitoring 2010].

[6] Zum Beispiel der Barcode-Scanner auf http://www.androidtapp.com/barcode-scanner/ für Android Smartphones
[7] http://de.semapedia.org/ , für Barcodes allgemein kann z. B. http://goqr.me/ genutzt werden

Fig. 5: Beispiele für QR-Codes, Messe Wien wurde generiert mit Semapedia

5.2 Baukulturmonitoring über QR-Codes und Social Communities

An der TU Kaiserslautern im Fachbereich Raumplanung findet derzeit ein Projekt zur Methodenfindung im Bereich des Baukulturmonitorings mit mobilen Geoweb-Methoden statt. Ein Teilbereich des Projekts umfasst auch eine empirische Untersuchung zum Zustand und zur Qualität des eigenen Arbeitsumfeldes und des Gebäude des Fachbereiches. Mithilfe dieser Fragestellung sollte die Eignung neuartiger Methoden wie die Anwendung von QR-Codes in Verbindung mit mobilen Onlineumfragen getestet werden, und in wieweit diese in der Raumplanung angewendet werden können. Testaufbau für die Umfrage war, dass mithilfe von Surveymonkey[8] eine Onlinebefragung statt findet, die über den QR-Code und mobile Endgeräte abgerufen werden sollte. Der Rücklauf der Befragung war in zwei Wochen eher dürftig (10 Rückläufe), so dass mithilfe von Social Communities wie Facebook[9] und StudiVZ[10] diese Befragung wiederholt wurde, inklusive der Frage, warum die Teilnahme bisher nicht stattgefunden hatte. Mithilfe von angelegten Gruppen zu diesem Thema konnte die Rücklaufquote um das fünffache gesteigert werden (51 Rückläufe). Hauptgründe für die Nichtteilnahme waren vor allem die noch nicht vorhandene Verfügbarkeit von Smartphones sowie die Tatsache, dass das Plakat mit dem QR-Code nicht im Fakultätsbau aufgefallen sei. Weiterhin wurde aber auch erwähnt, dass viele sich ein Smartphone demnächst zulegen wollen. Das Experiment soll auch nicht aufzeigen, dass die QR- in Verbindung mit Smartphone-Technologie nicht funktioniert, sondern vielmehr, dass es verschiedene Kanäle gibt, mit denen Information zum Thema Planen und Bauen transportiert werden kann. Dieses neuartige Methodenrepertoire sollten Studierende für die erfolgreiche Kommunikation von Planinhalten in der Zukunft beherrschen.

Fig. 6: QR-Code für die Umfrage über die Qualität des Fakultätsgebäudes und Adaption für die Umfrage in Social Communities [Baukulturmonitoring 2010]

[8] http://www.surveymonkey.com/
[9] http://www.facebook.com
[10] http://www.studivz.de

5.3 Mobile AR

Ein weiterer interessanter Aspekt für die zukünftige Planungspraxis im Web 3.0 ist die sogenannte Mobile Augmented Reality (Mobile AR). In Smartphones der neueren Generation ist es möglich, mithilfe der Handykamera, dem GPS-Sender und des eingebauten Kompasses auf dem Display erweiterte Informationen der Realität anzeigen zu lassen. So gibt es auf Smartphones mit dem Android OS oder iPhone OS Applikationen wie LayAR[11], Wikitude[12] oder Aloqua[13], die dies ermöglichen. Die interessanteste Software in diesem Bereich ist LayAR, da hier mit einem Developer Account auch das Hinzufügen von eigenen Inhalten möglich ist. Neben den klassischen punktuellen Informationen, die über WGS84-Koordinaten im System verortet werden, ist es mittlerweile auch möglich, dreidimensionale Inhalte über das von LayAR entwickelte L3D-Format zu integrieren und auf dem mobilen Endgerät anzeigen zu lassen. Die Modelle müssen dafür als Boundary Representation Models (BRep) vorliegen, dürfen eine maximale Flächenanzahl von 5000 Polygonen nicht übersteigen und die Texturen sollen im Power of Two Format vorliegen [LayAR 2010]. Die meisten der im städtebaulichen Planungsprozess erstellten 3D-Modelle, die für Echtzeitanwendungen optimiert wurden, sind so verhältnismäßig einfach zu transformieren [zum Modellierungsworkflow siehe Zeile 2010:126ff]. Blogs stellen eine gute Plattform dar für die Integration neuer Techniken.

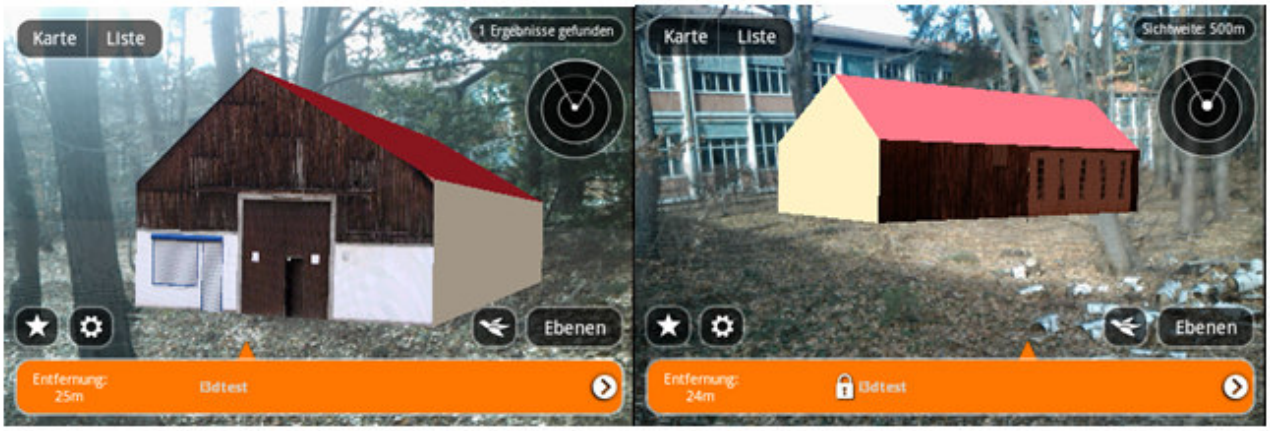

Fig. 7: Integriertes 3D-Model in der LayAR Umgebung, aufgenommen auf dem „kleinen Campus- Bau1“ der TU KL

6 FAZIT

Der Einsatz von Blogs bietet in Lehre und auch in der Forschung eine neue Form von kollaborativem Arbeiten. Durch den Wandel der Internettechnologie und dem Paradigmenwechsel zum „Web 2.0“ bieten sich innovative und gleichzeitig auch smarte Methoden an, räumliche Planung schneller, transparenter und besser verständlich einer großen Masse zugänglich zu machen. Da hinter dem ganzen Web 2.0-Gedanken allerdings auch eine große Community steht, die die Softwaretechnologien stetig überprüft und weiter entwickelt, ist es unerlässlich, als Lehrender und Forscher diese Entwicklungen kontinuierlich zu verfolgen. Der Lern- und Lehrprozeß unterliegt einem stetigem Wandel. Blogs und das damit verbundene „Bloggen“ sind als lebendiges Element der Forschungslandschaft und der damit verbundenen Diskussion nicht mehr wegzudenken. Dementsprechend sollten sie auch so behandelt und akzeptiert werden. Bloggen ist in diesem Sinne keine grundlegende Neuerfindung, sondern eine innovative Verknüpfung zweier ehemals eigenständiger Entwicklungen. Durch die hohe Frequenz von Entwicklungen und technischer Erkentnisse in den letzten Jahre, wächst auch der Bedarf nach einer zielgerichteten, chronologischen Publikation wisenschftlicher Fortschritte in der Forschungslandschaft. Da eine Publikation dieser Ergebnisse oft mit komplexen technischen Anforderungen verbunden sind, um die eigentliche Arbeit vollständig zu erklären (z.B. die Funktionalität eines 3D-Globus wie Google Earth lässt sich nicht nur auf einem „Blatt Papier“ verdeutlichen) müssen diese Inhalte auch zunehmend in interaktiver Form transferiert werden. Damit stellt das Weblog eine Publikationsform dar, die bestehende Strukturen verbindet und eben genau die vorgehend genannten Attribute auf sich vereint.

[11] http://layar.com
[12] http://www.wikitude.org/
[13] http://www.aloqa.com/

In Verbindung mit Geotags, also der Verortung von Information, dem Geoweb oder Web3.0, bieten sich vor allem in der räumlichen Planung große Potenziale, wie sie in diesem Paper angerissen wurden. Unter Berücksichtigung der Dynamik auf dem Sektor der mobilen Anwendungen ergeben sich schon heute Visionen, die spätestens in 5 Jahren von jedermann genutzt werden können und somit auch der räumlichen Planung dienen werden. Für alle im Lehr- und Forschungsbereich tätige Personen, nicht nur in der räumlichen Planung, kann an dieser Stelle nur die Empfehlung ausgesprochen werden: Bloggen macht Spaß und ist innovativ. Ausprobieren lohnt sich!

7 DANKSAGUNG

An dieser Stelle möchten wir den Studenten danken, dass sie sich auf dieses Experiment neuer Lehrmethoden eingelassen haben, teilweise vielleicht auch nicht ganz freiwillig. Das Arbeiten mit dieser neuen Form der Lehrdidaktik hat zumindest für uns als Lehrende viele Vorteile gebracht, und eine große Anzahl von Studierenden hatten so den ersten Kontakt mit Web 2.0 Methoden. Besonders danken möchten wir an dieser Stelle den Teilnehmern des großen Studienprojektes „Baukulturmonitoring". Vielen Dank an Jörg Bauer, Beate Caesar, Volker Durchholz, Christina Heinrichs, Alex Masser, Adrian Merdes, Marcus Reeg, Sebastian Rensch, Eva Thines, Tobias Wiemers und Xiaocen Wu, sowie bei Dr. Martin Rumberg, der das Projekt ebenso maßgeblich mit leitet.

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Wege im Grünen – Modellierung von Wegepräferenzen von Besuchern/-innen Wiener Erholungsgebiete anhand eines diskreten Wahlmodells

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1 ABSTRACT

Erholungswege sind ein essentieller Bestandteil der Erholungsinfrastruktur städtischer Grünanlagen. Doch wie sollen diese Wege aussehen, was ist wichtig für die Besucher und Besucherinnen? Gibt es Unterschiede hinsichtlich ihrer Wegepräferenzen? In mehreren Wiener Erholungsgebieten wurden 2006 325 Besucher und Besucherinnen über ihre Erholungswegepräferenzen befragt. Anhand eines diskreten Wahlmodells wurden 256 Szenarien von Erholungswegen mittels computergenerierten Fotomontagen dargestellt. Diese Szenarien enthielten systematisch acht Attribute in jeweils unterschiedlicher Ausprägung. Die dargestellten Attribute waren Besucheranzahl, Nutzerzusammensetzung, Wegetypus, Grünraumtypus, Hundeanzahl, Vandalismus, Müll und Erholungsinfrastruktur. Einen großen Einfluss auf die Wegepräferenzen hatten die Menge an Personen auf dem Weg, das Vorhandensein von Müll und die Gestaltung der Parkanlage. Weniger Einfluss hatten Vandalismusschäden und das Vorhandensein von Erholungsinfrastruktur in Form einer Parkbank. Eine Segmentierung der Befragten anhand einer latenten Klassenanalyse ergab drei Segmente, die sich hinsichtlich ihrer Wegepräferenzen bei fast allen Attributen unterschieden. Die Studienergebnisse dienen der Planung und dem Management von städtischen Erholungsgebieten.

2 EINLEITUNG

Erholungsgbiete bestimmen in einem nicht unerheblichen Ausmaß die Lebensqualität einer Stadt. Ein zentraler Teil von Erholungsgebieten ist ihre Erholungsinfrastruktur, insbesondere die Wege (Arnberger & Eder, 2008). Diese bieten Zugang ins Grüne, verteilen die Besucher und Besucherinnen im Gebiet und führen zu spezifischen Punkten und Attraktionen des Erholungsgebietes. Sie bringen Menschen dazu, sich körperlich zu betätigen und führen damit zu einer Verbesserung des Gesundheitszustandes (Reynolds et al., 2007). Aufgrund ihrer Wichtigkeit für die Erholungsnutzung stellt sich die Frage wie Erholungswege in städtischen Grünanlagen aussehen sollen? Wie wichtig sind gestalterische, soziale und management-bezogene Aspekte eines Weges für die Besucher und Besucherinnen? Gibt es Unterschiede hinsichtlich ihrer Wegepräferenzen? Diese Studie ging diesen Fragen nach und untersuchte die Wegepräferenzen anhand einer Befragung in Wiener Erholungsgebieten.

2.1 Präferenzen für Wege in Erholungsbieten

Untersuchungen zu Präferenzen über Wege in Erholungsgebieten liegen in großer Zahl vor. Allerdings sind Untersuchungen zu Wegen im städtischen Bereich eher selten (Arnberger, 2006; Arnberger & Mann, 2008). Viele der vorliegenden Publikationen beschäftigten sind entweder mit sozialen Aspekten der Wegenutzung (Gobster, 1995; Graefe et al., 1984; Lindsey, 1999; Luymes & Tamminga, 1995; Reynolds et al., 2007; Symmonds et al., 2000) oder mit gestalterischen Aspekten, insbesondere mit der Gestaltung des Landschaftsraumes bzw. des Weges hinsichtlich Wegbelag und Wegbreite (Janowsky & Becker, 2003; Jorgensen et al., 2002; Wiberg-Carlson & Schroeder, 1992; Lieber & Fesenmaier, 1984).

Hinsichtlich der sozialen Aspekte fokussierte ein Großteil der Studien auf Besuchermenge (Graefe et al., 1984; Manning, 2007) und Besucherkonflikte (Cessford, 2003; Jacob & Schreyer, 1980) oder integrierte beide soziale Faktoren in eine Untersuchung (Arnberger & Haider, 2005; Arnberger et al., 2010; Mann, 2006). Während Untersuchungen in abgelegenen Schutzgebieten der USA zu dem Ergebnis kommen, dass eine niedrige Besuchermenge von den Befragten präferiert wird (Graefe et al., 1984; Manning, 2007), zeigen neue Untersuchungen im städtischen Umfeld, dass auch höhere Besuchermengen von bestimmten Besuchergruppen präferiert werden (Arnberger & Eder, 2009; Arnberger et al., 2010). Auch das Besucherverhalten kann einen Einfluss auf die Wegepräferenzen haben. Hunde, die nicht an der Leine

gehalten werden, oder sehr schnelle Radfahrer werden oft negativ bewertet (Arnberger & Haider, 2005; English Nature, 2005; Reichhart & Arnberger, 2010).

Untersuchungen zu den physischen Attributen zeigten, dass die Wegumgebung eine wichtige Rolle spielt. Wege, die entlang von Baumgruppen und Wasserflächen führen und eine geschwungene Wegeführung aufweisen, werden bevozugt, während Wege, die entlang von Gebäuden und Straßen führen und vom Verkehrslärm beeinträchtig sind, weniger präferiert werden (Gobster, 1995; Lindsey 1999; Wiberg-Carlson and Schroeder, 1992; Reynolds et al., 2007; Schroeder, 1982; Shafer et al., 1999). Dichte Vegetation entlang eines Weges wird nicht als attraktiv empfunden. Schließlich widerspricht eine dichte Vegetation auch den Theorien zur evolutionären Landschaftspräferenzforschung (Orians, 1980; Appleton, 1975; Kaplan & Kaplan, 1989). Diese Theorien zeigten, dass gut überschaubare und damit kontrollierbare Landschaftsräume bevorzugt werden. Gerade das Sicherheitsempfinden kann durch dichte Vegetation entlang von Wegen beeinflusst werden (Luymes & Tamminga, 1995; Jorgensen et al., 2002; Schroeder & Anderson, 1984). Je dichter und näher die Vegetation an einem Weg ist, desto geringer ist die Präferenz für diesen. Landschaften, die einen ungepflegten Eindruck machen, reduzieren ebenfalls die Präferenz für einen Weg (Jorgensen et al., 2002; Schroeder, 1982).

Die Präferenzen für die Ausgestaltung eines Weges hängen zum Teil auch von der Aktivität der Befragten ab. Radfahrer zeigen eher eine Präferenz für asphaltierte Wege. In jedem Fall wird ein Weg, der schlecht gewartet ist, negativ bewertet (Reichhart & Arnberger, 2010; Gobster, 1995; Janowsky & Becker, 2003; Lindsey, 1999; Reynolds et al., 2007; Symmonds et al., 2000; Wiberg-Carlson & Schroeder, 1992). Management-bezogene Aspekte beeinflussen ebenfalls Wegepräferenzen. Vor allem Müll ist ein prominenter Faktor, aber auch Vandalismusschäden können die Präferenz für einen Weg reduzieren (Reynolds et al., 2007; Shafer et al., 1999).

2.2 Forschungsfragen

Bisherige Untersuchungen über Erholungswege fokussierten entweder auf soziale oder physikalische Parameter. Eine gemeinsame Betrachtung beider Bereiche im städtischen Kontext liegt nach Kenntnis der Autoren nicht vor. Untersucht wurde daher, (1) welche sozialen, Management-bezogenen und physischen Attribute eines Erholungsweges präferiert werden und wie hoch die Wichtigkeit dieser Attribute für die Befragten ist, (2) ob hinsichtlich der Wegepräferenzen Präferenzheterogenität gegeben ist, (3) wodurch sich mögliche Besuchersegmente hinsichtlich ihrer Wegepräferenzen charakterisieren lassen und wie groß die jeweiligen Besuchersegmente sind. Dazu wurde ein bildgestütztes diskretes latent-class Wahlmodell zur Anwendung gebracht, welches mittels systematisch manipulierter Fotos verschiedenste Szenarien von Erholungswegen zeigte.

3 METHODIK

3.1 Studiengebiete und Datenerhebung

In acht Wiener Erholungsbieten wurde eine standardisierte Befragung durchgeführt. Das Spektrum der Befragungsorte reichte vom innerstädtischen Park (Kardinal-Nagl-Platz, Stadtpark) über historische Gärten (Schönbrunn) bis hin zum Prater und Nationalpark Donau-Auen, Obere und Untere Lobau. Damit sollte ein möglichster breiter Querschnitt an Erholungsgebieten hinsichtlich Ausgestaltung und Nutzung gegeben sein.

Die Befragungen fanden im Sommer und Herbst 2006 statt. Die Zielgebietsbefragung erfolgte anhand eines strukturierten, standardisierten Interviews an vier zufällig ausgewählten Sonn- und an vier zufällig ausgewählten Werktagen. Befragt wurde gleichzeitig in allen acht Gebieten jeweils von der Früh bis zum Abend. Die Befragungen fanden nur bei Schönwetter statt.

Die Interviewpersonen waren Studierende, die sorgfältig in die Thematik und das Handling der Fragebögen eingewiesen worden waren. Die Interviews dauerten rund 15 Minuten. Nach der Beendigung eines Interviews wurde die nächste Person, die am Befragungstandort vorbei kam, von den Interviewern angesprochen. Im Rahmen der Befragung wurden insgesamt 325 Interviews durchgeführt. Vier Personen gaben keine Angaben zu den Fotodarstellungen ab. Die Verweigerungsrate lag bei etwas über 50%. Ein wichtiger Verweigerungsgrund war Zeitmangel, da die Angesprochenen auf dem Weg zu ihrer Arbeitsstätte oder Schule waren und das Erholungsgebiet nur durchquerten. Die geringe Stichprobengröße lässt keine Rückschlüsse auf die Besucherstruktur und Besucherpräferenzen für jeden der Befragungsorte zu.

Neben soziodemographischen und besuchsspezifischen Fragen wie Erfahrungsgrad mit dem Gebiet, Besuchsmotivationen und Aktivitäten wurden die Besucher zu einigen Indikatoren der Erholungsqualität wie Empfinden der Besuchermenge befragt.

Der zweite Teil der Befragung enthielt insgesamt 16 manipulierte Farbbilder, die verschiedene Erholungsszenarien darstellten (Abbildung 1). Diese bildeten die Stimuli zur Erfassung der Wegepräferenzen. Da jedem Befragten 16 Wegeszenarien vorzulegen waren, wurden den Befragten vier Wahlsets bestehend aus je vier Szenarien gezeigt. Die Zusammenstellung der Szenarien zu Wahlsets folgte einem statistischen Design. Die Besucherinnen und Besucher hatten dabei auszuwählen, welches der dargestellten Szenarien sie am meisten und welches sie am wenigsten bevorzugten.

3.2 Diskrete Wahlmodelle

Die Analyse der Wegepräferenzen erfolgte über ein diskretes Wahlmodell (Louviere et al., 2000). Es handelt sich dabei um ein multi-attributionelles, dekompositionelles Verfahren, welches aus dem ganzheitlichen Gesamturteil von hypothetischen Auswahlalternativen (z.B. Wegeszenarien) auf die Beiträge der einzelnen Eigenschaften der Alternative (z.B. Anzahl der Personen oder Wegebelag) zum Zustandekommen des Urteils mittels geeigneter stochastischer Verfahren schließt. Damit werden sowohl Wahlentscheidungen als auch „trade-off"-Verhalten erfasst. Die Analyse eines Wahlmodells basiert auf einem Zufallsnutzenmodell. Das individuelle Verhalten eines Befragten kann aufgrund vieler Faktoren nicht vollständig erklärt werden, da in einer Versuchsanordnung nie alle für das jeweilige Individuum zum Zeitpunkt der Befragung relevanten Variablen dargestellt werden können und die individuellen Wahlentscheidungen über Individuen aggregiert werden müssen. Daher werden stochastische Modelle angewendet (Hahn, 1997; Louviere et al., 2000). Die Auswahl einer Alternative impliziert, dass der Nutzen dieser Alternative höher ist als der Nutzen jeder anderen Alternative. Der deterministische Nutzen einer Alternative setzt sich dabei aus den erfassten positiven wie negativen Produkteigenschaften zusammen. Damit kann die Auswahlwahrscheinlichkeit einer Alternative als eine Funktion ihrer Attribute im Vergleich zu den Attributen der anderen Alternativen bestimmt werden (Louviere et al., 2000).

Um einer möglichen Heterogenität der Befragten hinsichtlich ihrer Wegepräferenzen Rechnung tragen zu können, wurden die Wahlentscheidungen nach latenten Klassen untersucht. Diese Methode erlaubt das Identifizieren und Quantifizieren von Klassen innerhalb der Befragten aufgrund ihrer mehrfachen Wahlentscheidungen (Kemperman & Timmermans, 2006). Latent-class Wahlmodelle stellen somit eine Erweiterung der diskreten Wahlmodelle wie auch der mixed-logit Modelle dar. Latent-class Modelle wurden bisher in verschiedensten Bereichen eingesetzt, z.B. Transportwesen (Hensher & Green, 2003) oder Tourismus und Erholung (Kemperman & Timmermans, 2006; Scarpa & Thiene, 2005). Anwendungen im Bereich städtischer Erholungsgebiete finden sich bei Arnberger und Eder (2009), Arnberger et al. (2010) oder Reichhart und Arnberger (2010). Das derzeit am häufigsten eingesetzte Kriterium zur Bestimmung der richtigen Anzahl an Klassen ist das Bayesian Information Criterion (BIC). Je niedriger der Wert, desto besser die Klassenlösung. Die Schätzung erfolgte mit dem Programm Latent Gold Choice 4.0 (Vermunt & Magidson, 2003). Ein Signifikanzniveau von $p < .05$ wurde festgelegt.

3.3 Wegeszenarien

Die bildlich dargestellten Wegeszenarien determinierten sich über acht Attribute. Drei beschrieben soziale, zwei managementbezogene und drei physikalische Faktoren. Die Attribute waren (1) Besucheranzahl (zwischen keiner Person und 18 Personen), (2) Hundeaufkommen (Präsenz von Hunden, mit oder ohne Leine, dieser Faktor zeigte somit auch Besucherverhalten an), (3) Nutzergruppen (unterschiedliche Anteile von Fußgängern, Radfahrern, Nordic Walkern und Joggern), Wegetypus (Wegbelag und –breite), Parktypus (Landschaftspark mit Blumenbeeten, Brache, Wald, Rolle von Büschen zum Weg etc.), Müll und Hundekot, Vandalismus (visuell sichtbar anhand eines Wegeschildes) und Erholungsinfrastruktur (Parkbank).

Für jedes dieser Attribute wurden unterschiedliche Ausprägungen (drei, vier, sechs oder acht Abstufungen) formuliert. Damit die dargestellten Besuchermengen immer erkenntlich sind, und um eine Verteilung der Personen im Bildvordergrund als auch im Bildhintergrund zu ermöglichen, wurde eine relativ gerade Wegstrecke als Bildhintergrund ausgewählt. Da die Personenanzahl systematisch variiert wurde, ohne dabei das Raumangebot zu ändern, spricht man hier von sozialer Dichte (Baum & Paulus, 1991). Die Gehrichtung

wurde immer konstant gehalten (50% der dargestellten Personen weggehend, 50% auf den Betrachtenden zukommend). Nur Einzelpersonen wurden dargestellt.

Als Fotostandort wurde ein Wegabschnitt im Wiener Prater ausgewählt. Die Fotos wurden mit Adobe Photoshop bearbeitet wobei jede Attributabstufung auf einem extra Layer abgespeichert und dann auf einem hochqualitativen Farbtintenstrahldrucker auf Fotopapier in der Größe von 10,5 x 14 cm ausgedruckt wurde. Jeweils zwei Fotos wurden auf einem A4 Blatt platziert. Die Interviewer hatten mehrere Wahlsets zur Verfügung, die sie abwechselnd für die Befragung verwendeten.

Die Zusammenstellung der digital kalibrierten Bilder erfolgte nach einem orthogonalen „fractional factorial"-Design (Louviere et al., 2000). Benötigt wurden insgesamt 256 bildlich dargestellte Wegeszenarien. In jedem dieser Szenarien waren immer alle acht Faktoren aber in jeweils unterschiedlicher Abstufung enthalten. Dies erlaubt bei der Analyse exakt die Bedeutung jedes einzelnen Faktors und seiner Abstufungen in Relation zu all den anderen dargestellten Faktoren in Hinblick auf die Wegwahl der Befragten zu bestimmen.

Fig. 1: Beispiele von Wegeszenarien. Jedes dieser Szenarien enthält acht verschiedene Faktoren in unterschiedlichen Abstufungen.

4 ERGEBNISSE

4.1 Stichprobe

Etwas über die Hälfte der Befragten waren Männer. Das Durchschnittsalter lag bei 43 Jahren. 94% der Befragten waren aus Wien. Die durchschnittliche Gruppengröße lag bei 1,5 Personen. Rund 13% der Befragten hatten ein Kind dabei. 60% der Befragten waren Fußgängerinnen oder Fußgänger, 16% Radfahrerinnen oder Radfahrer, 8% Hundeausführende und 6% Joggerinnen oder Jogger. Die Befragten suchten das jeweilige Erholungsgebiet im Schnitt mehr als 100 Mal im Jahr auf. Die durchschnittliche Aufenthaltsdauer lag bei 2,3 Stunden.

4.2 Ergebnisse des Wahlmodells

Das BIC-Kriterium zeigte an, dass eine Drei-Klassenlösung aufgrund des niedrigsten BIC-Wertes das beste Modell ergibt (Tabelle 1). Das Modell zeigte einen rho-Wert von 0,386 an und kann damit als ein sehr gutes Modell angesehen werden (Louviere et al., 2000). Das Modell klassifizierte 66,4% der Fälle richtig. Die Klasse 1 enthielt rund 65%, Klasse 2 20% und Klasse 3 15% der Befragten. Alle acht Attribute beeinflussten die Wegepräferenzen (Tabelle 2). Unterschiede zwischen den Klassen ergaben sich für alle Attribute außer für „Müll und Hundekot". Die Attribute Besucheranzahl, Hundeaufkommen, Wegetypus, Parktypus, Müll und Hundekot beeinflussten alle Klassen. Das Attribut „Nutzergruppen" hatte nur für die Klasse 3 eine Bedeutung.

Je positiver der Parameterwert ist, desto mehr ist die jeweilige Attributabstufung präferiert. Sehr hohe signifikante Parameterschätzwerte deuten auf eine hohe Bedeutung der Attributabstufung für die Wegewahl hin.

Anzahl Klassen	Anzahl Parameter	LL	df	rho^2	BIC
1	-2591,5	30	291	0,258	5356,1
2	-2487,6	61	260	0,330	5327,3
3	**-2393,2**	**92**	**229**	**0,386**	**5317,3**
4	-2332,0	123	198	0,439	5373,9
5	-2276,0	154	167	0,464	5440,7

LL = LogLikelihood; df = Freiheitsgrade; BIC: Bayesian Information Criterion

Tabelle 1: Kriterium zur Bestimmung der Klassenanzahl

Die Klassen können wie folgt charakterisiert werden. Die Klasse 1 wurde von allen Attributen bis auf die Nutzerzusammensetzung beeinflusst. Diese Klasse bevorzugt sehr geringe Besuchermengen im Gegensatz zu sehr hohen. Sie will keine Hunde, besonders abgelehnt werden viele Hunde, die nicht an der Leine sind. Sie präferieren Schotterwege mittlerer Breite, während schmale Schotterwege und breite Asphaltwege abgelehnt werden. Von den Grünraumtypen bevorzugen sie jene, die offener sind gegenüber jenen mit dichter Vegetation. Sie sind gegen Müll und Vandalismus und wollen keine Bank im Erholungsgebiet, v.a. wenn diese belegt ist. Im Vergleich zu den anderen Klassen wurde diese Klasse stark von den Attributen Besuchermenge und Müll beeinflusst.

Die Klasse 2 zeigt eine Präferenz für relativ hohe Besucherzahlen und eine Ablehnung sehr niedriger. Auch sie sind gegen eine Präsenz von Hunden, allerdings sind ihnen viele Hunde, die nicht an der Leine sind, lieber als wenige Hunde. Sie bevorzugen breite anstelle von schmalen Wegen und Grünraumtypen, die gepflegt sind bzw. wo die Büsche nicht direkt den Weg begleiten. Das Vorhandensein einer Parkbank wird präferiert, v.a. wenn diese belegt ist.

Die Klasse 3 hat hinsichtlich der Besucherzahlen eine ähnliche Präferenz wie die Klasse 1, indem sie eine geringe Besuchermenge bevorzugt. Die Befragten haben lieber Fußgänger und Radfahrer am Weg als Nordic Walker oder einen Mix aus verschiedenen Nutzergruppen. Die Wege sollten frei von Hunden sein, v.a. viele Hunde ohne Leine sind nicht erwünscht. Die Befragten dieser Klasse präferieren schmale Schotterwege und lehnen breite Asphaltwege ab. Der Grünraumtypus Wald wird bei weitem bevorzugt, während offene Landschaften nicht präferiert werden. Müll am Weg wird abgelehnt, wobei Hundekot als negativer beurteilt wird als geringe Mengen an Müll. Wege frei von Vandalimus werden bevorzugt. Für diese Klasse spielte der Wegtypus eine wichtige Rolle.

5 DISKUSSION

Diese Studie untersuchte anhand eines Wahlmodells mit systematisch manipulierten Bildern die Wegepräferenzen von Besucher und Besucherinnen städtischer Erholungsgebiete in Wien. Die Wegeszenarien waren über acht Attribute definiert. Weiters wurde untersucht, ob es hinsichtlich der Wegepräferenzen Unterschiede zwischen den Befragten gibt und wie diese Segmente charakterisiert werden können. Diese Studie soll dazu beitragen, Erholungsgebiete an die Bedürfnisse der Befragten besser anzupassen, um die Erholungsraum- und damit die Lebensqualität in der Stadt zu erhöhen.

Ergebnis war, dass alle Attribute die Wegepräferenzen beeinflussten und dass es innerhalb der Befragten drei verschieden große Klassen mit unterschiedlichen, teils gegensätzlichen Wegepräferenzen gibt. Unterschiede ergaben sich für soziale, Management-bezogene und physikalische Attribute. Damit sind die Wegepräferenzen der Befragten mit Ausnahme eines Attributes nicht homogen. Somit haben sie unterschiedliche Bedürfnisse hinsichtlich sozialen, Management-bezogenen und physikalischen Attributen von Wegen in Erholungsgebieten. Das heißt, dass es den Weg für alle nicht gibt. Dadurch ergeben sich auch Ansatzpunkte für eine Klassen-spezifische Bedürfnissbefriedigung und Besucherlenkung.

Einen großen Einfluss auf die Wegepräferenzen hatten die Menge an Personen auf dem Weg, das Vorhandensein von Müll, der Wegetpypus und die Gestaltung des Grünraumes. Weniger Einfluss hatten Vandalismusschäden und das Vorhandensein von Erholungsinfrastruktur in Form einer Parkbank sowie die Zusammensetzung der Nutzergruppen. Gemeinsam ist allen Klassen die Präferenz für müll- und hundefreie Erholungswege. Für alle anderen Attribute waren Unterschiede gegeben.

Die drei Klassen können im Groben wie folgt charakterisiert werden:

- Die Klasse 1 stellt den/die offenen Landschaftsbesucher und Landschaftsbesucherin dar, der/die sich einen geringen sozialen Stimulationsgrad in Form von wenigen Besuchern und breitere Schotterwege wünscht. Eine Erholungsinfrastruktur in Form einer Bank ist nicht erwünscht. Diese Gruppe umfasst rund zwei Drittel der Befragten.
- Die Klasse 2 hingegen sucht einen gewissen sozialen Stimulationsgrad in Form von höheren Besuchermengen (Besucheranzahl am Weg, belegte Parkbank). Sie präferiert gepflegte Grünräume mit breiten Wegen.
- Die Klasse 3 ist das kleinste Segment (15%) und stellt den/die Waldbesucherin dar. Sie präferieren einen geringen sozialen Stimulationsgrad und schmale Schotterwege.

Somit sind drei Gruppen gegeben, die sehr unterschiedliche Präferenzen haben. Erst über die Kombination von sozialen, Management-bezogenen und physikalischen Attributen konnte gezeigt werden, dass bestimmte soziale Präferenzen mit bestimmten physikalischen Präferenzen zusammenhängen (z.B. die Präferenz für wenige Besucher, ein Wegeumfeld in Form dichter Vegetation und schmale Schotterwege).

Tiefergehende Analysen sind nun erforderlich, um die festgestellten Präferenzen der einzelnen Segmente auch mit soziodemographischen und besuchsbezogenen Attributen in Verbindung zu setzen. So ist auf dem ersten Blick eine Präferenz der Klasse 2 von Hunden ohne Leine über jene mit Leine erstaunlich, wohl aber mit dem hohen Anteil an Hundeausführenden unter den Befragten begründbar.

Die angeführten Ergebnisse sind ein Beitrag für die Planung und das Management von Erholungsgebieten. Die Resultate zeigen, dass verschiedene Erholungsgebiete im städtischen Kontext angeboten werden sollten. Hauptaugenmerk sollte zwar aufgrund ihrer Größe auf die Klasse 1 gelegt werden, aber auch die Präferenzen der beiden anderen Gruppen sind zu berücksichtigen. Die Beseitigung von Müll scheint ein wichtiger Faktor im Wegemanagement zu sein, aber auch die Regulierung der Besuchermenge. Hier kann über das Angebot verschiedener Erholungswegetypen eine Besucherlenkung erfolgen. Eine räumliche Steuerung von Besuchermengen innerhalb eines Gebietes beispielsweise durch das Angebot unterschiedlicher Wegetypen wird aber nur dann möglich sein, wenn dieses eine entsprechende Größe aufweist. Große Erholungsgebiete sind aber im städtischen Kontext oft nicht vorhanden.

	Parameterschätzer			
Attribute und Attributabstufungen	Klasse 1	Klasse 2	Klasse 3	Test auf Klassen-unterschiede [b]
Anteil	65,0%	20,2%	14,8%	
Anzahl an Personen im Bild				
0 Personen [a]	0,434	-0,550	-0,043	
1 Person	***1,078	*-0,551	***1,319	<0,001
2 Personen	**0,314	***0,686	0,398	n.s.
4 Personen	0,193	-0,073	0,508	n.s.
6 Personen	*0,243	-0,118	0,411	n.s.
8 Personen	***0,335	*0,425	***-1,509	<0,001
12 Personen	***-0,403	-0,296	-0,374	n.s.
18 Personen	***-2,193	*0,477	*-0,711	<0,001
Nutzerzusammensetzung				
Fußgänger (60%) & Jogger (40%)[a]	-0,064	0,051	0,544	
Fußgänger (60%) & Nordic walker (40%)	0,041	0,068	*-0,498	<0,05
Fußgänger (60%) & Radfahrer (40%)	-0,003	-0,153	0,186	n.s.
Fußgänger (10%), Radfahrer (40%), Jogger (20%), Nordic walker (20%)	0,026	0,034	-0,232	n.s.
Hundeanzahl und Anleinrate:				
Kein Hund [a]	0,535	0,291	0,453	
1 Hund nicht an der Leine	-0,094	**-0,362	0,022	n.s.
2 Hunde an der Leine	-0,076	-0,132	-0,080	n.s.
2 Hunde nicht an der Leine	***-0,365	0,204	*-0,395	<0,001
Wegtypus				
1 m Breite, Schotter [a]	-0,376	-0,792	2,386	
2 m Breite, Schotter	***0,296	**-0,390	0,058	<0,001
4 m Breite, Schotter	***0,490	***0,523	***-0,826	<0,001
4 m Breite, Asphalt	***-0,411	***0,658	***-1,618	<0,001
Müll und Hundekot				
Kein Müll [a]	1,214	0,771	0,974	
Wenig Müll	***0,254	*0,257	***0,741	n.s.
Hundekot	***0,641	***0,678	0,262	n.s.
Viel Müll und Hundekot	***-2,110	***-1,706	***-1,976	n.s.
Grünraumtypus				
Wald und Wiese [a]	0,296	0,046	-0,456	
Landschaftspark mit Blumenbeet	0,183	***0,727	0,106	<0,05
Brachenähnlich	0,189	**-0,664	***-0,912	<0,001
Büsche nicht direkt am Weg	-0,076	0,198	-0,495	n.s.
Büsche direkt am Weg	***-0,438	**-0,530	0,148	n.s.
Wald	-0,153	0,222	***1,609	<0,001
Vandalismus				
Kein Vandalismus [a]	0,287	-0,182	0,666	
Graffiti	-0,004	0,179	*-0,529	<0,05
Zerstörtes Wegeschild mit Graffiti	***-0,283	0,003	-0,136	n.s.
Erholungsinfrastrukturangebot				
Keine Sitzbank [a]	0,253	-0,378	0,006	
Nicht besetzte Sitzbank	0,045	0,053	-0,299	n.s.
Besetzte Sitzbank	***-0,298	*0,325	0,293	<0,001
Rho²	0,386			

Einfluss der Attributabstufungen auf die Wegewahl auf dem Signifikanzniveau von: ***p <0,001; **p <0,01, *p <0,05; a = Referenzkategorie, die aus der negativen Summe der anderen Schätzparameter gewonnen wird; b = Wald-Statistik.

Tabelle 2: Schätzparameter der Segmente

Auch wenn es durch den Einsatz systematisch manipulierter Fotos möglich ist, beeinflussende Faktoren zu identifizieren, so ist ein Bild natürlich immer eine Abstraktion des Realen. Methodische Weiterentwicklungen, neue Methodenkombinationen wie auch Evaluationen von Methoden sind erforderlich, um möglichst realitätsnah den Einfluss zusätzlicher Faktoren wie beispielsweise Bewegung und Geschwindigkeit (Reichhart und Arnberger, 2010; Reichhart et al., 2007) oder Lärm auf die Wegepräferenzen zu untersuchen. Durch methodische Weiterentwicklungen und Methodenkombinationen, wie beispielsweise von Wahlmodellen und Agenten-basierten Simulationen (Taczanowska et al., 2008), werden präzisere Modelle geschaffen, die künftig eine Steuerung und Vorhersage der Auswirkungen der Gestaltung von Erholungsgebieten auf die einzelnen Besucherklassen erlauben werden.

6 DANKSAGUNG

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🏆 *reviewed paper*

Wie entwickelt sich der Grünraum in Wien?

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1 KURZFASSUNG

Beim Grünraummonitoring Wien wird für jede von rund 60.000 Teilflächen, in die das Stadtgebiet zuvor unterteilt wurde, die prozentuelle Verteilung der aus Infrarot-Luftbildern ersichtlichen Vegetations- bzw. Oberflächenbedeckungsart klassifiziert (Baum-, Strauch- und Krautschicht bzw. nicht versiegelte, versiegelte und bebaute Flächenanteile) und die Veränderung gegenüber früheren Zeitpunkten festgestellt.

Die Änderungen in den Zeiträumen zwischen 1997, 2000 und 2005 zeigen in Summe ein konstantes Bild: Der Abnahme in den unversiegelten Flächen (u. a. Ackerflächen) steht eine Zunahme sowohl der Grünfläche als auch des Versiegelungsgrades gegenüber.

Im europäischen Vergleich[1] zählen die durch das Monitoring gewonnenen Daten zu den qualitativ hochwertigsten Informationsgrundlagen für den Grünraum einer Großstadt. Sie liefern zuverlässiges Datenmaterial für strategische Entscheidungen in der Stadt- und Grünraumplanung und werden auch in der Grünflächenpolitik eingesetzt. Die Methode wird, den technischen Entwicklungen im Bereich der Fernerkundung folgend, laufend an den Stand der Technik angepasst.

2 GRÜNRAUMMONITORING - PROJEKTIDEE

Grünräume prägen das Stadtbild Wiens. Sie verbessern das Stadtklima und tragen durch positive Effekte zu einer Steigerung der Lebensqualität der Menschen in der Stadt bei. Grünraume sind Plätze der Erholung und wertvoller Lebensraum für Tiere und Pflanzen.

Mit dem Projekt Grünraummonitoring Wien erhebt die Wiener Umweltschutzabteilung - MA 22 seit dem Jahr 1991 regelmäßig Größe, Zustand und Entwicklung der Wiener Grünflächen. Die Methode des Grünraummonitorings (ursprünglich Biotopmonitoring Wien) wurde am ÖBIG[2] entwickelt. Grundlage für die Datenauswertung sind flächendeckend aufgenommene Infrarot-Luftbilder des Stadtgebiets. Der Wellenlängenbereich der Bilder liegt im nahen Infrarotspektrum (700-900nm). Das Chlorophyll in Pflanzen ist nicht nur im sichtbaren Grünbereich erkennbar, sondern insbesondere in diesem Wellenlängenbereich gut erfassbar (Reflexionsgrad mehr als 5-fach höher). Durch Interpretation der sogenannten Falschfarbenbilder können Qualitätsaussagen zu Grünflächen und eine Klassifikation des Baumkronenzustandes gemacht werden. Über die Intensität der Rotfärbung kann die Vitalität der Vegetation ermittelt werden. Außerdem sind unterschiedliche Oberflächenbedeckungen erkennbar.

Die Flüge finden Ende August bzw. Anfang September zum Zeitpunkt der höchsten Entfaltung der Grünbereiche statt. Mittlerweile liegen Befliegungen aus den Jahren 1991, 1997, 2000 und 2005 vor. Im Sinne eines Monitorings lassen sich dadurch Veränderungen des Grünraumes und Entwicklungen in der Stadt gut nachvollziehen.

Im Jahr 2005 wurden mehr als 60.000 Flächen unterschiedlichen Grünraumarten zugeordnet, deren grobe Zusammensetzung bemessen und die Veränderung gegenüber früheren Zeitpunkten festgestellt.

Für die Zukunft hat sich die Wiener Umweltschutzabteilung - MA 22 das Ziel gesetzt, die Methode so weiterzuentwickeln bzw. zu optimieren, dass durch Umstieg von analogen auf digitale Bilder die Auswertung teilautomatisiert werden kann. Damit können die quantitativen Ergebnisse schneller verfügbar sein. Die Qualität der Interpretation soll mit Hilfe bestehender Daten der Stadt Wien - ergänzend zu den Infrarot-Luftbildern - die Monitoringergebnisse noch aussagekräftiger machen.

[1] Es gibt ähnliche Ansätze in Deutschland und der Schweiz die Qualität des Grünraums in Städten zu beobachten. Umfassend, aufwändig und kontinuierlich gewartet wird beispielsweise das Grünflächeninformationssystem in Berlin (http://www.stadtentwicklung.berlin.de/umwelt/stadtgruen/gris/).
[2] vormals: Österreichisches Bundesinstitut für Gesundheitswesen (heute: Gesundheit Österreich GmbH, http://www.oebig.at/)

3 DIE METHODE DES GRÜNRAUMMONITORINGS

Für die Auswertung wurde die geometrische Grundlage der Realnutzungskartierung verwendet, ergänzt durch Straßenabschnitte und Kreuzungsbereiche als weitere Teilflächen (Abb.1). Für jede der so entstandenen rund 60.000 Raumeinheiten wurden folgende Attribute erfasst:

3.1 Prozentuelle Aufteilung:

- Baumkronenfläche (Baumschicht)
- Gehölzfläche (Buschfläche, Strauchschicht)
- Wiesenfläche (Krautschicht)
- nicht versiegelte Fläche
- versiegelte Fläche (aber nicht bebaut)
- bebaute Fläche

Die Werte wurden, wie in Abb. 2 und Abb. 3 dargestellt, ermittelt. Aus den Flächenanteilen wurden zwei wichtige Indikatoren des Grünraummonitorings abgeleitet:

Nettogrünfläche = Baumkronenfläche + Gehölzfläche + Wiesenfläche

Die Nettogrünfläche ist der zum Zeitpunkt der Luftbildaufnahme erkennbare Anteil an Grünpflanzen-Flächen. Das bedeutet beispielsweise, dass eine Grünfläche oberhalb einer Garage im Sinne der Methode zur Nettogrünfläche zählt. Ebenso, wie ein Baum, der auf einer versiegelten Fläche zur Straßenraumgestaltung gepflanzt worden ist.

Versiegelungsgrad = Anteil (versiegelte Fläche + bebaute Fläche)

Der Versiegelungsgrad ist der Anteil an der Gesamtfläche der zum Zeitpunkt der Luftbildaufnahme aus der Vogelperspektive erkennbaren versiegelten Flächen.

Abb.1

Abb.2

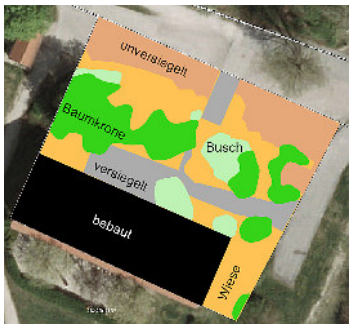

Abb.3

Abb.4

3.2 Kategorisierung:

- Grünflächen-Strukturtyp (z.B. Verkehrsfläche, Landwirtschaft, Großformbebauung,...)
- Grünflächen-Toptyp (z.B. Busch- u. Wiesenstreifen, Acker, Hofbegrünung,...)

Der Strukturtyp charakterisiert die Stellung und vorherrschende Nutzung der Fläche in der Stadtstruktur. Im gesamten Stadtgebiet unterscheidet man 27 unterschiedliche Ausprägungen (z.B. Betriebe – Gewerbe – Industrie, Dachgarten, etc.).

Der Toptyp unterscheidet das Erscheinungsbild der Vegetation und das Potential als naturbezogener Lebensraum für Pflanzen, Tiere und Menschen .

Die Übersicht aller Struktur- und Toptypen ist im Anhang zu finden.

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3.5 Veränderungen:

Zur qualitativen Beschreibung von Veränderungen werden noch folgende Codes erfasst, die Änderungen ergeben sich durch den Vergleich der Infrarot-Luftbilder:

- Grünflächenbezogene Veränderungen
- Ursachenbezogene Veränderungen (s. Abb. 12)
- Maßnahmenbezogene Veränderungen (s. Abb. 13)

Abb. 5, 6

Grünflächenbezogene Veränderungen sind beispielsweise (temporäre) Grünraumzuwächse, Änderungen des Grünrauminventars (Zuwachs bzw. Abnahme) oder Zustandsveränderungen (temporäre Qualitätszunahmen oder Qualitätsabnahmen).

Ursachenbezogene Veränderungen sind beispielsweise Änderung aufgrund eines Straßenbauprojektes, durch Wohnbau, Freizeitanlage, Verwilderung, Baustelle oder Baumkronenzuwachs.

Maßnahmenbezogene Veränderungen beschreiben Änderungen z. B. aufgrund der Neupflanzung von Bäumen, durch Hofbegrünungen, Rodung oder Kronenzustandsverschlechterung.

In dem in Abb.5 und Abb. 6 angeführten Beispiel eines locker bebauten Stadtgebietes sind die Änderungen mit einem gelben Pfeil markiert und repräsentieren folgendes:

- 1. Baumkronenzuwachs im Wohnpark
- 2. Neue Freizeitanlage
- 3. Baumkronenzuwachs südlich der Straße

4 ALLGEMEINE GRÜNFLÄCHENSITUATION IN WIEN 2005

Mehr als die Hälfte der Fläche Wiens, ca. 51% des Wiener Stadtgebietes, ist mit Vegetation bedeckt, der Versiegelungsgrad beträgt ca. 30%.

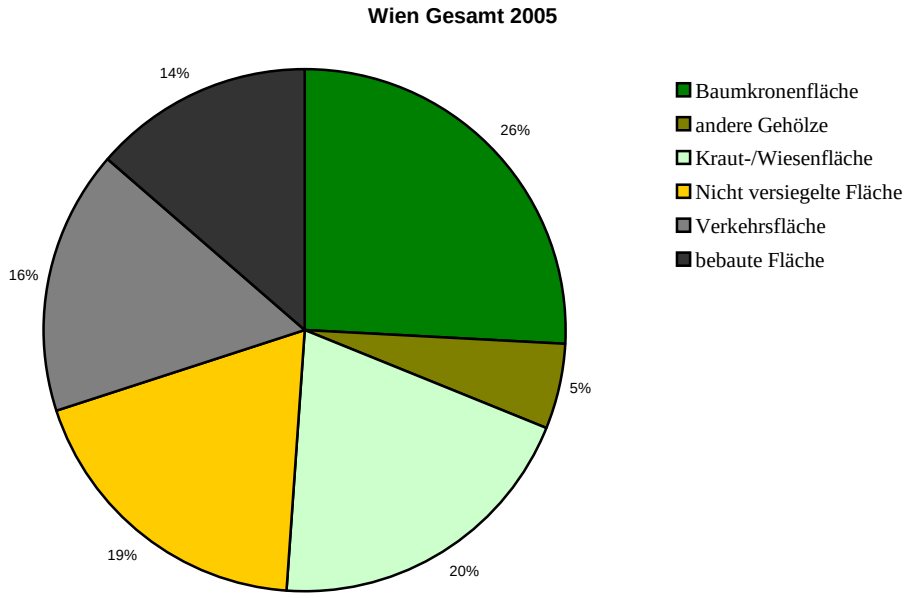

Abbildung 7: Darstellung von Grünanteil und Versiegelung als Diagramm (Ergebnisse Bildflug 2005)

Die Änderungen in den Zeiträumen zwischen 1997, 2000 bzw. 2005 zeigen in Summe ein konstantes Bild. Der Abnahme in den unversiegelten Flächen (u. a. Ackerflächen) steht eine Zunahme sowohl der Grünfläche als auch des Versiegelungsgrades gegenüber. Besonders wichtig erscheint auch die Stabilität und der Erhalt der Baumkronenflächen.

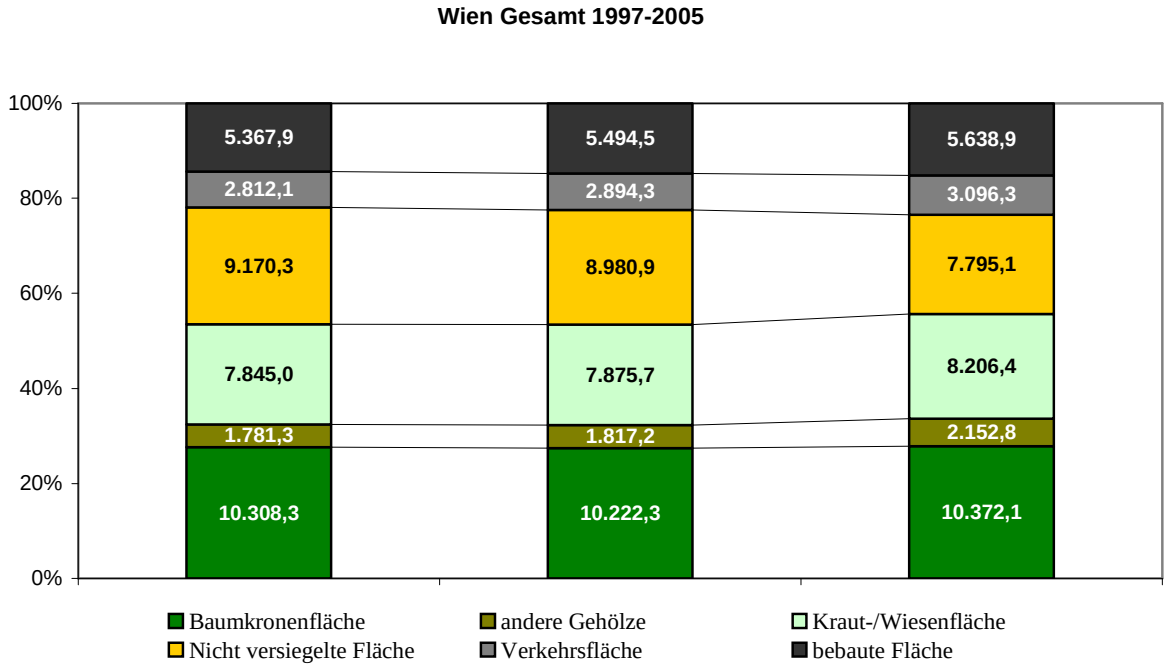

Abbildung 8: Veränderung der einzelnen Oberflächenbedeckungstypen zwischen 2000 und 2005

Bei landwirtschaftlichen Flächen ist mehr Grün beobachtbar. Besonders erfreulich ist das Ergebnis der Interpretation, das zeigt, dass die Zwischenraumbegrünung in Weingärten zugenommen hat. Die leichte, nicht signifikante, Zunahme der Waldflächen, kann auch auf die genauere Abgrenzung zurückzuführen sein.

Durch die rege Bautätigkeit und Stadtentwicklung in Wien, ist eine Zunahme der versiegelten Flächen um etwa ca. 350 ha festgestellt worden, was wiederum mit einer Abnahme der unversiegelten Flächen einher geht: Insbesondere in den Stadterweiterungsgebieten werden Baulandreserven genutzt, sodass zwar einerseits der Versiegelungsgrad steigt, andererseits die Freiraumgestaltung auch die Nettogrünfläche erhöht.

Die Entwicklungen im dicht bebauten Stadtgebiet sind schwieriger zu beurteilen. Flächen des öffentlichen Raumes sind laufend Pflegemaßnahmen ausgesetzt. Auch bezirksweise variiert die Dynamik und Entwicklung der Grünflächensituation.

Aufgrund der vorliegenden Daten können dennoch Tendenzen für das gesamte Stadtgebiet und Detailauswertungen für Bezirke oder verschiedene Grünflächenstrukturen aufgezeigt werden.

Darüber hinaus stellen die Infrarot-Luftbilder auch eine wertvolle Datengrundlage für Planungsüberlegungen und Sachverständigengutachten in den Bereichen Naturschutz, Räumliche Entwicklung und Bodenschutz dar.

Im Folgenden werden unterschiedliche Ergebnisse des Grünraummonitorings vorgestellt.

5 AUSGEWÄHLTE DETAILS DES MONITORINGS

Das zugrundeliegende Datenmaterial lässt unterschiedliche Analysen und Darstellungen zu. Es werden Auswertungen für das gesamte Stadtgebiet, für die Bezirksebene, nach Grünraumtypen, nach ursachenbezogenen und maßnahmenbezogene Grünflächenveränderung durchgeführt. Die Kombination mit anderen Datenquellen ermöglicht komplexe Analysen, beispielsweise die Verknüpfung von Stadtstrukturtypen, stadtökologische Funktionstypen mit Bevölkerungsdaten oder Erreichbarkeiten.

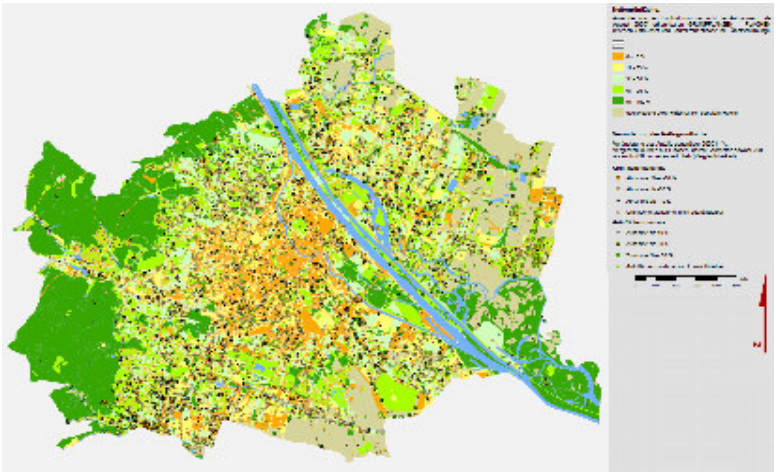

Abb. 9.: Nettogrünfläche 2005 für Wiens - relativ und Veränderung 2000/2005

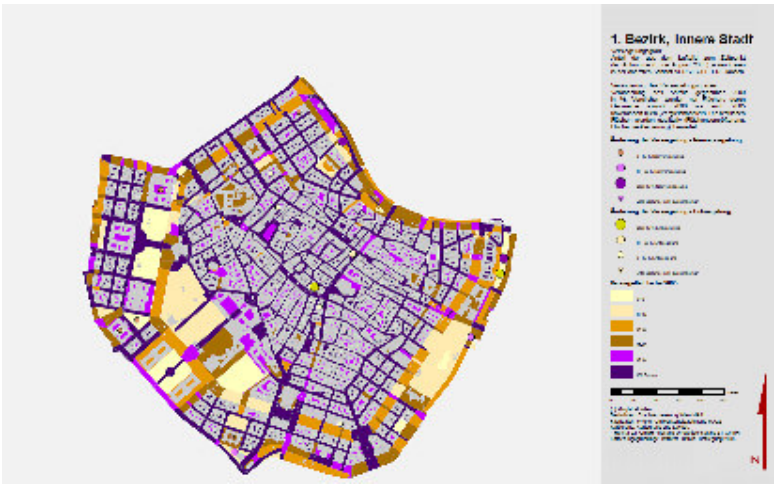

Abb. 10: Versiegelungsgrad für den Bezirk Innere Stadt - relativ und Veränderung 2000/2005

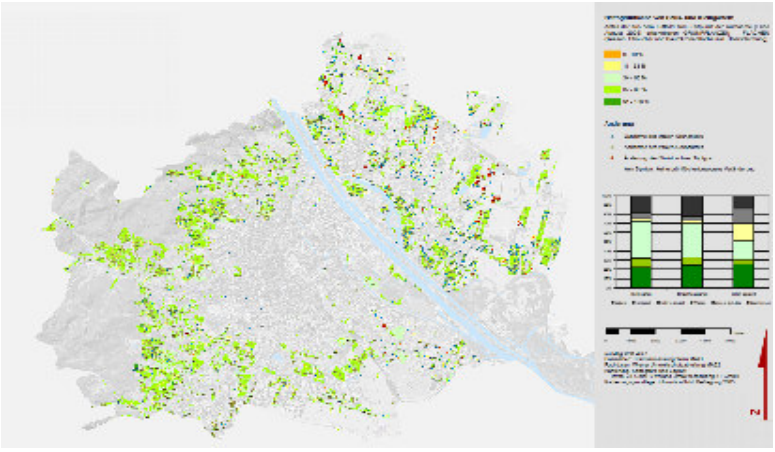

Abb. 11: Ergebnisse 2005 für Gärten und Kleingärten in Wien

5.1 Nettogrünfläche

In der Karte „Nettogrünfläche“ wird der prozentuelle Nettogrünflächenanteil ausgewiesen. Mit den Punktsymbolen werden die Veränderungen zur letzten Erhebung im Jahre 2000 veran-schaulicht. Schon in dieser Überblicks-darstellung erkennt man die relativ konstante Entwicklung in den Grün-gebieten Wiens und die dynamische Entwicklung im Nordosten (Transdanubien) bzw. im Süden Wiens.

5.2 Versiegelungsgrad

In der Karte „Versiegelungsgrad“ des 1. Bezirkes wird der prozentuelle Anteil der versiegelten und bebauten Flächen ausgewiesen. Ergänzend werden mit den Punktsymbolen die Veränderungen zur letzten Erhebung im Jahre 2000 veranschaulicht. Im innerstädtischen Bereich lassen sich nur relativ wenige quantitative Änderungen erkennen

5.3 Gärten und Kleingärten

Spezialauswertung der Karte Nettogrünfläche für den Grünraumtyp Haus- und Kleingarten: Neben der ringförmigen räumlichen Verteilung dieses Typs erkennt man den hohen prozentuellen Anteil an Nettogrün-fläche. Ergänzend wird mit Symbolen erläutert, welche Art von Grünflächen-veränderung auf der jeweiligen Fläche vorliegt (z.B. „blaues Dreieck“ □ Zunahme des vitalen Grünanteils).

Im Balkendiagramm von Abb.11 wird für die beiden Kategorien Kleingarten und Einzelhausgarten, im Vergleich zur Situation für das gesamte Stadtgebiet, die Verteilung von bebauten, versiegelten, nicht versiegelten Flächen, Wiesenflächen, anderen Gehölzflächen und Baumkronenflächen aufgezeigt.

Diese Art der kartografischen Darstellung wurde jeweils für verschiedene Grünraumtypen ausgewertet. Dadurch lassen sich sowohl für Wien als auch auf Bezirksebene Entwicklungen des „Grüns“ beispielsweise bei Großformbebauungen, land- und forstwirtschaftlichen Flächen, bei Park-, Erholungs- und Freizeitflächen oder bei Wiesenflächen beobachten.

5.4 Grünflächenveränderungen

Die Zunahme des vitalen Grünanteils hat meist sehr erfreuliche Gründe, wie die Schaffung neuer Grünflächen, Baumkronenzuwächse, Reduktion der geschädigten Bäume (insbesondere von durch Miniermotten geschädigten Kastanien). Weniger positiv sind Zuwächse, die nur auf den ersten Blick als solche erscheinen, beispielsweise wenn bei einem Neubau größere Rasenflächen kleinere Baumkronenflächen ersetzen oder bei der Ausbreitung von Neophyten statt standortgerechter Vegetation. Die Abnahme des vitalen Grünflächenanteils hat nicht nur Gründe wie das Umwandeln von Grünflächen in versiegelte Flächen bei Haus- und Straßenbau, das Fällen von Bäumen oder die Zunahme von geschädigten Bäumen. Sie kann sich, im Gegenteil dazu, sogar positiv auswirken, wenn geschädigte Bäume im urbanen Raum entfernt und durch Neupflanzungen ersetzt werden und dadurch der Zustand verbessert wird. Pflegemaßnahmen an Baumkronen durch Zurückstutzen sind ein weiteres Beispiel für die (temporäre) Abnahme von vitalem Grün.

In den Abbildungen 12 und 13 werden die ursachen- bzw. maßnahmenbezogenen Gründe für eine Grünflächenveränderung aufgezeigt. Im Rahmen der Kartierung wurde für jede Fläche der Grund für die Veränderung miterfasst. Baumkronenzuwachs und Rodung machen dabei jeweils ungefähr die Hälfte der Änderungsursachen bzw. -maßnahmen aus.

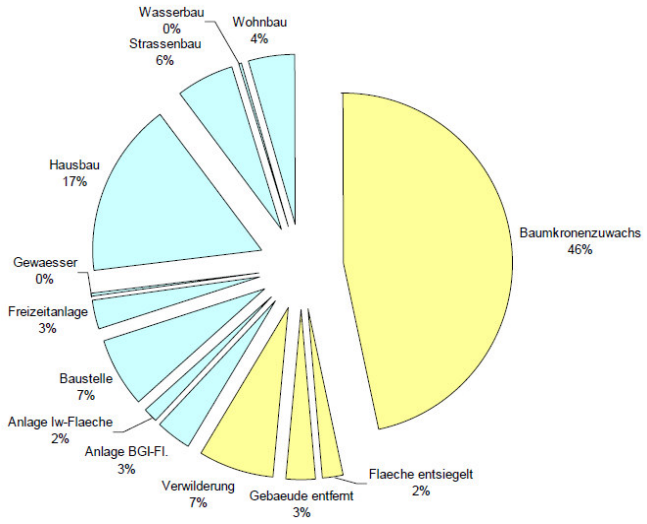

Abbildung 12: Ursachenbezogene Grünflächenveränderung (Ergebnisse 2005)

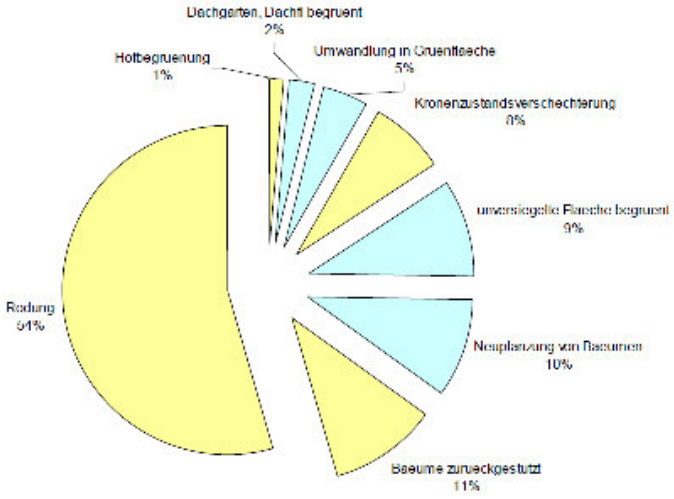

Abbildung 13: Maßnahmenbezogene Grünflächenveränderung (Ergebnisse 2005)

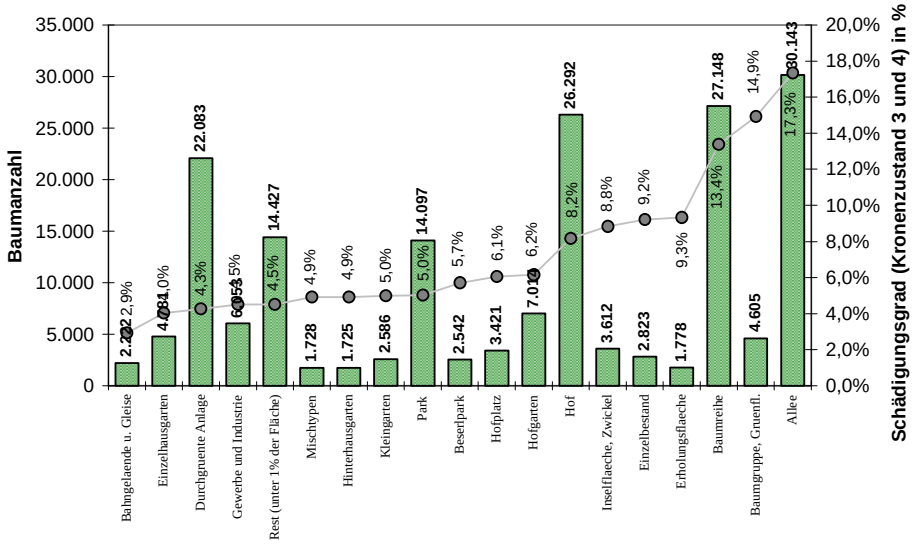

Abbildung 14: Anzahl der Bäume im innerstädtischen Bereich und im Straßenraum je Grünraumtyp, sowie Anteil der schädigten Bäume in Prozent (Ergebnisse 2005)

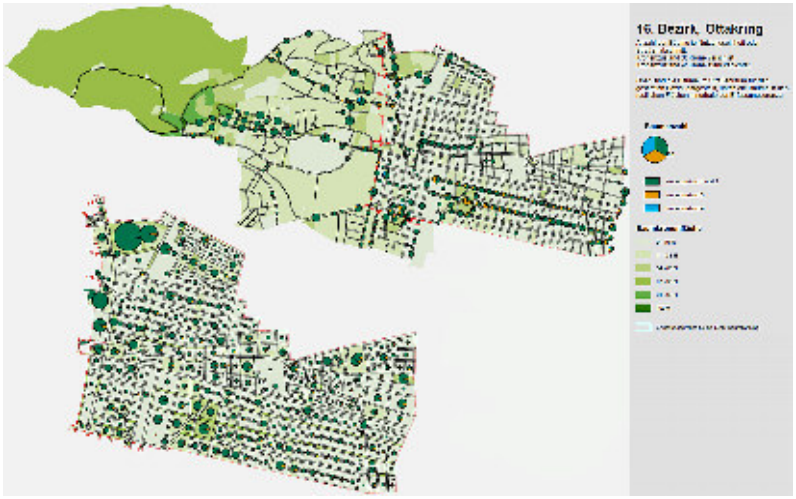

Abbildung 15: Ausschnitt der Baumkronenfläche Wiens, 16. Bezirk sowie Analysen zum Schädigungsgrad der Bäume (Kronenzustand 3 und 4)

5.5 Bäume in Wien

Im dicht bebauten Stadtgebiet und darüber hinaus für alle Straßen-abschnitte wurden sämtliche, aus den Infrarot-Luftbildern ersichtlichen, Bäume erfasst. Die Kartierung erhebt keinen Anspruch auf Vollständigkeit, da infolge des Kronenschlusses und durch Schattenbildungen die Zahl der Bäume nur geschätzt werden kann.

Für stark bestockte Flächen innerhalb des urbanen Gebietes wurde die Baumanzahl anhand der durchschnittlichen Baumkronendichte geschätzt. Die Ergebnisdarstellungen umfassen den Anteil der Baumkronenfläche in %, den Schädigungsgrad der Bäume in 3 Kategorien , die Baumdichte in den Bezirken und die Baumanzahl je Hektar.

Auf Bezirksebene wurde die Auswertung des Baumbestandes getrennt nach Straßenabschnitten und Blockbereichen durchgeführt. Üblicherweise ist die Belastung für einen Baum im Straßenbereich durch das Verkehrsaufkommen und den Winterdienst (Salzstreuung) höher als im Blockbereich. Dies zeigen die Abbildungen 14 und 15, aus denen ersichtlich ist, dass Bäume in den straßennahen Typen Baumreihe, Baumgruppe und Allee besonders belastet sind. Im oberen Plan der Abbildung 15 sind die Verteilungen der Baumqualitäten in den Straßenabschnitten symbolisiert, im unteren Plan jene für die Blöcke der Realnutzung.

5.6 Aggregation auf Stadtgebietstypen

Die zusammenfassende Betrachtung der Teilflächen nach Stadtgebietstypen zeigt ein erfreuliches Detail: Im Gebiet rund um den Bisamberg hat der Anteil der Krautschicht signifikant zugenommen (Abbildung 16). Der Versuch der Wiener Umweltschutzabteilung - MA 22 Zwischenrebenbegrünungen in den Weingärten und Gründüngung (Zwischenfruchtanbau) im Getreideanbau anzuregen, hat hier messbar zur positiven Entwicklung beigetragen. Auch das Programm Ackerrandstreifen im Zuge des Vertragsnaturschutzes hat die Grünausstattung auf landwirtschaftlichen Flächen verbessert.

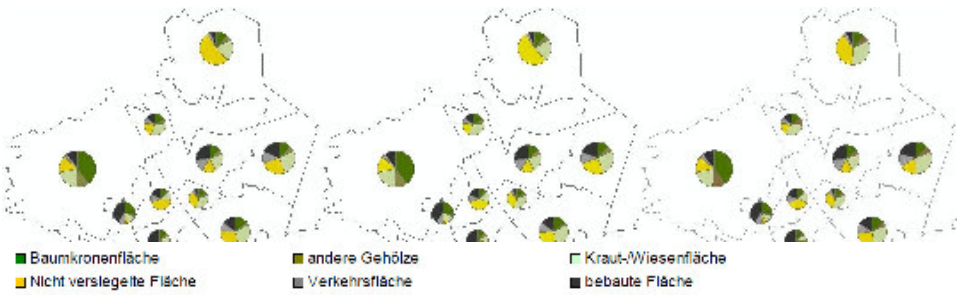

Abbildung 16: Ausschnitt der Karte: Anteil von Versiegelung, Begrünung und nichtversiegelten Flächen innerhalb der Stadtstrukturtypen

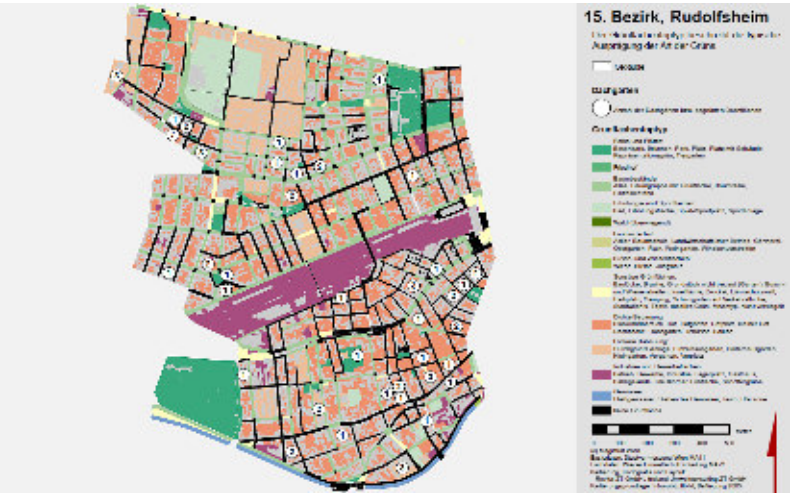

Abbildung 17:Anzahl Dachgärten und Grünflächentoptyp im 15. Bezirk

5.7 Dachgärten in Wien

Bei der Erhebung von 2005 wurden erstmals Dachgärten und Dachbegrünung im gesamten Gebiet aufgenommen. Balkonbegrünungen oder einzelne Topfpflanzen auf Dächern wurden nicht ausgewertet, da ihre Erfassungsgenauigkeit zu gering ist (Schattenwurf, Wachstums-konstanz, nicht homogen über das gesamte Stadtgebiet erkennbar). Es werden nur Dachflächen berücksichtigt, die eine großflächige Begrünung vorweisen. Eine solche kann eher über einen längeren Zeitraum bestehen und so eine ökologische Funktion erfüllen.

Knapp 1.100 Flächen mit Dachbegrünung wurden erkannt, die meisten innerhalb des Strukturtyps Hof im innerstädtischen Bereich. Vor allem die Bezirke Wieden, Margareten und Neubau weisen eine hohe Dichte an Dachbegrünungen auf. Auch auf Gebäuden von Industrie- und Gewerbeflächen ist gelegentlich ein Grünanteil auf Dächern zu finden. Bemerkenswert ist die üppige Ausstattung des Dachgrüns des Sandleiten-Wohnparks in Ottakring: Die Dachflächen sind so stark bewachsen, dass sie aus der Luft zum Teil nicht wahrnehmbar sind. Die größte Zahl an Dachbegrünungen in einer Nutzungseinheit finden wir auf den Dächern der UNO-City.

6 SCHLUSSFOLGERUNG

Das Grünraummonitoring hat sich als Planungswerkzeug und als Instrument zur Grünraumüberwachung etabliert. Die Anwendungsgebiete für die gewonnenen Daten sind vielfältig. Sie werden unter anderem als Grundlage der Überwachung der Grünraumqualität, als Input für Stellungnahmen in Widmungsverfahren und bei Bebauungsplänen oder für fachübergreifende Analysen herangezogen. Bedeutung haben sie auch für den Bodenschutz, bei der Beurteilung von Versiegelungen, als Grundlage für Sachverständigentätigkeiten und als Datengrundlage für wissenschaftliche Arbeiten.

Die Möglichkeiten der Fernerkundung haben sich in den vergangenen Jahren enorm entwickelt. Es ist eine Herausforderung, die Vergleichbarkeit der Daten fortlaufend zu gewährleisten – obwohl die Daten mit verschiedenen Techniken gewonnen wurden.

Im Sinne eines Monitorings und des Umweltschutzes ist die Wiener Umweltschutzabteilung - MA 22 bemüht, die Bandbreite der Technik auszuschöpfen und die Methode des Grünraummonitoring laufend an den Stand der Technik anzupassen.

7 ANHANG

Grünflächen-strukturtypen	Grünflächen-Toptypen nach übergeordneten Toptypen strukturiert			
Verkehrsfläche	**Baumbestände**	**Gewässer**	**Parks und Plätze**
Nebenfahrbahn	Allee (6)	Fließgewässer	Platz
Hof	Baumreihe	Stehendes Gewässer	Repräsentationsgrün
Hof zu Verkehrsfläche	Baumgruppe, Grünfl.	Uferzone	Park
Platz	Einzelbestand	Teich	Beserlpark
Park	**Betriebsgelände, Gewerbe, Industrie**	Brunnen	Platz mit Gebäude
Friedhof	BGI, Lagerpl., Gasth.	**keine Grünfläche**	Zoo, Tiergarten
Einzelhausgarten/park	Schottergrube	keine Grünfläche	**Sonstige Grünflächen**
Vor-, Hinterhausgarten	Bahngelände, Gleiskörper	**Landwirtschaft**	Inselfläche, Zwickel
Kleingarten	**Busch- und Wiesenflächen**	Acker	Schalthalle, Umspann
Erholung	Wiese, Busch, Jungw.	Landwirt. Betrieb, Gärtnerei	Brache
BGI	**Dichte Bebauung**	Baumschule	nicht versiegelt
Land-/Forstwirtschaft	Hofplatz	Rain	Lärmschutzwall
Windschutzstreifen	Hofgarten	Weingarten	Baulücke
Weingarten	Hof Dichte	Obstgarten	Parkplatz, Camping
Wald-/Busch und Wiesen	Dachgarten, Terrasse, Balkone	Windschutzstreifen	Stadtwildnis
Uferzone	Dachfläche	**Lockere Bebauung**	Schanigarten
Fließgewässer	Blockrandbereich	Einzelhausgarten	Busch und Wieserstreifen
stehendes Gewässer	kleiner Hof	Vorgarten, Vorplatz	Grundstück n.B. (Garten)
Baulücke	kleiner Hof, Grün dominiert	Hinterhausgarten	Mischtyp
sonstiges (Straßen)Bahnbereich	**Erholungs- und Sportflächen**	Kleingarten	Töpfe, mobiles Grün
Großformbebauung	Spiel-/Sportplatz	Durchgrünte Anlage	
Blockrandbereich	Sportanlage	**Wald**	
Dachgarten, Terrasse	Bad	Wald (überwiegend)	
Mischtyp	Erholungsfläche		
	Friedhof		

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🏆 *reviewed paper*

Zertifizierung von Stadtquartieren

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1 ABSTRACT

Die Entwicklung von Städten und Stadtquartieren steht vor unterschiedlichsten Herausforderungen und bedarf des stetigen Nachdenkens über Anforderungsniveaus und entsprechender Verständigung über Qualitätsstandards sowie deren Bewertung. Eine Komprimierung anhand quantitativer Verfahren kann hier hilfreich sein, um Anreize, Planungshilfen und Entscheidungsgrundlagen zu schaffen.

Die aktuell sehr kontrovers geführte Diskussion um die Zertifizierung von Stadtquartieren und die grundsätzliche Frage, ob Zertifizierung als Instrument zur Qualitätssicherung in der Stadtplanung über eine Konformitätsprüfung anhand gesetzter Standards einen Beitrag zur Schaffung lebenswerter, gesunder und prosperierender Städte leisten kann, steht in der Folge der zunehmenden Verbreitung von Gebäudebewertungssystemen und Nachhaltigkeitszertifikaten in der Bau- und Immobilienwirtschaft. Ähnlich der in der Erprobungsphase befindlichen internationalen Zertifizierungsansätze LEED Neighborhood Development und BREEAM Communities finden sich auch in Deutschland erste Ansätze und Bestrebungen für eine Zertifizierung von Stadtquartieren (DGNB).

Der vorliegende Beitrag greift die Diskussion um die Zertifizierung von Stadtquartieren auf, umreißt die Grundprinzipien der Zertifizierung, erläutert den aktuellen Stand der nationalen und internationalen Entwicklung von Zertifizierungssystemen für Stadtquartiere und skizziert den weiteren Forschungsbedarf hinsichtlich der Zertifizierung im räumlichen Kontext sowie der methodischen Übertragung der Zertifizierung auf Stadtplanungsprozesse.

Neben der verfahrensbezogenen Betrachtung der methodischen Weiterentwicklungspotenziale und -grenzen der Zertifizierung als Instrument der Qualitätssicherung im Rahmen von Stadtplanungsprozessen bedarf es der Untersuchung der Chancen (Optimierung, Marketing, Transparenz, Impuls- und Vorbildwirkung) und Grenzen (Stigmatisierung, Redlining etc.) des Einsatzes von Qualitätskriterien und Gütesiegeln zur Steuerung nachhaltiger Stadtentwicklung.

2 AKTUELLE DISKUSSION UM ZERTIFIZIERUNG IN STADTPLANUNG UND STADTENTWICKLUNG

Aufgrund sich wandelnder Rahmenbedingungen steht eine nachhaltige Entwicklung von Städten und Stadtquartieren vor unterschiedlichsten Herausforderungen. Da inzwischen mehr als die Hälfte der Weltbevölkerung in Städten lebt, hängt die Zukunftsfähigkeit der Menschheit eng mit der nachhaltigen Gestaltung der Städte zusammen. In Bezug auf das Konferenzthema Liveable, prosper, healthy CITIES for everyone stellt sich die Frage nach Standards für eine nachhaltige Entwicklung von Städten und Stadtquartieren. Es gilt unter Beachtung der weltweit verschiedenen Rahmenbedingungen Qualitätsmaßstabe nachhaltiger Stadtplanung und deren Sicherung im Rahmen von Planungsprozessen zu diskutieren.

Über die grundlegenden Ziele der Stadtentwicklung besteht weitgehender Konsens. Es gilt den sozialen Zusammenhalt, die ökologische und ökonomische Tragfähigkeit sowie baukulturelle Qualitäten zu stärken bzw. zu erhalten. Es bedarf dazu jedoch des kontinuierlichen Nachdenkens über Anforderungsniveaus in der Stadtplanung und einer wissenschaftlichen Fundierung. Vereinbarungen über Qualitätsstandards und deren Bewertung sind unabdingbar.

Eine Komprimierung von Informationen anhand quantitativer Verfahren kann hier hilfreich sein, um konkrete und handhabbare Grundlagen zu schaffen. Die Festlegung von Qualitätsanforderungen und Indikatoren zu deren Bewertung gewinnt bei Evaluierung und Monitoring im Rahmen der Stadtentwicklung auf kommunaler Ebene oder von Förderprogrammen (EU, Bund, Länder) zunehmend an Bedeutung, da somit die Transparenz der einzelnen Pläne und Programme hinsichtlich der Wirksamkeit des Mitteleinsatzes erhöht wird.

Diese Entwicklung folgt dem allgemeinen Trend zunehmender Bewertungs- und Zertifizierungsaktivitäten. Zum Teil gesetzlich geregelt bis weilen verstärkt auch freiwillig werden technische Produkte auf Konformität überprüft, lassen Unternehmen, Organisationen und Einrichtungen Prozesse und Verfahren oder

Studiengänge ihre Programme zertifizieren. In der Vielzahl von Audits und Labels zeigt sich ein deutlicher Trend, Qualitäten durch Indikatoren, Kennzahlen, Prädikate und Vergleiche messbar und somit öffentlich kommunizierbar zu machen.

Auch in der Bau- und Immobilienwirtschaft finden Gebäudebewertungssysteme und Nachhaltigkeitszertifikate zunehmende Verbreitung (BREEAM, LEED, DGNB, etc.). Beschränkte sich Zertifizierung im Bau- und Immobiliensektor bislang auf die Bewertung von neu errichteten Einzelgebäuden, so zeigen sich neben der Erweiterung um Varianten zur Bewertung weiterer Gebäudetypen (beispielsweise von Wohngebäuden) und Bestandsgebäuden auch Bestrebungen um die Entwicklung von Bewertungsvarianten für Stadtquartiere. Eine Zertifizierung von Stadtquartieren wie es beispielsweise die in der Erprobungsphase befindlichen internationalen Zertifizierungsansätze LEED for Neighborhood Development und BREEAM Communities anstreben steht aktuell auch in Deutschland zur Diskussion.

Die sehr kontrovers geführte Diskussion um die Zertifizierung von Stadtquartieren (unterschiedlichste Einschätzungen der Potenziale und Risiken, unklare Zielsetzung, unterschiedliche Interessenslagen, etc.) geht einher mit Fragen nach den Chancen und Grenzen des Einsatzes von Qualitätskriterien und Gütesiegeln als Instrument zur Steuerung nachhaltiger Stadtentwicklung [vgl. Potz 2009].

Der Bericht „Zertifizierung in der Stadtentwicklung – Bericht und Perspektive“ der Kommission des Deutschen Verbandes für Wohnungswesen, Städtebau und Raumordnung e.V. in Kooperation mit dem Bundesministerium für Verkehr, Bau und Stadtentwicklung (BMVBS) und die am 4. November 2009 im BMVBS in Berlin stattgefundene Fachveranstaltung zum Thema „Zertifizierung von Stadtquartieren: Qualitätskriterien und Gütesiegel als Instrumente einer nachhaltigen Stadtentwicklung“ bieten ein erstes Meinungsbild zur Leistungsfähigkeit und zu eventuellen Fehlentwicklungen von Zertifizierungen und Gütesiegeln [vgl. DV 2009].

Insbesondere die aktuell laufende Entwicklung weiterer Varianten des deutschen Zertifizierungssystems sowohl für Wohngebäude als auch Stadtquartiere stoßen teilweise auf Widerstände. Kritik äußert sich vor allem dahingehend, dass aufgrund einer Nachfrage nach komprimierter Information zunehmend Labels auf den Markt drängen und für Marketingzwecke genutzt werden, die eine objektive Qualitätsbewertung suggerieren, oft aber keine transparenten und auch keine fundierten Kriterien zu Grunde legen. Des Weiteren wird kritisiert, dass die Entwicklung der Zertifizierungssysteme vor dem Hintergrund wirtschaftlicher Interessen vorangetrieben wird und bisherige Systeme nicht plausibel und transparent sind. Bezug nehmend auf bestehende Zertifizierungsansätze im baulichen und räumlichen Kontext äußert sich Skepsis, ob die angloamerikanischen Ansätze auf die Verhältnisse in Deutschland übertragbar sind und ein für das im Vergleich einfach abzugrenzende System Gebäude entwickelter Zertifizierungsansatz auf ein System Quartier übertragen werden kann. Es wird bemängelt, dass der Frage nach der Definition der Qualitäten städtischer Quartiere und des zugrunde liegenden sozial-kulturellen Wertesystems nicht genügend nachgegangen wird.

Es zeigt sich, dass neben der Überprüfung möglicher Alternativen zunächst die grundsätzliche Durchführbarkeit und die Anwendungsvoraussetzungen von Zertifizierung in der Praxis untersucht werden sollten. Darauf aufbauend sollte es Ziel der Forschung sein, Formen der Anwendung des Instruments Zertifizierung zu finden, die einen auf Nachhaltigkeit zielenden Prozess in der Planung und Entwicklung von Stadtquartieren unterstützt. Damit einher geht die Frage, ob ein System bzw. ein Mechanismus aus Bewertung und Ranking eine Bereicherung des deutschen Planungssystems darstellen kann und in wie weit die wesentlichen Standards des Planen und Bauens in Deutschland bereits gesetzlich geregelt sind.

3 STRUKTUR UND ZIELE DER ZERTIFIZIERUNG

Um Aussagen zur Anwendung von Zertifizierung und Gütesiegeln im räumlichen Kontext treffen zu können, bedarf es in einem ersten Schritt der Untersuchung von Zertifizierung im nicht räumlichen Kontext hinsichtlich möglicher Übertragbarkeit. Bekannt und erprobt ist das Instrument der Zertifizierung vor allem im Bereich der produzierenden Wirtschaft im Rahmen der Kontrolle von Produkten anhand technischer Standards. Aufgrund der zum Teil langjährigen Existenz von Zertifizierungssystemen und Gütesiegeln in diesem Bereich können aus einer derartigen Analyse Erfahrungen gewonnen werden für die Entwicklung und Beurteilung von Zertifizierung im räumlichen Kontext.

Im Folgenden werden die Grundstruktur, Ziele und Elemente einer Zertifizierung schlaglichtartig dargestellt. Die Erläuterungen erfolgen zum Teil in vereinfachter Form und dienen dem Verständnis der in Kap. 4 erfolgenden Vorstellung von Zertifizierungsansätzen im baulichen und räumlichen Kontext.

Zertifizierung wird in unterschiedlichen Bereichen eingesetzt. Jedoch lässt sich aufgrund von zahlreichen Gemeinsamkeiten bestehender Zertifizierungssysteme eine Grundstruktur der Zertifizierung formulieren [vgl. Bieback 2008, 186]. In dieser Grundstruktur können je nachdem, ob es sich um eine akkreditierte Zertifizierung oder eine nicht akkreditierte Zertifizierung handelt, drei bzw. zwei Ebenen unterschieden werden: Die Ebene der Akkreditierung durch eine Akkreditierungsstelle, die Ebene der eigentlichen Zertifizierung durch eine Zertifizierungsstelle und die Ebene der Gegenstände der Zertifizierung [vgl. Bieback 2008, 29; Ensthaler et al. 2007, 38; Gropp 2009, 7].

Die akkreditierte Zertifizierung stellt demnach ein gestuftes Prüfsystem dar, bestehend aus den Stufen der Zertifizierung des Betrachtungsgegenstandes und der vorgeschalteten Akkreditierung zur Feststellung der Kompetenz der Zertifizierungsstelle [vgl. Bieback 2008, 29]. Im Rahmen nicht akkreditierter Zertifizierung entfällt die Stufe der Akkreditierung.

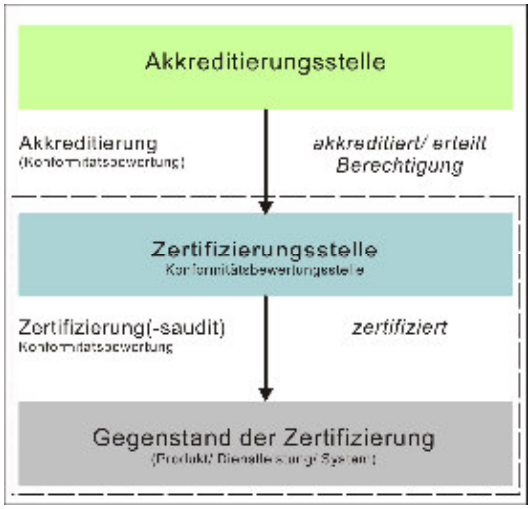

Abb. 1: Ebenen und Begriffe in der Struktur der Zertifizierung [Eigene Darstellung nach Bieback 2008, 29; Ensthaler et al. 2007, 38; Gropp 2009, 7]

In einer allgemeinen Definition lässt sich Zertifizierung bezeichnen als die seitens eines externen und unabhängigen Dritten durchgeführte Überprüfung (Drittparteienaudit), dass ein Produkt, eine Dienstleistung oder ein System bestimmten, vorher definierten Anforderungen entspricht. Dieser Schritt wird auch als Konformitätsbewertung bezeichnet. Die Überprüfung ist verbunden mit einer entsprechenden Bestätigung (Zertifikat) dieser Konformität. Eine Zertifizierungsstelle ist demnach die Stelle, die Zertifizierungen durchführt [vgl. Bieback 2008, 33; Ensthaler et al. 2007, 27; Gropp 2009, 11].[1]

Eine Akkreditierung beinhaltet in diesem Zusammenhang zum einen die formelle Feststellung und Bestätigung durch eine allgemein anerkannte Instanz, dass eine Stelle (Zertifizierungs- / Konformitätsbewertungsstelle) die Kompetenz aufweist, um bestimmte (Prüf- und Zertifizierungs-) Aufgaben durchzuführen, und zum anderen die Erteilung der Berechtigung zur Durchführung dieser Aufgaben. Eine Akkreditierungsstelle ist folglich eine befugte Stelle, die Akkreditierungen durchführt [vgl. Bieback 2008, 33f.].[2]

Grundsätzlich kann jeder und jede Stelle Zertifizierungen durchführen. Es bedarf hierzu keiner besonderen Berechtigung (Akkreditierung). Jedoch unterziehen sich Zertifizierungsstellen auch ohne gesetzliche

[1] DIN EN ISO/IEC 17000:2005 Ziffer 5.5 definiert Zertifizierung als „Bestätigung durch dritte Seite bezogen auf Produkte, Prozesse, Systeme oder Personen". Bestätigung wird nach Ziffer 5.5 definiert als „Erstellen einer Konformitätsaussage auf der Grundlage einer Entscheidung, die der Bewertung folgt, dass die Erfüllung festgelegter Anforderungen dargelegt wurde". Konformitätsbewertung ist nach Ziffer 2.1 die „Darlegung, dass festgestellt Anforderungen, bezogen auf ein Produkt, einen Prozess, ein System, eine Person oder Stelle erfüllt sind".

[2] DIN EN ISO/IEC 17000:2005 Ziffer 5.6 definiert Akkreditierung als „Bestätigung durch eine dritte Stelle, die formal darlegt, dass eine Konformitätsbewertungsstelle die Kompetenz besitzt, bestimmte Konformitätsbewertungsaufgaben durchzuführen". Der Begriff der Akkreditierung wird in anderen Bereichen weiter gefasst und einhergehend mit sprachlicher Unklarheit analog zur Zertifizierung auch für die Prüfung von Dienstleistungen, Managementsystemen oder Studiengängen verwendet [vgl. Bieback 2008, 34].

Regelungen oftmals einer Akkreditierung durch eine externe Stelle, um entsprechende Vertrauenswürdigkeit (z.B. gegenüber potenziellen Kunden oder Nutzern) zu erlangen. Eine Akkreditierungsstelle gründen und Akkreditierungen von Zertifizierungsstellen durchführen kann wiederum jeder [vgl. Bieback 2008, 30].

Neben dieser grundsätzlichen Freiheit zeigen sich in der jüngeren Vergangenheit zunehmend staatliche und supranationale (europäische) Initiativen und Regelungen zur Zertifizierung und Akkreditierung. Diese betreffen neben dem klassischen Bereich der Überprüfung der Sicherheit technischer Produkte beispielsweise die Leistungsfähigkeit von Abfallentsorgungsbetrieben, das Umweltmanagement von Unternehmen und Organisationen, die Programme von Studiengängen oder die Qualität von Pflegeleistungen entsprechender Einrichtungen. Trotz staatlicher Regelungen bleibt in vielen Fällen die Zertifizierung Aufgabe akkreditierter bzw. dazu berechtigter privater Stellen [vgl. Bieback 2008, 30].

Auf der dritten Ebene können Zertifizierungen neben den oben angeführten Einsatzbereichen auch anhand der zu überprüfenden Gegenstände unterschieden werden. Eine Differenzierung lässt sich anhand der Kategorien „Produkt“ und „System“ vornehmen. Der Zertifizierungsgegenstand „Produkt“ ist in einem weit gefassten Verständnis etwas, das eine Organisation hervorbringt und nach außen anbietet - als produziertes (technisches) Erzeugnis aber auch als Dienstleistung (bspw. Studiengangprogramme, Pflegeleistungen). Im Gegensatz dazu betrachtet die Zertifizierung von „Systemen“ interne Vorgänge und Abläufe (insb. Prozesse und Verfahren im Rahmen von Managementsystemen).[3] In der Literatur wird anhand der Betrachtungsgegenstände zum Teil weitergehend differenziert in Produkt-, Prozess- und Systemzertifizierung [vgl. Gropp 2009, 11f.]. Produkt- und Systemzertifizierung können sich ergänzen. So werden im Rahmen von Produktzertifizierungen oftmals auch ein Qualitätsmanagement bzw. Qualitätssicherungssysteme zertifiziert [vgl. Bieback 2008, 189; Hansen 1993, 151/161].

Zertifizierung verfolgt unterschiedliche Ziele. Grundsätzlich dient sie dem Schutz bestimmter je nach Einsatzbereich unterschiedlicher Güter. Dies kann bezogen auf die Produktsicherheit die Gesundheit und Sicherheit der Nutzer, im Rahmen von Umweltaudits der Schutz der Umwelt, bei Studiengängen die Qualität wissenschaftlicher Ausbildung oder im Pflegebereich der Schutz pflegebedürftiger Menschen und ihrer Rechte sein. Der Güterschutz erfolgt durch die Sicherung der Qualität der Zertifizierungsgegenstände [vgl. Bieback 2008, 196f.]. Der Qualitätsbegriff lässt sich jedoch nur schwer definieren [vgl. Stockmann 2006, 22ff.; Bieback 2008, 197]. Die in der Industrie weit verbreitete Definition von Qualität als Grad der Einhaltung technischer Anforderungen – anhand scheinbar objektiver Kriterien – bedarf in vielen Zusammenhängen der Berücksichtigung der Erfüllung von Bedürfnissen und Erfordernissen, die aus Kunden- und Nutzersicht festgelegt werden [vgl. Stockmann 2006, 23]. Ausgehend von der Qualität eines Produktes oder einer Dienstleistung wird auf die Qualität der zu diesem Ergebnis führenden Prozesse oder des gesamten Systems geschlossen [vgl. Gropp 2009, 9]. Bei aller Begriffsverschwommenheit lässt sich einschränkend festhalten, dass „die Qualität eines Produktes oder einer Dienstleistung nicht allgemeingültig bestimmt werden kann, sondern sich nach der Bewertung des Nutzens durch die Kunden bemisst. Diese Bewertung kann nach verschiedenen Kriterien vorgenommen werden, die wiederum je nach situativem Kontext, kulturellen Besonderheiten und Art des Produkts von sehr unterschiedlicher Bedeutung sein können.“ [Stockmann 2006, 24]

Qualitätssicherung kann allgemein als die Gesamtheit von Maßnahmen und Tätigkeiten, die auf die Erreichung von Qualität gerichtet sind, verstanden werden. Das Ziel der Qualitätssicherung im Rahmen der Zertifizierung kann über die einfachste Form der Konformitätsbewertung (Ergebnisqualität) hinaus auch eine systembezogene Qualitätssicherung (Prozess- und Strukturqualität) sowie im Rahmen eines weit gefassten Auftrages die Entwicklung und Setzung von Qualitätsmaßstäben sein [vgl. Bieback 2008, 197ff.].

Zertifizierung hat oftmals eine Innen- und eine Außenwirkung. Nach innen bietet der Bewertungs- und Zertifizierungsprozess die Möglichkeit, Transparenz zu schaffen, Strukturen, Abläufe und Zustände zu optimieren sowie einen kontinuierlichen Verbesserungsprozess zu initiieren. Nach außen wird die Konformität mit vorher festgelegten Qualitäten im Sinne einer Qualitätsauszeichnung bescheinigt [vgl.

[3] DIN EN ISO/IEC 9000:2005 Ziffer 3.4.1 definiert Prozess als „Satz von in Wechselbeziehung oder Wechselwirkung stehenden Tätigkeiten, der Eingeben in Ergebnisse umwandelt“. Nach Ziffer 3.4.2 wird als Produkt das durch den Prozess erzeugte Ergebnis bezeichnet. Als System wird nach Ziffer 3.2.1 ein „Satz von in Wechselbeziehung oder Wechselwirkung stehenden Elementen“ bezeichnet, der die Gesamtheit der Prozesse inkl. der zur Durchführung benötigten Ressourcen (Personal, Mittel und Verfahren) umfasst [vgl. Gropp 2009, 8].

Gropp 2009, 1]. Dies schafft Vertrauen für potenzielle Nutzer und Kunden und kann entsprechend zu Marketingzwecken genutzt werden.

Bei der Betrachtung der einzelnen Elemente einer Zertifizierung lassen sich Zertifizierungssysteme grundsätzlich unterteilen in den Prozess der Bewertung und das Zertifizierungsverfahren. Im Rahmen des Bewertungssystems gilt es zwischen Sach- und Wertebene zu unterscheiden (siehe Abb. 2).

Auf der Sachebene wird der Bewertungsgegenstand über Modellebenen und Qualitätsdimensionen in Verbindung mit Qualitätskriterien modelliert. Auf der Wertebene erfolgt die Setzung von Qualitätsmaßstäben bspw. in Form von Normen und Standards zur Operationalisierung von im gesellschaftlichen und/ oder fachlichen Diskurs definierten Qualitätszielen [vgl. Fürst 2008, 297ff.]. Die Verbindung von Indikatoren, Qualitätsmaßstäben sowie Mess- und Bewertungsmethoden ermöglicht die Entwicklung eines Katalogs von Kriteriensteckbriefen, der die Basis des eigentlichen Zertifizierungsaudits darstellt.

Auf der Verfahrensebene erfolgt die Zertifizierung entsprechend der gewählten Struktur einer akkreditierten oder nicht akkreditierten Zertifizierung (siehe Abb. 1). Bei erfolgreicher Bewertung der Konformität wird ein Zertifikat erteilt [vgl. Bieback 2008, 186 ff.; Ensthaler et al. 2007, 15ff.].

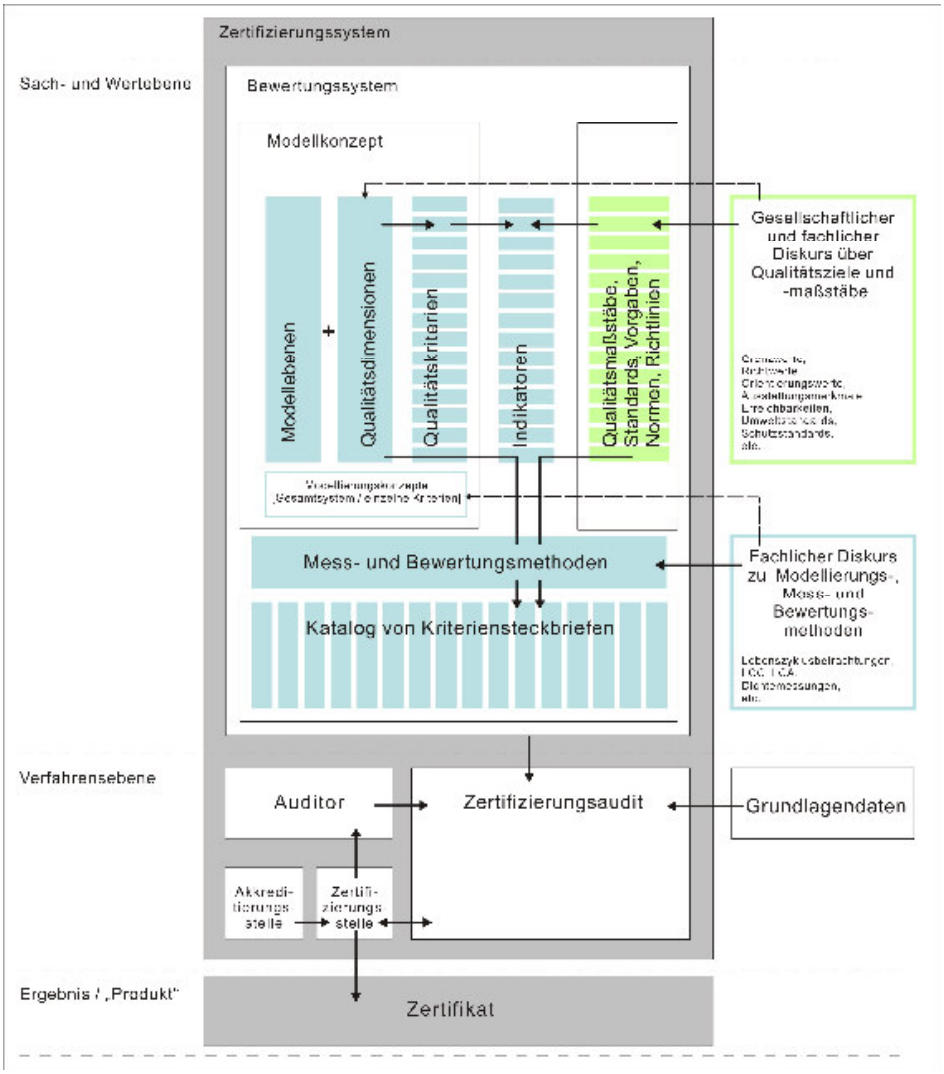

Abb. 2: Elemente eines Zertifizierungssystems [Eigene Darstellung]

4 ZERTIFIZIERUNGSSYSTEME IM BAULICHEN UND RÄUMLICHEN KONTEXT

In der jüngeren Vergangenheit kamen zu den klassischen Einsatzbereichen der Zertifizierung weitere im baulichen und räumlichen Kontext hinzu. Die Bewertung und Zertifizierung von Bauwerken kann bereits auf eine längere internationale Entwicklung von über 15 Jahren zurückgreifen, während sich die Ansätze der Zertifizierung im stadträumlichen Kontext (Stadtquartiere, Communities, Neigborhoods) noch in der Erprobungsphase befinden. Diese verzögerte Zuwendung zu Quartieren als Bezugseinheit ist nicht einer

mangelnden Relevanz der Thematik sondern der Komplexität des räumlichen Betrachtungsgegenstandes geschuldet [vgl. DV 2009, 20].

Ausgehend von der Normierung und Zertifizierung von Baustoffen und Bauteilen sowie aufgrund von Bestrebungen um die Setzung von Standards und die Qualitätssicherung im Bausektor wurden zum Teil auf private (NGO) und zum Teil auf staatliche Initiative hin in diversen Ländern Zertifizierungssysteme im Bauwesen entwickelt. In ihrer Entwicklung am weitesten fortgeschritten sind das durch das britische Building Research Establishment (BRE: ehemaliges staatliches inzwischen privatisiertes britisches Bauforschungsinstitut) entwickelte System BREEAM Communities und das System LEED-Neighborhood Development des United States Green Building Council (USGBC: NGO).

BREEAM Communities basiert auf den Erfahrungen, die seit 1990 durch die stetige Weiterentwicklung der BREEAM-Gebäudezertifikate (Building Research Establishment Environmental Assessment Method) gewonnen wurden. Das BREEAM-Bewertungsschema für Gebäude ist bislang in Varianten für Büros, Industrieanlagen, Schulen, Gerichte, Gefängnisse, Einzelhandelsgebäude, Krankenhäuser, Ökohäuser, Wohnanlagen und Wohnhäuser verfügbar. Durch den „Code for Sustainable Homes“ wurden in einigen Bereichen verbindliche nationale Standards abgeleitet. Als ältestes Bewertungssystem für nachhaltiges Bauen ist BREEAM das Vorbild für die Systeme anderer Länder.

Nach einem internen Review-Verfahren startete BREEAM Communities Mitte 2009 in die Pilotphase. Der Bewertungsrahmen wurde anhand von Projekten in den neun englischen Regionen erprobt. Bekannte Projekte sind das „Athletes' Village London 2012“ und der Hauptsitz von BBC in Manchester „MediaCityUK“.

BREEAM Communities wurde in einem Top-Down-Ansatz als Zertifizierungssystem für großflächige „New Development Projects“ (Greenfield, Brownfield, Infill Projets) und „Major Regeneration Projects“ entwickelt und ist Teil einer staatlichen Strategie zur Förderung nachhaltiger Stadtquartiere.

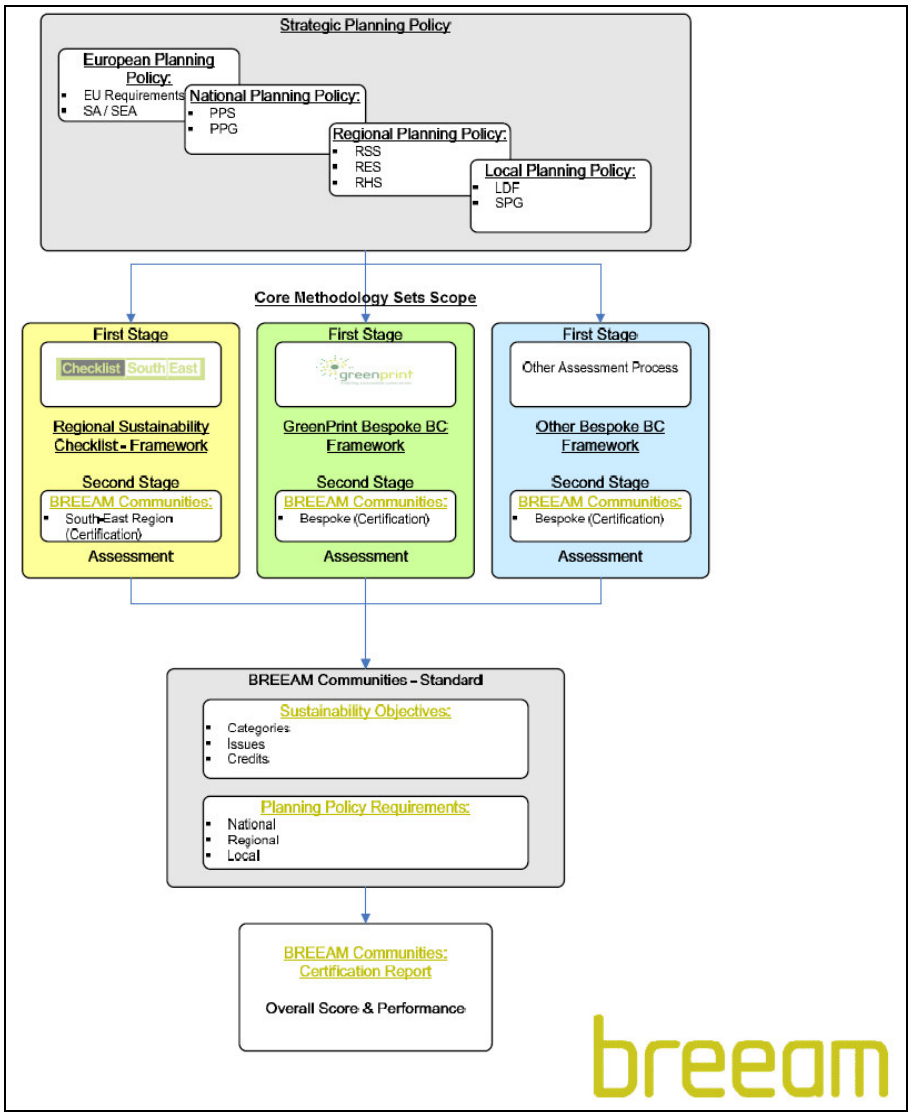

Abb. 3: Mehrstufiges Zertifizierungssystem BREEAM Communities [BRE Global 2010, www.breeam.org]

Das BREEAM Communities Scheme ist konzipiert als Hilfestellung für Planer und Entwickler, um in verschiedenen Phasen des Planungsprozesses die Nachhaltigkeit von Projektentwicklungsanträgen zu verbessern und unabhängig zu bescheinigen. Verknüpft mit „Regional Sustainabilits Checklists“ bildet das BREEAM Communities Scheme die Grundlage für den angestrebten verbindlichen „Code for Sustainable Communities“, der einen nationalen Bewertungsrahmen für nachhaltige Planung von Stadtquartieren darstellen wird. Entwicklungsprojekte können bislang in zwei Phasen des Planungsprozesses zertifiziert werden. Durch ein optionales „Interim Certificate“ (Vorzertifikat) kann eine Projektplanung auf einem frühen Stand zertifiziert werden. Auf der zweiten Stufe wird durch ein obligatorisches „Final Certificate“ die detaillierte finale Projektplanung vor dem verbindlichen Genehmigungsverfahren bezogen auf ökologische, soziale und ökonomische Nachhaltigkeitsziele überprüft. Für darauf folgende Projektphasen ist eine Zertifizierung als „Post-construction Review“ und „Post-occupancy Evaluation“ geplant. Die Grundlage der Bewertung bildet ein Katalog aus Kriterien in acht Kategorien (Klima, Gemeinschaft (community), Place making, Gebäude, Verkehr und Mobilität, Ökologie, Ressourcen, Handel). Das durch BRE erteilte BREEAM-Zertifikat wird ergänzend zum Bauantrag im Genehmigungsverfahren eingereicht [vgl. Braune et al. 2007, 7ff.; BRE Global 2010, www.breeam.org; DV 2009, 22ff.; Ernst & Young Real Estate 2008, 11ff.].

Das Ratingsystem LEED for Neighborhood Development stellt einen der bislang acht Standards für umweltfreundliches, ressourcenschonendes und nachhaltiges Bauen dar, die vom United States Green Building Council (USGBC) seit 1998 entwickelt und angeboten werden. LEED-ND wurde in einem Bottom-Up-Ansatz als Zertifizierungssystem für die freiwillige Bewertung von „Development and Redevelopment Projects“ entwickelt. Es integriert die Prinzipien des „Smart Growth“ und des „New Urbanism“ und stellt eine Zusammenarbeit zwischen USGBC, Congress for the New Urbanism und Natural Resources Defense

Council dar, die aufgrund des öffentlichen Planungssystems in den USA als Think Tanks und NGO-Netzwerke eine nicht unwesentliche Rolle bei der Entwicklung von Qualitätszielen in der Planung spielen. Im Jahr 2007 wurde eine Pilotphase mit 240 Projekten weltweit eröffnet. Die Post-Pilot-Version von LEED-ND ist seit Ende 2009 öffentlich zugänglich. Projekte können nach LEED-ND in drei Stufen im Rahmen eines Drittparteienaudits zertifiziert werden: In der ersten Stufe (Optional Pre-review) wird die grundsätzliche Konformität mit den LEED-Standards geprüft. Die zweite Stufe (Certification of an Approved Plan) ermöglicht es, nach Vorlage aller notwendigen Genehmigungen das Projekt als „LEED-ND Certified Plan“ zu bewerben. Das endgültige Zertifikat (Certification of a completed Neighbourhood Development) wird in der dritten Stufe im Rahmen der Fertigstellung der Bauwerke ausgestellt. Wie die anderen LEED-Systeme besteht das LEED-ND-System aus zwingend zu erfüllenden Voraussetzungen (prerequisites) und optionalen Kriterien, die mit Punkten bewertet werden. Die Grundlage der Bewertung bilden Kriterien in vier Kategorien (Smart location and linkage, Neigborhood Pattern and Design, Green Construction and Technology, Innovation and Design Process). Abhängig von der erreichten Punktzahl wird ein Zertifikat in Silber, Gold oder Platin vergeben [vgl. Braune et al. 2007, 7ff.; DV 2009, 21ff.; Ernst & Young Real Estate 2008, 11ff.; USGBC 2010, www.usgbc.org].

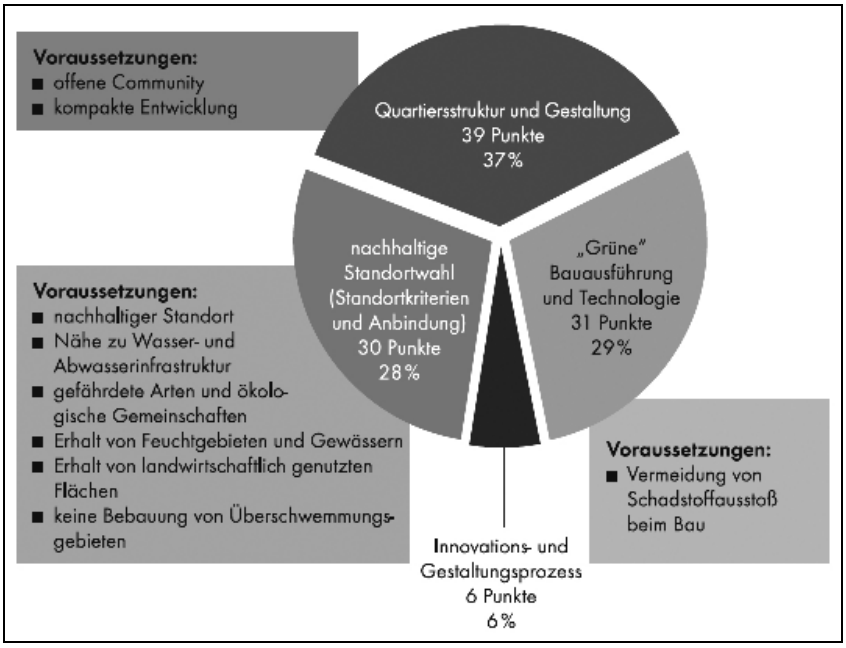

Abb. 4: Kriteriengewichtung des Zertifizierungssystems LEED Neighborhood Development [DV 2009, 23]

In Deutschland besteht bislang kein allgemein verfügbares Zertifizierungssystem für Stadtquartiere. Seit 2009 ist mit dem „Deutschen Gütesiegel Nachhaltiges Bauen“ ein Zertifizierungssystem für die freiwillige Bewertung von Büro- und Verwaltungsbauten als Ergebnis einer gemeinsamen Entwicklung der Deutschen Gesellschaft für Nachhaltiges Bauen e.V. (DGNB) und des Bundesministeriums für Verkehr, Bau und Stadtentwicklung (BMVBS) am Markt verfügbar. Auf der Basis deutscher bzw. internationale Baustandards und Normen wurde ein Kriterienkatalog zur ganzheitlichen Betrachtung und Bewertung von Nachhaltigkeitsaspekten für Gebäude entwickelt. Unter Betrachtung des gesamten Lebenszyklus von Gebäuden werden ökologische, ökonomische und soziokulturelle Qualitäten sowie technische und prozessuale Aspekte fertig gestellter Bauten bewertet (siehe Abb. 5) [vgl. BMVBS 2010, www.nachhaltigesbauen.de; Ernst & Young Real Estate 2008, 11ff.; Gertis et al. 2008, 251ff.].

Zwischenzeitlich hat die DGNB die Entwicklung weiterer Systemvarianten u.a. auch für die Zertifizierung von Stadtquartieren angekündigt, die auf der Grundstruktur des Bewertungssystems für Büro- und Verwaltungsbauten aufbauen [vgl. DGNB 2010, www.dgnb.de; Potz 2009].

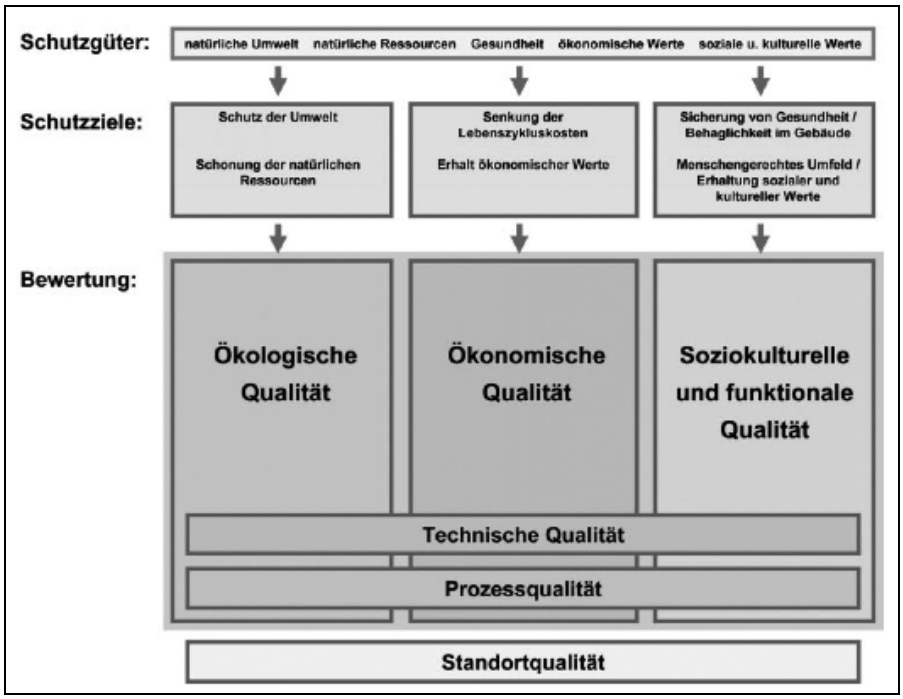

Abb. 5: Struktur des Deutschen Gütesiegels Nachhaltiges Bauen [Gertis et al. 2008, 252]

5 FORSCHUNGSBEDARF ZUR ZERTIFIZIERUNG IM RÄUMLICHEN KONTEXT

Anhand der vorangegangen Ausführungen zu Struktur und Zielen der Zertifizierung, zu Qualität und Qualitätssicherung sowie zu bestehenden bzw. sich in der Entwicklung befindlichen Zertifizierungssystemen im baulichen und räumlichen Kontext ergibt sich aus Sicht der Stadtplanung folgender Forschungsbedarf.

Es gilt die grundlegenden Rahmenbedingungen einer Zertifizierung von Stadtquartieren bzw. der Zertifizierung in der Stadtplanung zu definieren. Im Zusammenhang der Erfahrungen mit Zertifizierung in anderen Bereichen und deren Übertragung auf den räumlichen Kontext stellen sich mehrere Fragen: Handelt es sich bei Quartieren um ein „Produkt“ und kann ein „Ergebnis“ auf Konformität geprüft und bewertet werden? Auf welcher Grundlage kann die Planung eines Quartiers als Produkt zertifiziert werden? Oder sollte eine verfahrensbezogene Prozess- bzw. Systemzertifizierung im Sinne einer Zertifizierung des Qualitätsmanagements im Planungsprozess erfolgen?

Neben einer Betrachtung der methodischen Weiterentwicklungspotenziale und grenzen der Zertifizierung als Instrument der Qualitätssicherung im Rahmen von Stadtplanungsprozessen bedarf es der Untersuchung der Chancen (Optimierung, Marketing, Transparenz, Impuls- und Vorbildwirkung) und Grenzen (Stigmatisierung, Redlining etc.) des Einsatzes von Qualitätskriterien und Gütesiegeln zur Steuerung nachhaltiger Stadtentwicklung.

Bei der Übertragung der Erkenntnisse aus der Zertifizierung von Bauwerken und Gebäuden auf den räumlichen Gegenstand des Stadtquartiers zeigen sich weitere Schwierigkeiten. Es stellen sich Fragen zum Sachmodell, zum Zielsystem, zu Bewertungsregeln, zur Wertzuordnung und Wertsynthese sowie zur Grundlage und zum Zeitpunkt der Zertifizierung von Stadtquartieren.

Insbesondere bei der Setzung von Modell- bzw. Systemgrenzen des Zertifizierungsgegenstandes Stadtquartier zeigen sich die grundlegenden Unterschiede zwischen Bauwerk und Raum. Ein Stadtquartier kann nicht wie ein Gebäude als abgeschlossenes System verstanden werden, sondern als Raum mit sozialem Bezugssystem, der zum einen durch städtebauliche und funktionale Gegebenheiten und zum anderen durch reale sowie subjektiv empfundene Kriterien bestimmt wird [vgl. DV 2009, 13, 20]. Die bereits komplexe Betrachtung eines Gebäudes im Kontext seines Standortes ist nur beschränkt übertragbar auf ein Quartier im Kontext des Raumes. Des Weiteren bedarf es einer differenzierten Betrachtung von Bestands- und Neubauquartieren.

In materieller Hinsicht stellt sich ausgehend von den Überlegungen zur Definition von Qualität und Qualitätssicherung die grundsätzliche Frage nach Qualitäten von Stadt und deren Teilbereiche, nach

Qualitäten nachhaltiger Stadtentwicklung und Qualität in der Stadtplanung sowie der entsprechenden Setzung von Anforderungsniveaus und Qualitätsstandards.

6 AUSBLICK

Wenn die Zertifizierung von Plänen und Projekten in der Stadtplanung mehr sein soll als die Auszeichnung von Vorzeigeprojekten und ihre Vermarktung, dann sollte die Zertifizierung im räumlichen Kontext als Instrument der Qualitätssicherung und -entwicklung sowie Planungsoptimierung und Entscheidungsunterstützung verstanden und kritisch auf ihre Potenziale und Risiken untersucht werden.

Sollte sich eine Zertifizierung in diesem Sinne als geeignet erweisen, dann kann dies ein Instrument darstellen, das über die Beschreibung und Bewertung von Zuständen hinausgeht, das Bewusstsein für Qualitäten fördert und das zur Steuerung nachhaltiger Stadtentwicklung beiträgt.

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“Air-City”: Modular pneumatic and bionic architecture for buildings and mobile fairs

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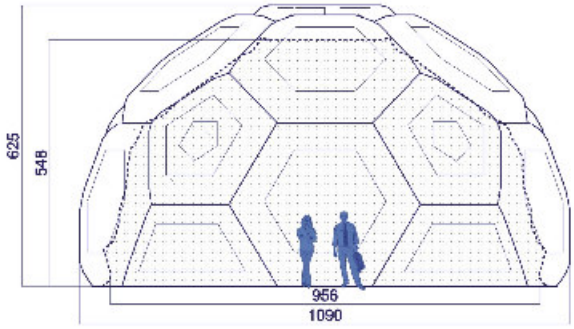
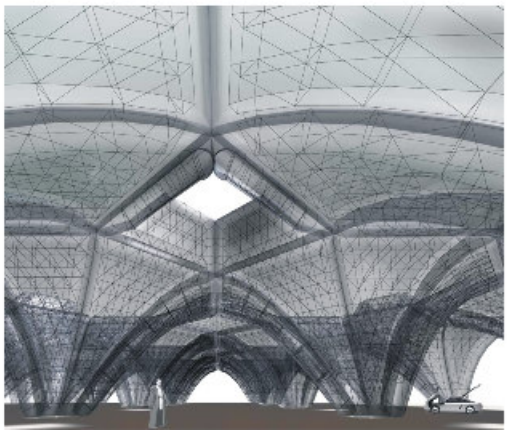
1 ABSTRACT

Nach einer Einführung in pneumatisches Bauen stellt Thomas Herzig die ökologischen, statischen und praktischen Vorteile der von ihm entwickelten modularen pneumatischen Bauweise vor. „Pneumocell“ ist ein Bausatz aus aufblasbaren Zellen in Analogie zu biologischen Zellkonstruktionen. Wie riesige Legosteine können die einzelnen Zellen vielfältig miteinander verbunden werden und nahezu unbegrenzt neue Räume erschließen. Hiermit wird die Basis für eine völlig neuartige ressourcenschonende Baumethode gebildet, die für extrem leichte, schnell errichtbare, mobile oder auch permanente Gebäude geeignet ist.

Angesicht aktueller Trends sieht Gerald Härtlein so auch eine Möglichkeit, gerade Messen für eine umweltfreundliche Mobilität an städtischen Hot-Spots wie Bahnhöfen oder Fussgängerzonen mit einem zeitgemäßen Ausstellungsprogramm zu veranstalten. Denn angestoßen durch die mobile Online-Kommunikation wird das multimodale Leitbild „mobil unterwegs“ den alten automobilen Mythos von Fahrspass, Freiheit und Unabhängigkeit allmählich ablösen. Prägte bislang der motorisierte Individualverkehr das Aussehen der Städte, liegt es nun an ihnen, intelligente Verknüpfungen zwischen den einzelnen Verkehrsträgern aufzuzeigen und das neue, umweltfreundlichere Leitbild publicityträchtig auch mit einer passenden Expression zu verbreiten.





2 PNEUMATISCHE BAUTEN UND DIE SEHNSUCHT NACH LEICHTIGKEIT

Seit Jahrhunderten haben Architekten und Ingenieure das Ziel den Materialbedarf und das Gewicht ihrer Konstruktionen zu minimieren. Beispiele sind hierfür die schlanken Pfeiler und Steingitter der Gotik, bis hin zu filigranen Stahlfachwerken des 20. Jahrhunderts und den Leichtbaukonstruktionen der Luftfahrt. In diesem Streben nach Leichtigkeit und Entmaterialisierung erweist sich „Luft“ als ein Baustoff mit einem enormen Potential. Das Pneu als Konstruktionsprinzip ist eine flexible, geschlossene Membran, die von einem flexiblen Medium wie Luft, einem anderen Gas oder einer Flüssigkeit gefüllt ist. Stabilität und Form eines Pneus ergeben sich aus der Differenz zwischen Innen- und Aussendruck in Zusammenhang mit der Oberflä-

chengeometrie der Membran. Dabei ist die Membran wie ein Luftballon stets bestrebt die Form anzunehmen, welche das maximale Volumen garantiert.

Pneumatische Konstruktionen sind hinsichtlich Materialminimierung und Gewichtsreduzierung jeder anderen Konstruktionsmethode überlegen. Der Grund dafür ist, dass ausschließlich Zugkräfte auf das Material einwirken und daher keine statische Überdimensionierung erforderlich ist um Knickungen vorzubeugen. Typische technische Anwendungen sind Schlauchboote, Schwimmhilfen, Airbags, Luftmatratzen, Fahrzeugreifen, Luftkissenboote, Luftschiffe, Ballone oder großvolumige Module für Raumstationen. Pneumatische Konstruktionen fallen mit Zeltkonstruktionen unter die Kategorie der Membrankonstruktionen. Bei allen Membrankonstruktionen ist für die Stabilisierung der Membran eine Vorspannung nötig, die in einer doppelte Krümmung der Membranfläche resultiert. Bei Zelten erfolgt die Vorspannung über Rahmen oder Stäbe, bei Pneus über den Innendruck. Im Vergleich zum bereits recht leichten Zeltbau, fallen also beim Pneu die knickgefährdeten und schweren Tragstäbe weg.

Die pneumatische Architektur selbst lässt sich wie folgt unterteilen:

- **Traglufthallen** (http://en.wikipedia.org/wiki/Frederick_W._Lanchester, erstes Patent von William Lanchaster 1917), bei denen ein einziges Volumen mit einem Innendruck von 2 bis 5 Millibar von einer einlagigen Membran umspannt wird. Die Nachteile dieser kostengünstigen Konstruktion liegen nicht nur in der schlechten Wärmedämmung der Einfachmembran. Da der Innenraum unter Druck steht, sind für den Zugang extra Luftschleusen notwendig. Traglufthallen erfordern eine besonders starke Bodenverankerung, da nicht nur der sehr drastisch verformende Winddruck einwirkt, sondern zusätzlich durch den vorhandenen Innendruck ein permanenter Auftrieb entsteht, dem entgegengewirkt werden muss. Bei einem großen Luftloch kollabiert die gesamte Konstruktion.
- **Doppelwandige Konstruktionen** wie die bekannten kommerziellen "Luftburgen" oder das Frankfurter „Peanut-Teahouse" (http://www.form-tl.de/pages/projects/p2.html) des Architekten Kengo Kuma haben eine Aussenhülle aus zwei Membranlagen, die durch innere Seilverspannungen oder quergespannte Folien einen vordefinierten Abstand halten, wenn sie bei 10- 100 Millibar starken Druck aufgeblasen werden. Diese etwas aufwendigere Konstruktionsmethode ermöglicht mit einem druckfreien Innenraum beliebige Öffnungen. Luftdicht ausgeführte Bauten sind zudem besser wärmegedämmt und benötigen eine weniger solide Bodenverankerung als eine Traglufthalle.
- **In Rahmenkonstruktion eingespannte pneumatische Kissen.** Derartige Konstruktionen sind nicht pneumatisch selbsttragend, sondern bedürfen ähnlich einer Glasfassade oder -überdachung, einer Rahmenkonstruktion aus Stahl oder Glas. Anstatt Glas werden i.d.R. zwei oder mehrere Lagen ETFE (Ethylen-Tetraflouretylen)-Folie in die Rahmenfelder gespannt. Aufgrund der Gewichtsvorteils gegenüber Glas, kann die Tragkonstruktion leichter und kostengünstiger ausgeführt werden. Prominente Beispiele sind die Allianz Arena, das Schwimmstadion Bejing oder der Edenpark-Cornwall.

Neben der Leichtigkeit und dem geringen Materialbedarf bieten pneumatische Konstruktionen auch statische Vorteile**.** Harte Konstruktionen werden bereits durch kleine Verformungen zerstört, da die direkte Weiterleitung von Druckkräften, lange bevor die maximale Druckfestigkeit ausgereizt ist, zu Knickungen führt. Bei pneumatischen Konstruktionen leitet dagegen das innere Druckmedium jede einwirkende Kraft gleichmäßig auf die äußere Membran als knickfreie Zugkräfte ab. Das Objekt verformt sich, gewinnt aber von alleine seine alte Form zurück, sobald die Krafteinwirkung vorbei ist. Leider hat das Jahr 2010 Haiti gleich zu Beginn ein paar schreckliche Erdbeben beschert. Wären alle Häuser dort aufblasbar gewesen, hätte es erheblich weniger Todesopfer gegeben. Pneumatische Konstruktionen sind absolut erdbebensicher, da sie nahezu jegliche Verformung aufnehmen können. Es ist zwar derzeit eine unrealisierbare Utopie sämtliche Bauten pneumatisch zu konstruieren, aber es zeigt sich, dass es wichtig und richtig ist, in diese Richtung weiter zu forschen. Die pneumatische Architektur ist noch eine relativ junge Technologie, deren Potential bisher nur zu einem Bruchteil ausgeschöpft wurde. Völlig neue Herangehensweisen für Produktion, Aufbau, Konstruktion, statische Berechungen und Formensprache werden damit einhergehen. Auch das Bauen sollte heute mit weniger Ressourcen- und Energieverbrauch erfolgen. Pneumatische Konstruktionen kommen hier dem Ideal des entmaterialisierten Bauens am meisten entgegen. Zudem sind die Wiederverwendbarkeit und Recyclebarkeit wichtige Faktoren, die das Bauen ökologisch verträglicher und kostengünstiger machen.

3 PNEUMOCELL – MODULAR PNEUMATISCHE BAUTEN

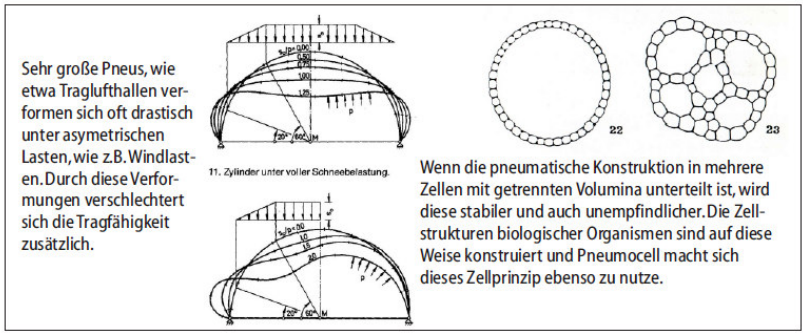
Doppelwandige pneumatische Konstruktionen als Bausatzelemente sind eine technische Neuheit und daher ist auch bisher nichts Vergleichbares am Markt vorhanden. „Pneumocell“ (www.pneumocell.com) wurde vom Wiener Architekt Thomas Herzig erfunden und patentiert. In Analogie zu biologischen Zellen, ist Pneumocell ein Bausatzsystem seriell gefertigter aufblasbarer Luftzellen, die wie riesige „Lego-Elemente“ vielfältig zusammengesetzt werden können. Die Kompatibilität der unterschiedlich geformten Pneumocellen ist durch deren gemeinsame Kantenlänge gewährleistet. Die Stabilität des Zellverbands wird entweder dadurch erreicht, dass die Elemente schalenförmig aneinander gefügt werden, oder dass Querrippen nach Decke-Balkenprinzip die Konstruktion aussteifen. Vorbild hierfür ist die Natur, welche diese effizienteste aller Konstruktionsarten bereits vor Millionen Jahren hervorgebracht hat: Jeder Wassertropfen, jede lebende Zelle und jedes von einer Haut umgebenes vielzelliges Organ ist wie ein Pneu, ein abgeschlossener Körper, der von einer formbaren Hülle umschlossen ist.

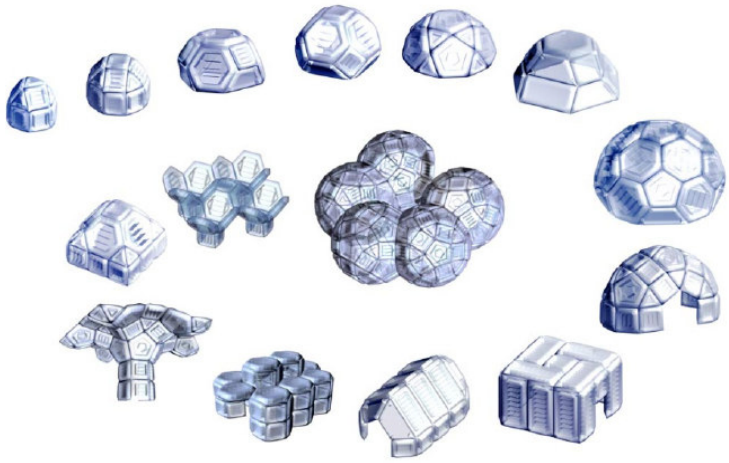
Aufgrund der Serienfertigung der Pneumocellen können die Kosten für Produktion und Entwicklung erheblich reduziert werden. Mit dem Bausatzsystem wird auch die Errichtung und Anwendung pneumatischer Bauwerke wesentlich kostengünstiger und einfacher. Gleichzeitig lässt es eine Vielzahl individueller Lösungen zu. Erstmals wird bei Pneumocell im Membran-Hochbau auch transparente Polyurethanfolie (TPU) verwendet, die luftdicht verschweisst ist. Pneumocell weist gegenüber den oben skizzierten pneumatischen Konstruktionen folgende Merkmale und Vorteile auf:

- **Bausatzprinzip**:Vorgefertigte Module können kostengünstig in Serie produziert und schnell geliefert werden. Bei neuen Entwürfen und Aufbauten kann auf großteils bewährte Komponenten zugegriffen werden. Unabhängig vom Einsatzort können die Pneumocellen am optimalen Produktionsstandort angefertigt und zu jedem Punkt der Erde leicht transportiert werden.
- **Zellprinzip**: Mehrere Zellen machen die Konstruktion stabiler und unempfindlicher. Ist eine Zelle beschädigt, kann sie ausgetauscht werden, während die anderen Zellen im Verband die Konstruktion weiterhin halten, ähnliche einer biologischen Zellkonstruktion. Während große Traglufthallen in einem Stück gefertigt sind und daher nicht ohne Maschinen aufgebaut werden können, sind Pneumocell-Elemente immer gerade noch so groß, dass sie von Menschenhand getragen und zusammengesetzt werden können.
- **Selbsttragend**: Anders als bei den üblichen ETFE (Ethylen-Tetraflouretylen)-Membrankissenkonstruktionen braucht Pneumocell keine Rahmenkonstruktion und auch sonst keine festen Bauteile, sondern ist komplett selbsttragend.
- **Luftdichte Zellen**: Da die Zellen aus TPU-Folie luftdicht verschweisst sind, muss nicht ein ständig mitlaufendes Gebläse den Luftdruck aufrechterhalten. TPU ist nicht nur klar transparent erhältlich, sondern anders als ETFE elastisch, so dass es für Transporte zusammengefaltet werden kann.
- **Skalierbarkeit**: Aus einzelnen Modulen lassen sich Gebäude nahezu unbegrenzter Größe zusammensetzen. Jedes Einzelmodul ist aber gerade nur so groß, dass es alleine durch menschliche Arbeitskraft ohne Baumaschinen und Kräne manipuliert werden kann.
- **Keine festen Teile**: Pneumocellen können jederzeit im luftleeren Zustand zusammengefaltet und transportiert werden. Die Montage bzw. das Verbinden der einzelnen Elemente kann am Boden ohne Baugerüste und Kräne erfolgen. Anders als bei einem Zelt, richtet sich die Konstruktion durch die Luftbefüllung von alleine auf.
- **Ökologische Vorteile**: Im Vergleich zu einer Konstruktion aus Pneumocell-Elementen, würde eine Holzkonstruktion ungefähr die 40-fache Masse benötigen um ein gleich großes Volumen wind- und wetterdicht zu überbauen. Bei einer massiven Konstruktion aus Ziegel und Beton wäre es sogar die 400-fache Masse. Besonders bei mobilen Bauwerken, die jährlich mehrmals transportiert werden müssen, ist das geringe Eigengewicht mehr als alles andere entscheidend für einen kleinen ökologischen Fussabdruck. Pneumocell-Elememente bestehen aus reinem TPU, das sich hundertprozentig recyclen lässt. Bei der Entsorgung entstehen keine problematischen Mischabfälle.
- **Wärmedämmung und Steuerung des Lichteinfalls**: Mehrere Luftkammern hintereinander können den U-Wert auf Niveau der allerbesten Isolierverglasungen drücken. Die beiden äußeren Membranen können zudem reflektierend bedruckt werden: Ohne Luft zwischen den beiden Membranen sind die

Druckraster deckungsgleich, so dass fast kein Licht durchkommt. Wird aber Luft in den Zwischenraum geblasen, so lässt jede Folienlage jeweils 50% Licht durch.

- **Statische Leistungsfähigkeit für eine City-Architektur und mobile Hallen**: Die spannende Herausforderung mit dem entsprechenden Umsatzpotential liegt bei größeren Hochbauanwendungen. Derzeit werden größere und statisch leistungsfähigere Elemente für richtig große Hallen und Überdachungen (30m Spannweite und mehr) entwickelt. Für große Spannweiten wird die dünne Folie in ein Seilnetz eingebettet, das sämtliche auftretenden Zugspannungen aufnehmen kann und somit die Folie entlastet. Pneumocell wird so auch Stahl-Glaskonstruktionen für Überdachungen und Fassaden zu einem Zehntel der bisherigen Kosten ersetzen können, zudem mobil und wieder verwendbar sein.





Modulares pneumatisches Bauen, Beispiele von Pneumocell-Aufbauten

4 MOBILE MESSEN FÜR EINE UMWELTFREUNDLICHE MOBILITÄT

Praktisch werden Pneumocell-Bauten bereits für regionale Messen eingesetzt. Oft sind gerade in Klein- und Mittelstädten die Stadthallen zu klein oder ungeeignet und oft wird auch ein ungewöhnlicher Präsentationsrahmen für einen Event gewünscht. Flexibler als Zelte sind modulare pneumatische Bauten schnell in ein bestehendes urbanes oder architektonisches Umfeld einpassbar. Flexibler als Zelte sind modulare pneumatische Bauten schnell in ein bestehendes urbanes oder architektonisches Umfeld einpassbar. Der geringe Zeit- und Ressourcenaufwand für den Aufbau und Antransport, sowie das geringe Gewicht sorgen zudem Indoor wie Outdoor für eine ökonomisch und ökologisch interessante Lösung. Grüne Standards sind mittlerweile auch in der Veranstaltungsbranche en vogue und werden bereits vereinzelt im Messebau angeboten (Messewirtschaft, Sonderbeilage SZ, Nr.21, 2010). Entsprechend hätte gerade eine Pneumocell-Messe für eine umweltfreundliche Mobilität, plaziert an hochfrequentierten urbanen Hot-Spots wie Bahnhöfen, Bahnhofsvorplätzen oder Fussgängerzonen, einen besonderen Öko-Charme: Werden die Passanten auf dem Weg zu ihren Alltagsgeschäften von einer mobilen Messe „abgefangen", unterblieben die mobilitätsbedingten Umweltbelastungen einer extra anzufahrenden Veranstaltung.

Wie könnte demnach ein marktfähiges und zeitgemäßes Messekonzept „mobil2020" aussehen? Anläßlich der Preisverleihung „Gelber Engel" forderte der deutsche Bundespräsident Horst Köhler vor versammelter Automobilwirtschaft neben umweltfreundlichen Antrieben und einen attraktiveren öffentlichen Nah- und Fernverkehr, auch ein nachhaltiges Überdenken des liebgewonnen Alltagstrotts: „Die Mobilität, wie wir sie

heute praktizieren, ist nicht zukunftsfähig. Um in Zukunft mobil zu bleiben, müssen wir alle grundlegend umdenken. Machen wir aus dem alten Autokult eine neue Mobilitätskultur.“ (aus: ADAC Motorwelt 2/2010) Verschiedene Verkehrsträger sinnvoll zu vernetzen und hierfür die passenden Schnittstellen zu präsentieren, könnte entsprechend die Vision einer städtischen Mobilitätsmesse lauten: „Für den zukünftigen Verkehrsteilnehmer ist es völlig normal mit dem gemieteten Flüssiggas-, Erdgas-, Elekro- oder Hybrid-Auto den Arbeitskollegen mitzunehmen. Das Navigationssystem leitet ihn zum besten P+R-Parkplatz, von dem er dem ÖPNV zusteigt. Wenn es regnet, entscheidet er für die Weiterfahrt zur Arbeit nicht, den Service Bike & Ride zu nutzen, sondern kurzerhand mit dem Smartphone bei einer OpenRide-Börse eine mobile Ad-hoc-Mitfahrgelegenheit zu suchen.“

Ist so eine Vision einer multimodalen Mobilität überhaupt zukunftsfähig? Obwohl sich Autofahrenerheblich verteuerte und zu großen Umweltbelastungen führt, hat sich in den letzen 20 Jahren wenig geändert. Während in Deutschland der Personenverkehrsaufwand um 26 Prozent stieg, haben sich die Verkehrsteilnehmer nicht verstärkt für umweltfreundliche Fortbewegungsmittel entschieden. Immer noch sind 68 Prozent der Berufstätigen mit dem eigenen PKW zu ihrem Arbeitsplatz, der durchschnittlich 22 Kilometer vom Wohnort entfernt liegt, unterwegs. Dafür brauchen sie im Schnitt 45 Minuten. Selbst für Strecken, die weniger als fünf Kilometer lang sind, steigt noch etwa die Hälfte ins Auto. Insgesamt steht etwa ein Viertel bis zu dreimal wöchentlich im Stau. Nur jeder vierte Berufstätige nutzt das Fahrrad oder geht zu Fuß. Auf Bus und Bahn setzen lediglich 19 Prozent. (SZ, 2010, Nr. 173) Neben der CO_2-Belastung führt der motorisierten Individualverkehr trotz verbesserter Emissions- und Immissionsnormen vor allen in den Städten zu erheblichen Umwelt- und Gesundheitsschäden wie Lärm, bodennahes Ozon, Feinstaubbelastung, sowie hohe und giftige Stickstoffdioxid-Immissionen.

5 DER NEUE SINNMARKT MOBILITÄT

Doch die unbedingte Vorherrschaft des Autos scheint nur auf den ersten Blick ungetrübt zu sein. Es gibt Entwicklungen, die sie ernstzunehmender erodieren, als es eine durch die Finanzkrise bedingte Absatzflaute je vermochte. Die erste Entwicklung ist ein Einstellungs- und Wertewandel. Während die Automobilwirtschaft weiterhin das Auto als „emotionalen Lebensraum“ propagiert, belegen bereits mehrere sozialwissenschaftliche Studien eindrücklich die „Entzauberung“ des einstigen Kult- und Statusobjekts:„Das Konsumgut Auto hat sein Poleposition im emotionalen Raum verloren. Die Liebesbeziehung zum Auto wird immer mehr zur Vernunftsehe. Insbesondere für Hersteller im Premium-Segment ist das eine dramatische Entwicklung. In den letzen Jahren hat sich der Aspekt Nachhaltigkeit beim Kunden vom wohlmeinenden Apell immer mehr zur echten Herzensangelegenheit entwickelt. Umweltschutz und soziale Gerechtigkeit sind die neuen Dimensionen der Attraktivität. Die Industrie hat viel zu lange unbeirrt an ihrer auf technische Innovation, Leistungsstärke und Verarbeitungsqualität ausgerichteten Produktpolitik festgehalten“. (www.Horizont.net, 3.4.2009)

Mobilität wird demnach, kaum bemerkt von den Autoherstellern und Medien, neu bewertet: Sie muss heutzutage verstärkt dem Gefühl entsprechen vernüftig, stressfrei und ohne schlechtes Gewissen „sinnvoll in meinen Alltag zu passen“. So sind mittlerweile deutsche Autofahrer bereit, durchschnittlich 2.200 Euro Preisaufschlag für ein CO_2-armes Auto zu zahlen. (ZEW 2010, iwd-online.de) An die Stelle der Begeisterung für das Produkt Auto tritt zunehmend der Wunsch nach persönlich sinnvollen Mobilitätskonzepten. Aus dem Objekt der Begierde und dem Symbol persönlicher Unabhängigkeit wird mehr oder weniger ein nüchternes Werkzeug mobiler Funktionalität (SZ, mobiles Leben, 2. Juni 2009).

In den Einstellungen zur Mobilität hat sich also bereits „unterschwellig“ einiges geändert. Der maßgeblichste Veränderungsdruck kommt aber nicht aus dem Verkehrssektor selbst, sondern von der IT- Branche. Das iPhone verwandelte das Handy zum Computer im Taschenformat, mit denen man auch telefonieren und von unterwegs ins Internet gehen kann. Mit einem schnellen Internet-Zugang krempeln derzeit die modernen Smartphones die ganze IT- Branche um. Die mobile Internetnutzung mit neuen Diensten, Anbietern und Geschäftsmodellen war auch der Schwerpunkt des letzten Mobile World Congress in Barcelona, der eine Mobilfunkbranche im Goldrausch zeigte. Kleiner, flacher, leichter und längere Akkulaufzeiten lauten die Hardware-Trends. Ultraflache Mini-Notesbooks versprechen eine neue Leichtigkeit. Touchscreen Handys bieten auch eine Kompletttastatur zum bequemen Eintippen für SMS und Mails. Micro Notebooks sind dabei die Lücke zwischen häufig zu kleinen Smartphones und noch zu sperrigen Mini- Notebooks zu schließen.Während man auf dem kleinen iPod nur mühsam eine Zeitung lesen kann, bietet der neue schreibblock-

große iPad „weniger Computer als vielmehr netter Bildschirm" (Der Spiegel) durch Befummeln und Streicheln der Touchscreens eine mühelose Bedienbarkeit.

Schon jetzt bieten Apps, denen die geschäftlich unterwegs sind, mit einer mobilen Routenplanung und Büronutzung einen erheblichen Reisekomfort. Eine Zeitungsannounce verspricht z.B.: „Greif auf deinen Computer zu, selbst wenn er gar nicht in der Nähe ist. Dieser echt praktische App zeigt dir den Bildschirm deines Computers und erlaubt dir Zugriff auf alle deine Dateien- und das mit nichts als deinem iPhone. Verwandle (zudem) dein iPhone in eine tragbare Festplatte. So kannst du über WLAN alle möglichen Dokumente zwischen deinen Computer und deinem Handy verschieben. Umgehe (ferner die) Warteschlangen am Ticketschalter, indem du dir dein Zugticket direkt auf dein iPhone schicken lässt. Behalte außerdem die ständig aktualisierten Abfahrtzeiten und alle Anschlusszüge im Blick. Musst du (dann noch) los zu einem Geschäftstermin? Dann miete dir direkt einen Wagen. Prüfe die Verfügbarkeit des Autos, reserviere es und lass es für deine Ankunft bereitstellen." (T-Mobile, iPhone 3G, Welt am Sonntag 21.3.2010) Jeder wird zukünftig auch seine Fahrtstecken, je nach momentaner Ausgangslage, „just in time" modular zusammenbauen können. Der mobile Mitfahrdienst OpenRide verknüpft bereits mobile Endgeräte, Navigations- und Routensoftware. Jeder Nutzer kann so unterwegs von seinem Mobiltelefon aus spontan und bequem nach Mitfahrgelegenheiten in seiner Umgebung suchen. „Damit erschliesen wir einen neuen Markt, denn im Nah- und Alltagsverkeht typische spontane und kürzere Fahrten werden bisher nicht vermittel", so lautet die Presseerklärung des Fraunhofer Instituts. Gerade im Großstadtverkehr können so die meist nur von einer Person besetzten Fahrzeuge besser ausgelastet werden. (Mobile Mitfahrzentrale, 28.8.2010, iwd-online.de)

Die einstmals teueren und schweren Laptops ließen sich zeit- und platzbedingt bestenfalls im Bahn-Fernverkehr ungestört aufklappen und waren mindestens so sperrig wie ein ausgebreiteter Aktenordner. Doch haben Bahnreisende schon mit Handys und Laptops der „sperrigen Generation" den Großraumwagen in ein rollendes Büro verwandelt. Was sich im Fernreiseverkehr bereits deutlich abzeichnet, wird sich mit den neuen, kleinformatigen und mobilen Internettools beschleunigt durchsetzen und vor allem auch den öffentlichen Nahverkehr spürbar verändern. Dieser wird enorm aufgewertet, wenn die verbrachte Zeit nicht mehr im Empfinden eines Passiv-kutschiert-Werdens nutzlos und schier endlos verstreicht, sondern jederzeit aktiv genutzt werden kann. Man arbeitet bereits im Büro, während man noch dort hinfährt. Oder man ist noch Zuhause, während man es bereits verlässt. Kurzum: Mobilität morgen bedeutet künftig „Jederzeit-und-überall". Mit attraktiven Tools für einen mobilen Internetzugang steigen die Opportunitätskosten einer singulären Autofahrt erheblich. Die multimedialen Möglichkeiten übersteigen zunehmend die Aufmerksamkeitskapzität eines Autofahrers, die zudem noch durch einen immer dichteren Straßenverkehr erheblich eingeschränkt wird (Der Spiegel, 7/2010). Das Auto fährt zunehmend „offline", der öffentliche Personennah- und Fernverkehr dagegen zunehmend „online".

6 FAZIT: PNEUMOCELL ALS VISION EINER MULTIMODALEN MOBILITÄT

In Liason mit dem Wertewandel ermöglichen mobile Online-Tools im Westentaschen- oder Taschenbuchformat das neue Leitbild „mobil unterwegs". Aus der Stadt wird eine „On-the-Air-City", in der jeder jederzeit und jederorts private und geschäftliche Räume entwirft und zwischen ihnen gleitet. Wer beispielsweise intensiv und permanent geschäftlich telefoniert, taucht auch seinen Sitznachbarn in eine Büroatmosphäre, so wie am iPad Autorennen spielende Jugendliche in das Zugabteil eine Spielhalle „projizieren". Unterwegs werden also Zeiten und Räume fluide, transparent und sie durchdringen sich. Das Virtuelle durchzieht zunehmend die Wirklichkeit. So wird demnächst die Realität als „Augmented Reality" (AR) virtuell unterstützt und ausgedehnt werden. Richtet man das Handygerät auf Strassen, Gebäude oder Denkmäler, liefert es die passenden Informationen aus dem Internet. (Welt am Sonntag, Nr. 11, 2010).

Auch Fahrtstrecken werden mit der mobilen Onlinekommunikation verstärkt modular zusammengesetzt und dabei wird, zur Freude der Umwelt, situationsbezogen zwischen den einzelnen Verkehrsträgern gewechselt. Wenn auch die großen Automobilmessen nicht unbedingt zu intermodalen Mobilitäts-Shows mutieren, weil sie noch am alten Kultobjekt ‚Auto' festhalten, stellt sich die Frage, wie sich die neuen Formen der Mobilität ädequat inszenieren lassen. Zunächst am besten vor Ort, denn das Set mobiler Möglichkeiten ist von Stadt zu Stadt verschieden. Ein zeitgemäßes Ausstellungsprogramm „mobil 2020" müsste neben umweltfreundlichen Autos alle Verkehrsträger präsentieren, die Vor-Ort-Akteure und Dienste für eine umweltfreundliche Mobilität bündeln, sowie neben den Möglichkeiten des mobilen Internets auch die Schnittstellen für eine multimodale Mobilität aufzeigen.

Sicherlich kann ein derartiges Messekonzept auch im Rahmen eines Zeltbaus oder einer Halle erfolgen. Doch um es eingängig zu profilieren, sollte es sowohl eine eigene und dichte Sprache sprechen, als sich auch vom Genre ‚Automesse' markant absetzen. Mit vollkommen mobilen und flexiblen pneumatischen Bauten wird die Vision „überall und jederzeit mobil unterwegs" zum Corporate Design, das die Topologie einer Stadt aufnehmen kann. Der Informationsraum „ÖPNV" könnte in Form eines Pilzes am Bahnhofsvorplatz stehen, der Informationsraum „mobiles Internet" als Torbogen in der Fussgängerzone, der Informationsraum „fit zu Fuss und zu Fahrrad" als Dome vor dem Rathaus und der Informationsraum „alternative Antriebe" als Kubus oder Pyramide vor dem Einkaufszentrum diese Raumfolge abschließen. Die ungewöhnlichen Pneumocell-Bauten sind anders als ein normales Zelt so auffällig, dass auf eine, übrigens auch CO_2-intensive, Plakatierung der Veranstaltung weitgehend verzichtet werden kann. Nachts ermöglichen sie eine außergewöhnliche Beleuchtung. Werden die Passanten auf ihren Weg abgefangen und angezogen, unterblieben die Umweltbelastungen einer extra anzufahrenden Veranstaltung. Die transparenten Pneumocell-Bauten verdecken auch nicht die städtische Umgebung, deren Lebensqualität verbessert werden soll. Betritt man den den Bau ist das umgebende Umfeld auch Indoor stets zu spüren. Gebaut wird schließlich mit dem Medium, auf das es letztendlich ankommt: Saubere Luft.

Fig.: Aufbau eines 80m^2-Pneumocell-Domes im Hbf Zürich

Abschießend noch ein Gedanke zum Ausdruck: Auffallend während der ersten Vermietungsphase von Pneumocell war die große Nachfrage von Kunstveranstaltern. Offenbar wird eine von „gewöhnlichen Events" unterscheidbare höherwertige Präsentationsform gesucht. Die sinnlich schwer zu fassende transparente Materialität, zwischen kristallin-eckiger Härte der Zellen und weicher Leichtigkeit, schafft eine (auch akustisch) gedämpfte Atmosphäre, was die Besucher offenkundig dazu anhält, sich vorsichtig und fast ehrfurchtsvoll den Bauten anzunähern. In Analogie zu Kunstmuseen verbreitet Pneumocell keine aufdringliche Lightsshow, sondern „gefasst in sich leuchtend" ein besonderes Lichtgenre. Pneumocell-Bauten verhüllen nicht, sie sind aber auch nicht vollständig transparent wie aus Glas geschaffene Räume. Sie rücken eine numinose „Sphäre aus Licht" zwischen Aussen- und Innenraum, wenn sich das Tages- bzw. LED-Licht in den Querverbindungen der Luftzellen „fängt". Wie bei der bekannten Glaspyramide des Louvres wird das Tageslicht focusiert nach innengeleitet, so dass letztendlich nicht das Gebäude, sondern im Mittelpunkt das ausgestellte Exponat im Licht erstrahlt. Spätestens seit Marcel Duchmap 1917 ein von ihm unter falschem Namen signiertes Urinal als „Readymade" bei einer New Yorker Kunstausstellung einreichte, streiten sich die Kunsttheoretiker verbissen, was eigentlich Kunst ausmacht. (brand eins, 11. Jg, 2009) Nach Boris Groy definieren weder der Kunstmarkt, noch das Werk oder der bekannte Künstler ‚Kunst', sondern in erster Linie die würdevolle Formsprache der musealen Inzenierung, die selbst banale Alltagsgegenstände in den Götterhimmel höherwertiger und unvergänglicher Kunstdinge zu heben vermag. (Boris Groy 2003, Topologie der Kunst; Wien, München) In diesem Sinn könnte ein in einem Pneumocell ausgestellter Elektroantrieb ein „Readymade" sein, ein wertvolles Unverwechselbares, ein echtes Kunststück, ein Orginal - aus einer einfachen Messe für eine umweltfreundliche Mobilität wird eine Ökomenta, die wirklich Werthaltiges inszeniert.

7 REFERENCES

Thomas Herzig (Architekt Mag. Arch, ZT) www.pneumocell.com

Nach seinem Diplom an der Akademie der bildenden Künste in der Meisterschule für Architektur bei Prof Gustav Peichl sammelte der Wiener Architekt zunächst Erfahrung mit Ausstellungsgestaltungen und Umbauten, dann als Projektleiter in der Umsetzung von Großprojekten im Wohn- und Verkehrsbau. Als selbstständiger Architekt setzte er kleinere Wohnbauten, Dachgeschoßausbauten und Messegestaltungen um. Sein Tätigkeitsfeld umfasste neben konventionellen Hochbau auch Webanimationen, Design, und Fahrzeugdesign. Seit 2004 ist aus seiner Idee für polygonale aufblasbare Bauelemente das industriell gefertigte und patentierte Serienprodukt „Pneumocell“ gereift. Mittlerweile ist Thomas Herzig einer der wenigen Spezialisten für aufblasbare Objekte und Konstruktionen und entwickelt auch Sonderobjekte, oft in Kooperation mit Künstlern. Für den Vertrieb und den Aufbau der Pneumocellkonstruktionen hat er seit letztem Jahr mit der Messe AG in Deutschland einen Partner gefunden.

Gerald Härtlein (Dipl. Volkswirt) www.messe.ag

Nach seinem Studium befasste sich Gerald Härtlein wissenschaftlich mit Stadtforschung sowie der Hermeneutik und dem „kommunikativen Wirken von Räumen“. Schwerpunkt als freiberuflicher Kommunalberater waren u.a. Standortanalysen, Citymarketing-, Umnutzungs- und Stadthallenkonzepte. Seit drei Jahren ist er für Deutschlands größten Regional- und Umweltmessenveranstalter, der Mattfeldt & Sänger Marketing und Messe AG für die Projektentwicklung, sowie für die PR- und Öffentlichkeitsarbeit verantwortlich.

AmauroMap – Interactive Online City Map for Blind and Visually Impaired People

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1 ABSTRACT

AmauroMap aims to give blind and visually impaired people access to interactive digital city maps. The project is not about linear navigation from A to B, moreover it is about the creation of cognitive maps by interactively exploiting a digital map. The system applies for the preparation of unknown routes. The technical innovation is the automatic derivation of spatial information from digital vector maps which makes it possible to use the system on a large area. The output will be a textual description of the visual map that can be accessed either with a braille display or a screenreader. The challenge is to describe the elements of the map in a way that respects the requirements of the target group. Therefore, a key element of the project is an empirical study about the orientation of blind and visually impaired people in the urban space.

2 INTRODUCTION TO AMAUROMAP

Today cities can be discovered easily and in a comfortable way from home with the help of interactive online maps. Although digital maps become more and more popular, they still belong to those elements of the web which are not accessible for all user groups. So far especially blind people do not get the chance to discover online city maps. AmauroMap tries to make this access possible.

The term “AmauroMap” is derived from “amaurosis” which is the ancient Greek term for blindness and indicates an interactive online map for blind and visually impaired people with the aim to support the preparation for unknown routes. The approach is to describe the visual map in words. So far there are mainly research and development activities in the field of navigation for blind people. However, AmauroMap does not want to navigate the user, but the user to navigate itself by interactively exploiting digital city maps. The goal is to get a better image of the city; this image – or cognitive/mental map – should include information about streets, intersections, blocks, points of interest, possible causes of risk, etc. (see figure 1) and their relation to each other. The elements of the map are described in a semantic way that is adapted to the requirements of blind and visually impaired people. As research activities are rather low and literature is rare in the field of orientation of blind people, AmauroMap works on an empiric study on the orientation of blind people and their requirements on a map for blind and visually impaired people. What needs to be stressed out is the innovative automatic annotation of the spatial description so that a large area can be covered.

The project AmauroMap is supported by the Internet Foundation Austria within the Netidee programme.

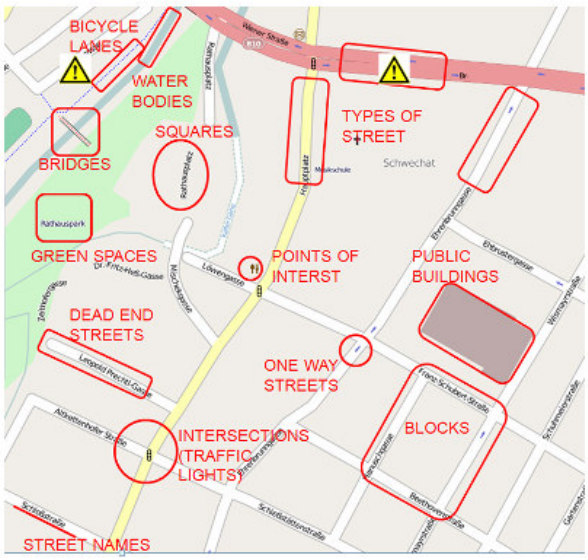

Fig. 1: Describable spatial information. Data source: Open Street Map

3 COGNITIVE MAP APPROACH

The theoretical background of the project is the “mental maps” or “cognitive maps” approach (TOLMAN 1948). Each person has an individual mental image (or map) of the surrounding which is important for orientation and wayfinding. In this regard LYNCH (1960) defines five elements of the urban space which are needed for the creation of cognitive maps: paths, edges, nodes, districts and landmarks (see figure 2). According to GOLLEDGE et al. (1996) blind people develop certain wayfinding skills by ”studying“ the surrounding area and memorising those elements. AmauroMap builds on this structure.

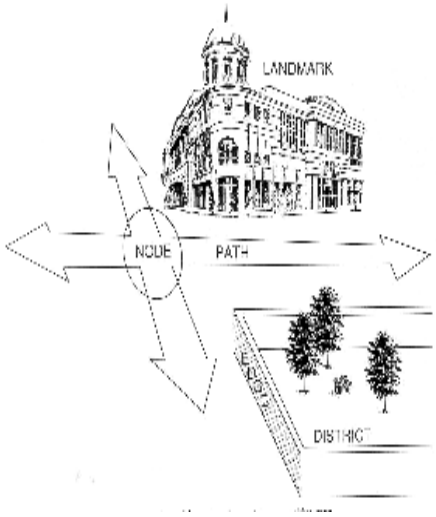

Fig. 2: Elements of the urban space according to LYNCH (1960) (Source: University of Eichstaett)[1]

4 EMPIRICAL STUDY ON THE ORIENTATION OF BLIND AND VISUALLY IMPAIRED PEOPLE

4.1 Methodology

Qualitative guided interviews with blind and visually impaired people, mobility trainers as well as representatives of organisations for blind and visually impaired people give information about the orientation of the target group. The interview partners have different profiles, meaning that they differ in the degree of visual impairement, age and the age when the blindness occured, mobility, sex, education and the use of additional devices such as navigation systems, guide dogs, white canes or information systems such as POPTIS.[2] For a successful realisation of AmauroMap it is necessary to know the user’s needs as clear as possible. The key questions asked are what are the important landmarks for orientation? What information is required in a map for a successful wayfinding? What should the spatial description be like so that it is understandable and useful?

4.2 Results

The interview results show that on a micro-level orientation points are extremely individual. Every route has specific orientation points and every person perceives them in a different way. Some people concentrate stronger on tactile landmarks, whereas others perceive acoustic or olfactory ones more easily. Especially the perception of acoustic landmarks varies a lot between the respondents; some are even able to hear objects such as walls, telephone boxes, etc. when they come close to them. For the interview partners the degree of importance of the following elements in a map is different: the information about the width of a street in meters, the number of driving lanes, one-way streets, the length of the street, stairways, the material of the surface (asphalt, cobblestone, etc.), pedestrian crossings as well as the shape and number of corners of blocks and parks. Some consider those elements to be important, whereas others do not at all.

[1] http://www.ku-ichstaett.de/Fakultaeten/PPF/fachgebiete/Psychologie/lehrstuehle/psycho2/Lehre/info/SS05/UpsySem/HF_sections/content/Kevin%20Lynch.ppt, Dec. 2009

[2] POPTIS is a system by the Vienna Transportation System (Wiener Linien) which gives blind people detailed directions in the Vienna subway network.

In general essential orientation points for blind people are guidelines (which can be tactile systems on the ground, house walls, pavement edges) and fixed landmarks that can either be perceived acoustically (streets, intersections), olfactory (bakery, coffee shop) or which can be touched (immobile objects). The interviews show that it is strongly recommended that the map includes information about street names, the type of street (motorway, a main road, residential road, pedestrian area, etc.), the shape of the street (straight or curved), intersections and the number of intersecting streets as well as the angle between the intersecting streets, acoustic traffic lights, tactile systems, pavements, bicycle lanes, bus stops, bridges, underpasses, dead end streets, pedestrian refuge islands, tramway lanes, entrances of houses/passage ways/garages/parks, house numbers in the destination area or on demand, water bodies and points of interest (shops, public buildings, cultural spots). Also it is important to differ between the left and the right side of the street.

“Noise is for the blind as fog is for the sighted.” (Quote from one interview) Risks for orientation are mobile/dynamic landmarks, noise, missing guidance systems (house walls, pavement edges), construction works, barriers in the hight of the head, and the crossing of squares. The “shared space concept” was mentioned several times by the interview partners as a big threat for the community. Shared space is an urban design concept that favours the integrated use of the urban space and was developed in 2003 by Hans Mondermann. The aim is not to seperate between different road users (motorised vehicles and pedestrians). Especially for blind people this is a dangerous approach as a clear division between pedestrian areas/pavement and the running track is required. (Schmidt-Block/Böhringer)

4.3 Importance of the Empirical Study for the Development of AmauroMap

What conclusion can be made of the empirical study and what is the input for the development of the city map?

The interviews clearly show that the majority of blind people need to prepare for new routes in advance; only a minority says not to need any information in advance when exploiting unknown areas. In general preparation is not easy to do as the possibilities are limited. The main sources for new information are family, friends, systems like POPTIS, or tactile maps. The last two are indeed a big support but difficult to maintain. They are developed manually and do not cover large areas. Therefore there is a need beyond the blind community for a system like AmauroMap that supports the preparation of routes.

“Every irritation means new orientation.” (Quote from an interview) Blind people have to study new routes; mobility is highly controlled and not random at all, so a high density of information is important. The map has to contain as much information as possible, BUT in a categorised and layered way; so the user should be allowed to make a user-specified selection (see figure 3). It has to be mentioned that not every information that the user group asks for can be included in the map because the digital data is not available or does not exist; for instance this is the case for construction sites, mailboxes, traffic sights in the height of the head, etc. To formulate a clear and understandable textual description mobility trainers are consulted; also the empiric study gives information about they way geometric shapes can be described the best way.

Information about the section of a street

Automatic display	**On demand**	**On demand**	**On demand**
Type of street section [e. g. motorway (= danger), main road, residential road, pedestrian area, etc.], name of the street section, description intersections at both ends of the street section.	Gives detailed information about the section of the street, i. e. width of the street, shape of the street, etc.	Availability of tactile systems and acustic traffic lights.	Landmarks such as bridges, underground passages, bus stops, stairs, etc.
All threads and risks! The interviews show that it is not the shortest route which is the most attractive, but the safest one.	Gives information about points of interest available on each side of the street, which should be again classified: public buildings/cultural facilities/medical facilities/shops/etc.	others	others
user-specified	others	others	others

Fig. 3: Overview of categorised output information (first draft)

5 TECHNICAL APPROACH

Already existing digital maps for blind people are in general based on a manual allocation of attributes to objects in the map which means big efforts in work and a reduction of the map on a small area. AmauroMap develops a GIS-based method to create the spatial description automatically. The spatial description will be derived from vector data so that a large-scale mapping is possible. This method makes it possible to describe the shape of crossings, blocks, etc. in words and in a standardised way. For the programming of the prototype open source software (PostgresSQL, PostGIS, GeoServer, PHP) and free datasets (Open Street Map) will be used. The way the textual description is accessed can be chosen by the user. The empirical study shows that the majority but not all blind and visually impaired people are aware of Braille. So the technology chosen for having access to the text can be either a Braille display or a screenreader. In addition to the textual description there is going to be a visual map for sighted people.

6 CONCLUSION AND OUTLOOK

AmauroMap is supported by the Internet Foundation Austria IPA within the Netidee programme from November 2009 until October 2010. Within the first six months of the project there have been detailed research on literature and comparable ongoing projects, strong dissemination activities, establishment of contact to the blind and visually impaired community as well as researchers and developers and first programming activities. The outcome of the first year will be a prototype with basic functions adapted to the users' needs. The focus is on user orientation; the users are involved in the development of AmauroMap from the beginning. The interview partners will be asked to test the system in various phases and to give feedback. Also the community will be invited to add personal information to the system that can be shared with others. The results of AmauroMap will be open to the community. The aim is to continue and push forward the project on long term and in cooperation with further partners.

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AnachB.at – das neue Echtzeit-Verkehrsinfoservice für die Vienna Region

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1 ABSTRACT

ITS Vienna Region ist das Verkehrsmanagement-Projekt der drei österreichischen Bundesländer Wien, Niederösterreich und Burgenland (Vienna Region) und wurde von diesen 2006 als eigenständiges Projekt im Verkehrsverbund Ost-Region VOR gegründet.

ITS Vienna Region ist in zahlreiche Forschungsprojekte involviert und hat im Sommer 2009 AnachB.at, das neue Echtzeit-Verkehrsinfoservice für Wien, Niederösterreich und Burgenland, präsentiert. AnachB.at bietet intermodale Routenplaner für alle Verkehrsarten sowie ein dynamisches Verkehrslagebild als kostenlose Web-Applikation für alle Verkehrsteilnehmer/-innen auf www.AnachB.at an. 2010 ist zusätzlich eine mobile Applikation, vorerst für das Iphone, geplant.

AnachB.at wird laufend mit den neuesten Daten von Verkehrssensoren, Baustellen-, Störungs-, Unfall- und Fahrplandatenbanken, Floating Car Data (FCD) und Verkehrsmeldungen aktualisiert. Diese Daten werden von den AnachB.at-Partnern, zu denen ASFINAG, Wiener Linien, VOR, ÖBB, Polizei, Taxiunternehmen und die ORF Ö3 Verkehrsredaktion zählen, zur Verfügung gestellt. Ein Verkehrsmodell errechnet daraus laufend ein neues flächendeckendes Verkehrslagebild für die gesamte Vienna Region und legt dieses auf das digitale Verkehrsnetz (Graphenintegrationsplattform GIP) um.

Die GIP wurde von ITS Vienna Region völlig neu entwickelt. Sie ist nicht nur wesentlich detaillierter als herkömmliche Graphen, sondern wird auch von den Ländern und vom VOR gemeinsam laufend aktualisiert und für E-Government und Verwaltung genutzt. Auch die Gemeinden bekommen die Möglichkeit, mit dieser Datengrundlage zu arbeiten. Im Rahmen von GIP.at und GIP.gv.at laufen aktuell konkrete Bemühungen rund um eine Ausdehnung der GIP und darauf basierender Anwendungen auf weitere österreichische Bundesländer.

Verkehrslagebild und GIP dienen als Basis für die AnachB.at-Routenplaner, die so je nach Rahmenbedingungen laufend neue optimale Wege von A nach B vorschlagen. AnachB.at hat somit zahlreiche Vorteile gegenüber herkömmlichen Verkehrsservices:

- AnachB.at funktioniert für öffentlichen Verkehr, Autos, Radfahren und Fußgänger gleichermaßen und kann diese Verkehrsarten auch intermodal kombinieren.
- AnachB.at wird laufend aktualisiert und basiert nicht wie die meisten herkömmlichen Verkehrsservices auf statischen Daten. Die vorgeschlagenen Routen werden somit automatisch an die aktuellen Verkehrsverhältnisse angepasst.
- AnachB.at bietet zusätzlich spezielle Routenplaner für Radfahrer/-innen und Pendler/-innen (Park & Ride) sowie alle Baustelleninformationen und Verkehrsmeldungen an.
- AnachB.at funktioniert für die gesamte Vienna Region.

2 DAS PROJEKT: ITS VIENNA REGION

ITS Vienna Region wurde von den drei Bundesländern Wien, Niederösterreich und Burgenland 2006 als gemeinsames Verkehrsmanagement-Projekt gegründet und als eigenständiges Projekt im Verkehrsverbund Ost-Region eingebettet.

Das zentrale Ziel von ITS Vienna Region ist, die Verkehrssituation in der Vienna Region mithilfe von Verkehrstelematik möglichst vollständig und aktuell zu erfassen, alle Verkehrsdaten in einem gemeinsamen Datenpool zusammen zu führen und darauf aufbauend eine umfassende und laufend aktualisierte Verkehrsinformation für alle Verkehrsarten zu entwickeln.

Nutzer sind einerseits alle Verkehrsteilnehmer/-innen, denen ITS Vienna Region kostenlose Verkehrsservices (Routenplaner, Verkehrslagebild, …) bietet. Andererseits können aber auch die Dienststellen der Länder sowie Verkehrs- und Infrastrukturbetreiber Verkehrsmanagement- oder E-Government-Prozesse optimieren und die länderübergreifende Zusammenarbeit effizienter gestalten.

3 DAS ECHTZEIT-VERKEHRSINFOSERVICE: ANACHB.AT

Am 18. Juni 2009 hat ITS Vienna Region sein neues Echtzeit-Verkehrsinfoservice für Wien, Niederösterreich und Burgenland, AnachB.at, präsentiert. AnachB.at bietet für alle Verkehrsteilnehmer/-innen intermodale und auf dynamischen Daten basierende Routenplaner für alle Verkehrsarten sowie ein dynamisches Verkehrslagebild als kostenlose Web-Applikation auf www.AnachB.at an.

Öffentlicher Verkehr, Autoverkehr, Radfahren und zu Fuß gehen können so verglichen und auch kombiniert werden (z.B. Park&Ride oder Bike&Ride). Die Verkehrsteilnehmer/-innen erhalten dadurch einen optimalen Überblick über alle Mobilitätsmöglichkeiten und werden auch angeregt, für ihre Wege neue Routen oder Verkehrsmittel auszuprobieren (z.B. Öffentlicher Verkehr oder Radfahren).

AnachB.at wird laufend mit den neuesten Daten von Verkehrssensoren, Baustellen-, Störungs-, Unfall- und Fahrplandatenbanken, Floating Car Data (FCD) und Verkehrsmeldungen der Ö3ver (ORF Ö3 Verkehrsredaktion) aktualisiert. Diese Daten werden von den zahlreichen AnachB.at-Partnern, zu denen neben ASFINAG auch Wiener Linien, VOR, ÖBB, Polizei, Taxiunternehmen und die ORF Ö3 Verkehrsredaktion zählen, zur Verfügung gestellt.

Anfang 2010 kann AnachB.at bereits durchschnittlich rund 60.000 Abfragen pro Monat verzeichnen. Bereits 2009 wurde auch schon mit der Entwicklung einer mobilen Version von AnachB.at begonnen. Diese ist noch 2010 vorerst als iPhone-Applikation verfügbar.

Abbildung: AnachB.at mobil als iPhone-Applikation (Präsentation 2010)

4 EIN DIGITALES VERKEHRSNETZ FÜR DIE VIENNA REGION: GIP

Als technische Basis errechnet ein Online-Verkehrsmodell aus den laufend aktualisierten Verkehrsdaten der Partner ständig ein neues flächendeckendes Verkehrslagebild und legt dieses auf ein digitales Verkehrsnetz, die Graphenintegrationsplattform GIP um.

Die GIP wurde von ITS Vienna Region aus den folgenden Beweggründen heraus völlig neu entwickelt:

- Von den Ländern, insbesondere von der Stadt Wien wird seit über 30 Jahren ein eigener Stadtgraph gepflegt, der immer auf dem aktuellen Stand ist und somit eine weit aktuellere und genauere Datengrundlage bietet als kommerziell verfügbare Navigationsgraphen.
- Die vorhandenen zukünftig zu erhebenden Netze für Fußgänger und den Radverkehr sollten nahtlos in den Graph integrierbar sein. 2009 wurden beispielsweise zur Verbesserung der Datengrundlagen alle Hauptradrouten in Niederösterreich in einer Befahrung erhoben und die Fußwege-Verbindungen in Wien wurden von einem externen Dienstleister korrigiert.

- Der Graph soll für Behörden als Verortungsreferenz für rechtsverbindliche Verwaltungsabläufe und E-Government-Prozesse geeignet sein. Er muss daher voll historisiert sein, die Identifikationsnummern müssen stabil sein. Auch eine verteilte Datenhaltung in den Landesverwaltungen war eine Voraussetzung.

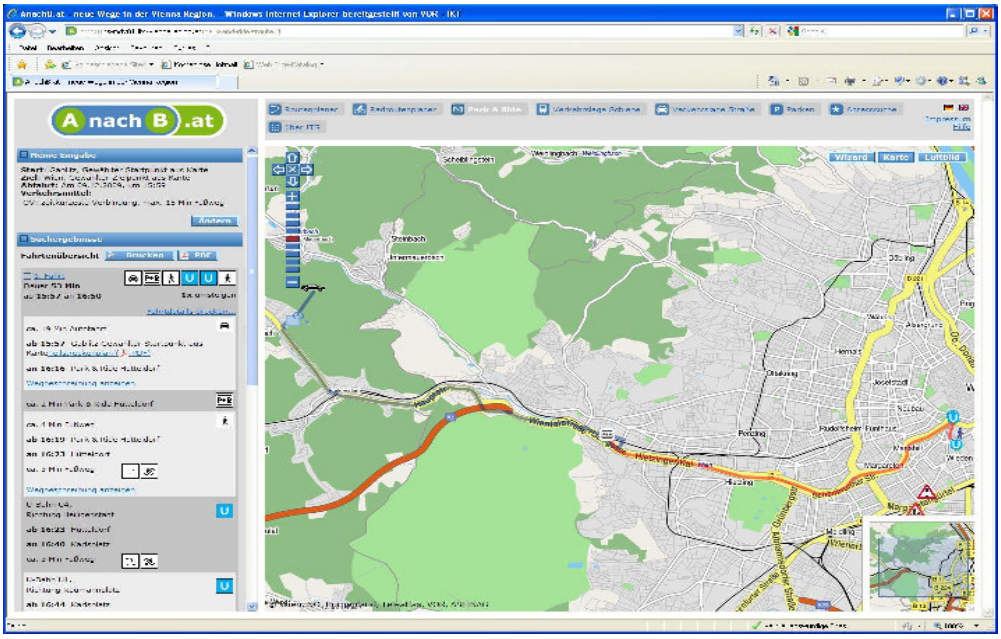

Abbildung: Screenshot von www.AnachB.at mit Park & Ride – Routing (Stand April 2010)

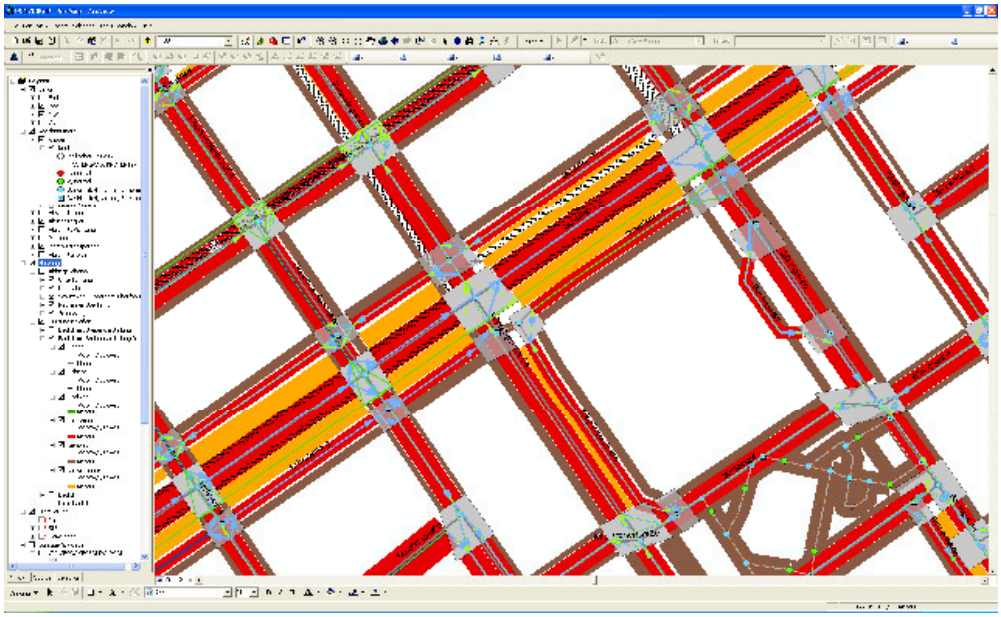

Abbildung - Graphenintegrationsplattform GIP – Screenshot am Beispiel eines städtischen Ballungsraums

In der Graphenintegrationsplattform GIP konnten somit zahlreiche unterschiedliche Graphen-Datenbestände, die vorher parallel existierten, zusammengeführt werden:

- der Stadtgraph der Stadt Wien,
- der Landesstraßengraph der Länder Niederösterreich und Burgenland,
- das Netz des öffentlichen Verkehrs, wie es vom Verkehrsverbund Ostregion gepflegt wird,
- die Autobahnen und Schnellstraßen der ASFINAG
- die Radwegegraphen der beteiligten Bundesländer sowie verschiedene Fußwege in Parks, Wald, Friedhöfen oder entlang von Flüssen.

Von zentraler Bedeutung für die GIP ist ihre laufende Wartung im Rahmen der Verwaltungsabläufe. Jede Änderung im Straßen- und Wegenetz erfolgt im Rahmen eines Verwaltungsakts, der automatisch an die GIS-Infrastruktur der Verwaltungsorganisation angebunden ist. Dadurch kann die GIP laufend auf dem aktuellen Stand gehalten werden, ohne dass zusätzliche Arbeitschritte erledigt werden müssen. Gleichzeitig ermöglicht diese Integration von Verkehrsinformation und Verwaltung den Zugriff auf die Verwaltungsakte über eine räumliche Verortung. Das ermöglicht ein leichteres Auffinden von Rechtsgrundlagen ebenso wie eine wesentliche Verbesserung der Rechtssicherheit in der Verwaltung. Durch die GIP bekommen auch kleinere Gemeinden die Möglichkeit, mit dieser Datengrundlage zu arbeiten und sie gleichzeitig dezentral zu warten.

5 EINE GIP FÜR GANZ ÖSTERREICH: GIP.AT UND GIP.GV.AT

Das Interesse der anderen Bundesländer und der nationalen Infrastrukturbetreiber an den bei ITS Vienna Region entwickelten Technologien, insbesondere der Graphenintegrationsplattform GIP, mündete in einer Ausschreibung des Klima- und Energiefonds KLI.EN für ein österreichweites digitales Verkehrsnetz mit den dazu nötigen elektronischen Verwaltungsabläufen und einer österreichweiten Verkehrsauskunft für alle Verkehrsmittel.

Die Zuschläge für das österreichweite digitale Verkehrsnetz und die elektronischen Verwaltungsabläufe wurden noch 2009 vergeben, wobei ITS Vienna Region bei beiden siegreichen Projekten maßgeblich involviert ist.

Im Rahmen des Projekts GIP.at soll die bei ITS Vienna Region entwickelte GIP in allen Bundesländern Österreichs umgesetzt werden – derzeit ist sie in Wien und Niederösterreich fertig implementiert. Auch die nationalen Verkehrsinfrastrukturbetreiber ASFINAG und ÖBB sind neben den Bundesländern an GIP.at beteiligt.

Im zweiten Projekt GIP.gv.at wird die Integration von Verkehrsinformation und Verwaltung auf Basis eines integrierten Verkehrsgraphen vorangetrieben, wobei hier ITS Vienna Region die Rolle des Konsortialführers übernommen hat. Die Abläufe für die Verordnung von Verkehrszeichen und Bodenmarkierungen und die Genehmigung von Baustellen im Straßenraum sollen mit elektronischen Verwaltungsabläufen (E-Government) unterstützt werden, bei denen das Aktuell-Halten des Verkehrsgraphen gleichsam als Nebenprodukt zuverlässig und ohne zusätzlichen Arbeitsaufwand erfolgt.

6 GEMEINSAM INNOVATIV: VERNETZUNG UND FORSCHUNGSPROJEKTE

ITS Vienna Region ist seit seiner Gründung in zahlreiche Forschungsprojekte involviert und engagiert sich stark bei der Vernetzung von Experten/-innen, Unternehmen und Forschungseinrichtungen. Die Projekte werden durch Forschungsförderungsprogramme des BMVIT und der EU finanziell unterstützt. Folgend werden exemplarisch einige ausgewählte Forschungsprojekte beschrieben, die von ITS Vienna Region betrieben werden, bzw. in die ITS Vienna Region involviert ist:

6.1 Wetter und Verkehr

In diesem Forschungsprojekt wird der Einfluss des Wetters auf das Verkehrsgeschehen untersucht und darauf aufbauend ein Modell entwickelt, das in den Prognosen für die Verkehrslage und die Verkehrsauskunft berücksichtigt wird. Das Projekt wurde im Jänner 2008 begonnen und 2009 erfolgreich abgeschlossen – die Ergebnisse fließen nun in die Weiterentwicklung von AnachB.at ein.

6.2 CooperatiV

Im Rahmen des Forschungsprojekts CooperatiV wird eine netzadaptive Verkehrssteuerung in einem Modellgebiet in Wien und in St. Pölten erprobt, indem die Rechenergebnisse aus dem Verkehrsmodell in die Ampelsteuerung einfließen. Die Bevorrangung von Straßenbahn und Bus wird in die Steuerungslogik integriert. Das Projekt läuft bereits seit 2008. 2009 wurde im Rahmen dieses Forschungsprojekts gemeinsam mit der ASFINAG aktuelle Verkehrsinformation auf Wechselanzeigen über die Zufahrt zu den Verkehrsbehinderungen im Zuge der Bauarbeiten zum Bahnhof Wien eingerichtet.

6.3 ITSworks

In ITSworks wird am Beispiel von AnachB.at untersucht, wie Verkehrsinformation und -services von Nutzern wahrgenommen, verstanden und genutzt werden. Erste Zwischenergebnisse des 2009 gestarteten Forschungsprojekts fließen bereits parallel in die Optimierung von AnachB.at ein.

6.4 QM4ITS

Im Rahmen des Forschungsprojekts QM4ITS werden unter der Konsortialführung von ITS Vienna Region seit 2009 neunzehn verschiedene Tests und Messverfahren entwickelt. Diese Tests sollen Kennwerte für die Qualität einzelner Datengrundlagen und Services liefern, sodass diese messbar verbessert werden können. Vergleichende Kontrollen der verschiedenen Datenquellen (Taxi-FCD; Meldungen, Detektoren) ermöglichen eine automatische Fehlererkennung, zusätzliche Kontroll-Messungen können so minimiert werden.

aspern Die Seestadt Wiens – nachhaltige Stadtentwicklung

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1 ABSTRACT

Within the next 20 years "aspern Vienna's Urban Lakeside" (aspern Die Seestadt Wiens) in Vienna's 22nd district aims at providing a high-quality urban area with working and living facilities for up to 20.000 inhabitants and 25.000 employees. The master plan describes the development of a total gross floor area of more than 2 million squaremetres.

A research project was set up to define measures for an environmentally sustainable development of this area. It consists of an integrated energy concept to balance and optimise energy use and supply and the definition of criteria on energy efficiency and sustainability that form part of the tendering process for the individual building lots.

The starting point of the project was the development of an integrated energy concept. It was based on the estimation of the future energy demand, an analysis of the available resources and the potential for using renewable energy sources. Priority areas were defined for district energy systems (heating and cooling) as a result of an assessment of economic feasibility and an analysis of primary energy benefits. The positive contribution of deep geothermal energy sources (implementation is currently being assessed), was shown, as well as the primary advantages of implementing photovoltaic technologies.

Apart from that an overall guideline for responsible urban development was created that lists demands and measures in three fields: town planning, mobility and use of resources. First, it correlates benchmarks in international urban developments with measures for aspern Urban Lakeside on the level of settlement. Furthermore, on the level of building lots, a criteria catalogue has been elaborated. In the tendering processes the projects of the potential investors will be assessed according to their performance in terms of sustainability criteria. Thus, aspern shall become a role model for the development of a sustainable city.

2 ASPERN SEESTADT - NACHHALTIGE STADTENTWICKLUNG

Das Ziel der Stadtentwicklung ist es, zukunftssichere und verantwortungsvolle Lösungen zu finden, die mit den absehbar zur Verfügung stehenden Ressourcen auskommen und allen gesetzlichen, aber auch Generationen übergreifenden Verpflichtungen bestmöglich gerecht werden. Angestrebt wird eine „nachhaltige Entwicklung", was bedeutet, „dass die gegenwärtige Generation ihre Bedürfnisse befriedigt, ohne die Fähigkeit der zukünftigen Generation zu gefährden, ihre eigenen Bedürfnisse befriedigen zu können".[1]

Mit der Entwicklung eines neuen Stadtteils oder einer Siedlung werden Vorgaben und Standards für die kommenden Jahrzehnte festgelegt und dadurch Ressourcen gebunden. Bereits mit den ersten Plänen wird darüber entschieden, wie viel Energie und Rohstoffe auf lange Zeit gebunden und verbraucht werden. Die Chance am Beginn einer Stadtentwicklung besteht darin, ein Konzept zu erarbeiten, das die Rahmenbedingungen für eine Ressourcen schonende Errichtung und Nutzung sowie eine dauerhafte, lebendige Entwicklung ermöglicht.

2.1 Masterplan und nachhaltige Entwicklung für „aspern Die Seestadt Wiens"

In diesem Sinne wurde bei der Entwicklung des ehemaligen Flugfelds Aspern in Wiens 22. Bezirk, die einem Masterplan des schwedischen Planungsbüros Tovatt Architects & Planners folgt, ein Prozess in Gang gesetzt, der die nachhaltige Entwicklung anhand eines Energiekonzeptes und eines Wegweisers mit Nachhaltigkeitskriterien ermöglichen soll.

Heute trägt das Areal den neuen Namen „aspern Die Seestadt Wiens" und die ersten Gebäude entstehen bereits Anfang 2011. Über einen Zeitraum von mehr als zwei Jahrzehnten wächst dieses neue Stadtgebiet mit Zentrums-, Wohn- und Arbeitsfunktion für rund 20.000 Bewohner/-innen und 20.000 Beschäftigte. Angestrebt wird dabei eine Mischung von Grünräumen, Büros, Wohnungen, Betrieben sowie Forschungs-,

[1] Brundtland, UNCED (1988): Our common future, S.24

Entwicklungs- und Bildungseinrichtungen. Insgesamt sieht der Masterplan für den Stadtteil Gebäude mit einer gesamten Bruttogeschoßfläche von über 2 Mio. m² vor.

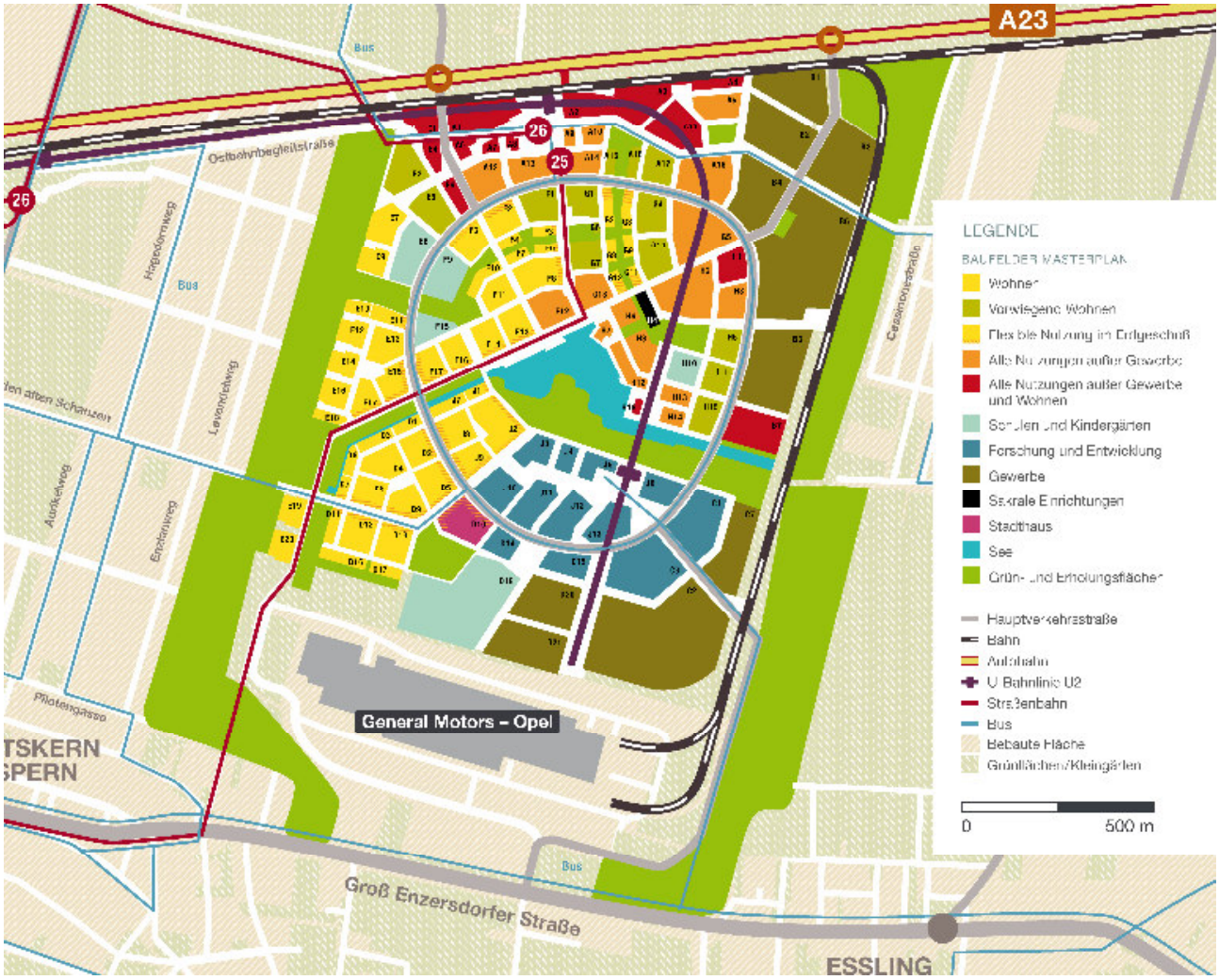

Abb. 1: Masterplan aspern Die Seestadt Wiens, Stand September 2009, Quelle: Wien 3420 AG

Im Rahmen des Forschungsprojektes NACHASPERN[2] wurden ein Gesamtenergiekonzept und ein Wegweiser für die nachhaltige Entwicklung der Seestadt erarbeitet.

2.2 Gesamtenergiekonzept

Das Ziel für das Gesamtenergiekonzept in der Seestadt aspern ist, den Energiebedarf im Gebäudesektor so niedrig wie möglich zu halten, um die verursachten CO2-Emissionen zu minimieren. Der Energiebedarf soll durch einen hohen Anteil an lokal vorhandenen erneuerbaren Energiequellen abgedeckt werden. Als Energiesystemgrenze wird dabei die physikalische Grenze der Seestadt herangezogen.

Das Energiekonzept baut auf zwei Prinzipien auf:

- Maximale Energieeffizienz der Gebäude

  Zu diesem Zweck werden Mindestanforderungen und Zielwerte für den Heizwärmebedarf und den außeninduzierten Kühlbedarf definiert.

- Deckung eines Maximums des Energiebedarfs aus erneuerbaren Energiequellen

[2] NACHASPERN ist ein Projekt, das vom Bundesministerium für Verkehr, Innovation und Technologie (BMVIT) und dem Bundesministerium für Familie, Jugend und Wirtschaft (BMFJW) im Rahmen von „Energie der Zukunft“ gefördert und von der Forschungsförderungsgesellschaft (FFG) betreut wurde. Unter dem Antragsteller Wien 3420 AG, der Entwicklungsgesellschaft für die Seestadt aspern, arbeitete folgendes Team an dem Projekt: AIT, e7 und ÖGUT. Die wissenschaftliche Arbeit im Projekt NACHASPERN konzentrierte sich auf das Thema Ressourcen und hier im Speziellen auf den Bereich Energie. Inhalte zu Städtebau und Mobilität wurden aus dem parallel entwickelten Handbuch öffentlicher Raum und dem Mobilitätsleitfaden, beide beauftragt von der Wien 3420 AG, bezogen.

Theoretische Abdeckung des thermischen Energiebedarfs zu 100 % über die geplante benachbarte Geothermieanlage; praktisch wird mit einem gesenkten Primärenergiefaktor für Fernwärme gerechnet. Für den Strombedarf ergibt sich dadurch eine Präferenz für Photovoltaiksysteme, um den Strombedarf auch lokal von erneuerbaren Energiequellen abdecken zu können. Urbane Windkraftanlagen können dann integriert werden, wenn es die lokalen gesetzlichen und technischen Rahmenbedingungen ermöglichen. Daher sind sie in Abbildung 2 nicht berücksichtigt.

Für Wärme, elektrischen Strom und Kälte sind die erwarteten jährlichen Energiebedarfsmengen sowie die vorhandenen Energiemengen aus erneuerbaren Energiequellen in den beiden untersuchten Ziel- und Mindestszenarien auf Abbildung 2 gegenübergestellt. Dabei wurde das Potenzial von Photovoltaikanlagen eher konservativ gerechnet und urbane Windkraftanlagen nicht berücksichtigt.

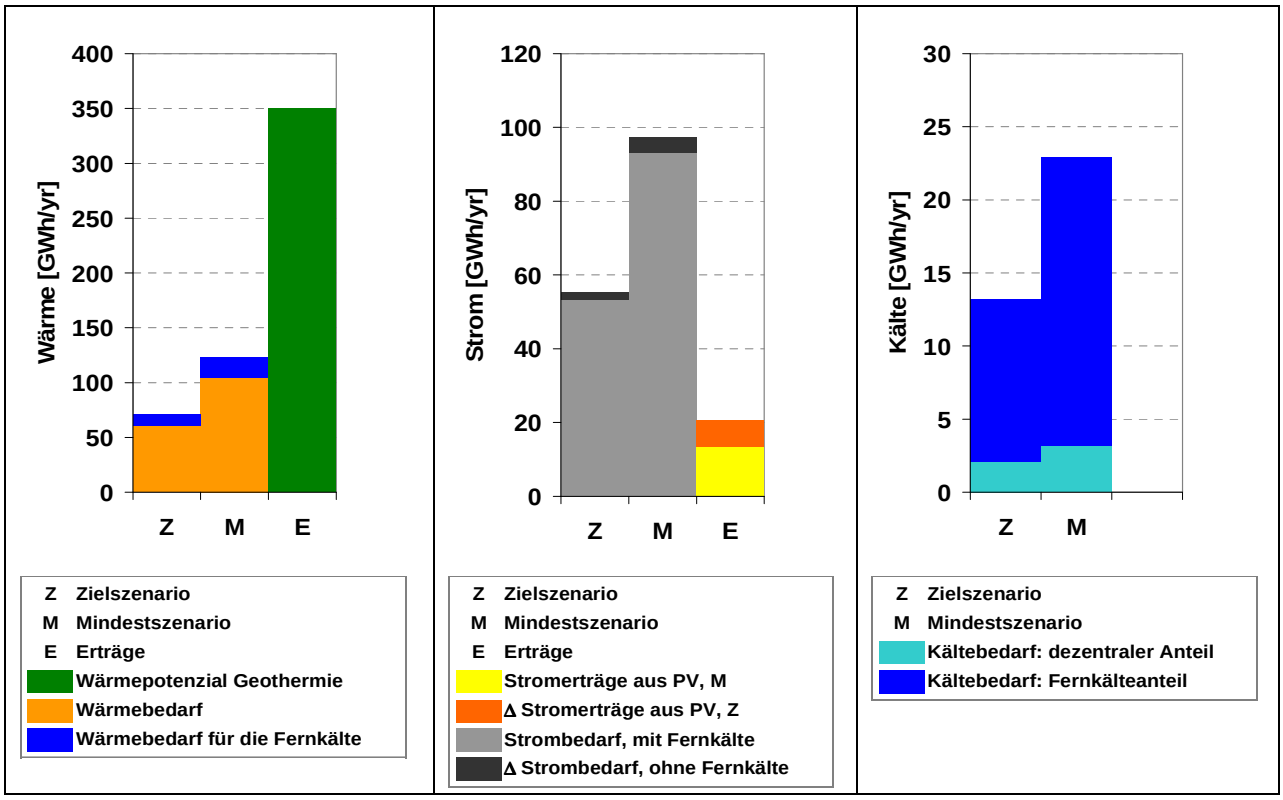

Abb. 2: Energieszenario NACHASPERN (Endenergiebedarfswerte und vorhandene selektierte Ressourcen), Quelle: AIT

2.3 Wegweiser[3] für eine zukunftsweisende Stadtentwicklung.

Die Vorgaben für die Gebäudeebene und für die übergeordnete Siedlungsebene sind in einem Wegweiser für eine nachhaltige, Ressourcen schonenden Stadt- und Siedlungsentwicklung zusammengefasst. Inhaltlich werden Kriterien in drei Bereiche gruppiert:

- Städtebau
- Mobilität
- Ressourcen

Der Wegweiser richtet sich an Projektentwickler, an die kommunale Ebene, an wissenschaftliche Kreise und an die interessierte Fachöffentlichkeit, dient aber in erster Linie als Grundlage und Werkzeug für die Entwicklung der Seestadt. Auf zwei Ebenen werden die Kriterien im Wegweiser vorgestellt. Zum einen werden die Maßnahmen beschrieben, die die Entwicklungsgesellschaft Wien 3420 AG für das gesamte Areal umsetzen kann. Auf der anderen Ebene werden die Kriterien beschrieben, die sich direkt auf die umzusetzenden Projekte in den Baufeldern beziehen. Damit wendet man sich an die Bauträger und in der Folge an die Planerinnen und Planer, die die Vorgaben in den einzelnen Projekten umsetzen.

[3] Hageneder, Lindenthal et. al. (2010): Wegweiser für eine zukunftsweisende Stadt- und Siedlungsentwicklung

Die Kriterien werden in die Bebauungsleitfäden der Entwicklungsgesellschaft eingearbeitet und sind somit Grundlage für die Vergabe von Liegenschaften. In den Ausschreibungen und Wettbewerben wird die Einhaltung der Vorgaben in einem Qualitätssicherungsverfahren geprüft.

Der Aufbau des vorliegenden Wegweisers für eine nachhaltige und Ressourcen schonende Stadt- und Siedlungsentwicklung wird in Abbildung 3 deutlich: in die Erarbeitung der Anforderungen und Kriterien sind die Inhalte verschiedener Dokumente und internationaler Beispiele eingeflossen.

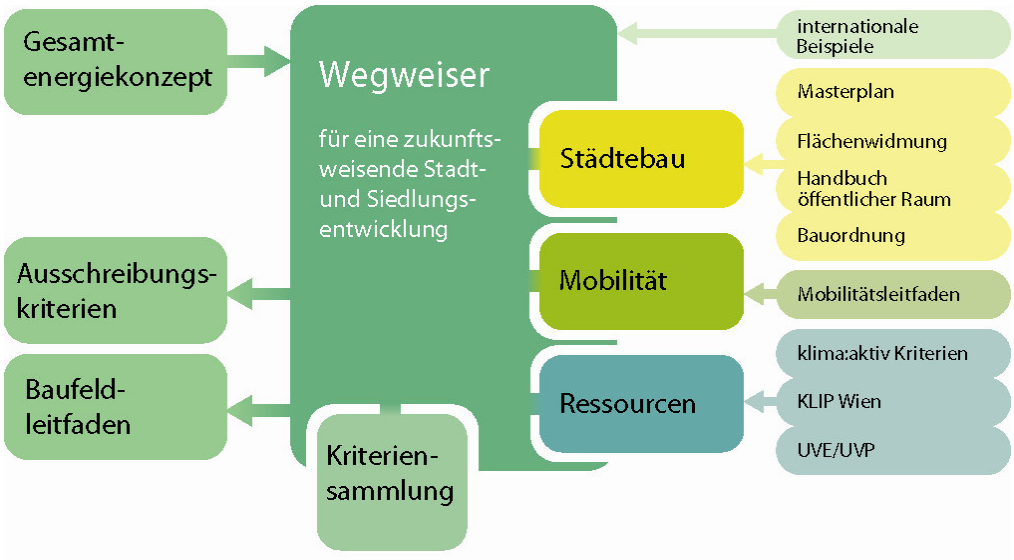

Abb. 3: Aufbau des Wegweisers für eine zukunftsweisende Stadt- und Siedlungsentwicklung (Quelle: Österreichische Gesellschaft für Umwelt und Technik (ÖGUT))

2.4 Anforderungen an eine nachhaltige Stadt- und Siedlungsentwicklung

Um aus den drei Säulen der Nachhaltigkeit (Soziales, Ökologie, Ökonomie) inhaltliche Anforderungen an eine Stadt- und Siedlungsentwicklung zu machen, wurden die im Folgenden beschriebenen Kernbereiche identifiziert:

- Städtebau: ein stabiler Rahmen für den Städtebau mit größtmöglicher Flexibilität in der Funktionsdurchmischung:

  vielfältige Bauformen unterschiedlicher Dichte und Einbeziehung der zukünftigen Nutzer soweit als möglich, gut nutzbare Freiflächen sowie deren Anbindung an übergeordnete Grünräume, die Schaffung von hochwertigem Wohnraum, Büros und Betriebsansiedlungsflächen mit Maßnahmen zur standortsichernden Wirtschaftsförderung sowie Forschungs- und Bildungseinrichtungen;

- Mobilität: eine intelligente Verkehrsplanung

  mit Schwerpunkt auf guter öffentlicher Anbindung (lokal, regional und überregional), Rad- und Fußgängerverkehr, und eine gezielt geplante Infrastruktur der kurzen Wege;

- Ressourcen: ein schonender Umgang mit Ressourcen

  Minimierung des Ressourcenverbrauchs und effizienter Einsatz der Energieressourcen bei Gebäuden durch Passivhausbauweise; Energieversorgung aus erneuerbaren Energiequellen, wie zum Beispiel die Einbindung von Solarenergienutzung zur Warmwasserbereitstellung und zur Stromerzeugung; Regen- und Abwassernutzungskonzepte sowie Müll- und Recyclingkonzepte;

Diese drei Kernbereiche, die eine nachhaltige und Ressourcen schonende Stadt ausmachen, werden in der Entwicklung der Seestadt aspern berücksichtigt und auf mehreren Ebenen eingesetzt. Einerseits gibt es die Ebene der Kriterien, die sich die Entwicklungsgesellschaft vorgegebenen hat und die für das gesamte Areal auf Masterplanebene relevant sind. Andererseits sind für die Umsetzung in den einzelnen Baufeldern Kriterien vorgesehen, die derselben Aufteilung in Städtebau, Mobilität und Ressourcen folgen (siehe Tabelle unten). Einsatz finden sie bei den Ausschreibungen und Wettbewerben für die Baufelder der Seestadt.

Die folgende Tabelle zeigt die Übersicht über die Kriterienkategorien[4] in den drei Bereichen:

I	**Städtebau**
I.1	**Bebauung**
	Gebäude und öffentlicher Raum; Durchlässigkeit der Baukörper; Flexibilität des Gebäudes
I.2	**Freiflächen**
I.3	**Immissionen**
	Lärm; Staub
II	**Mobilität und Verkehrsplanung**
II.1	**Fahrradverkehr**
II.2	**PKW-Verkehr**
II.3	**Baustellenverkehr**
III	**Ressourcenbedarf**
III.1	**Gebäudequalität und Energieeffizienz**
	Standard Wohngebäude/Dienstleistungsgebäude; Beleuchtung Freiraum; Energiemonitoring; Nutzungshandbuch
III.2	**Wasser**
	Abwasser; Regenwasser; Versickerungsflächen
III.3	**Müll**
III.4	**Energieproduktion und Vernetzung**
	Photovoltaik; Fernwärme, Abwärmenutzung und Wärmeeinspeisung; Kältebedarfsreduktion, Fernkälte und Mikrokältenetze; alternative Konzepte

Tabelle 1: Übersicht Kriterientabelle, Quelle: ÖGUT

2.5 Qualitätssicherung in der Seestadt

Die Qualität einer Ressourcen schonenden Stadt- und Siedlungsentwicklung muss anhand von Erfolgskontrollen gemessen werden. Nur dann kann zuverlässig Auskunft darüber gegeben werden, ob gesetzte Ziele erreicht worden sind und der eingeschlagene Weg noch stimmt. Das gilt ganz besonders für Projekte, die sich über einen Zeitraum von mehreren Jahrzehnten erstrecken.

Geplante Maßnahmen:

- Qualitätssicherung im Auswahlverfahren

  Wettbewerbe und Ausschreibungen auf Basis der vorliegenden Kriteriensammlung
- Qualitätssicherung in der Planungsphase

  Begleitete Planung, Grundstückstransaktion erst unmittelbar vor Baubewilligung
- Qualitätssicherung in der Ausführungsphase

  Integration von Qualitätskriterien in Verträge
- Einrichtung eines Qualitätssicherungsbeirates
- Förderung eines zentralen Energieverbrauchsmonitorings

[4] Die gesamte Kriterientabelle mit allen Subkriterien sowie der Beschreibung der Maßnahmen und Nachweise ist im „Wegweiser für eine zukunftsweisende Stadt- und Siedlungsentwicklung“ zu finden.

2.6 Chancen und Herausforderungen

Die Chance besteht darin, bereits am Beginn der Stadtentwicklung ein ganzheitliches und innovatives Nachhaltigkeitskonzept zu entwickeln, das die Rahmenbedingungen für die künftige Entwicklung festlegt. Durch die frühe Analyse des Energieverbrauchs und die Entwicklung einer Energieversorgungsstrategie auf Basis des Masterplans konnten die wesentlichen Parameter definiert werden, um ein hohes Maß an Energieeffizienz, Reduktion der Emissionen und weitgehende Unabhängigkeit von externen Ressourcen zu gewährleisten.

Durch die Größe und Relevanz für den Standort Wien, als auch durch die Möglichkeiten der gezielten Implementation, die durch das Vorhandensein einer zentral steuernden Entwicklungsgesellschaft gegeben sind, soll aspern Seestadt zu einem Vorzeigeprojekt mit Ausstrahlwirkung auf andere Gebäude- und Siedlungsprojekte werden. Die Vorbildwirkung ist vor allem im Bereich der Nachhaltigkeit von besonderer Relevanz. Die Umsetzung des Nachhaltigkeitskonzepts für eine Entwicklung dieser Größe ist eine besondere Herausforderung. Die entwickelten Konzepte und Tools werden in weiterer Folge auch auf andere Siedlungsprojekte übertragbar sein.

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Assessing the implementation of Rawalpindi's Guided Development Plan through GIS and Remote Sensing

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1 ABSTRACT

Rawalpindi is the fourth largest city of Pakistan inhibiting 2 million people. Growth of Traffic in Rawalpindi city has acquired an alarming situation and put tremendous pressure on infrastructure of the city. Rawalpindi Development Authority conducted the series of traffic surveys in 1995, 1998 and a Guided Development Plan was formulated to develop proper road infrastructure, a series of main & sub-main traffic corridors. The plan is supposed to be implemented soon. But with the passage of time, road alignment plans are required to be updated with respect to the ongoing development activity in the area. Traffic and ground surveys were conducted in year 2007. But it 2009, the plan needs to be rechecked. Required cost, time and manpower for this purpose make this task virtually impossible, thus hindering the implementation of the project.

In this paper, we have proposed a system of regularly monitoring on ground situation, using high resolution "Quickbird" satellite images of and Geographical Information Systems, at a relatively lower cost. Satellite images have been used to identify the exact on ground alignment of the proposed roads through spatial overlays of georeferenced data. The process will support authority to know whether the proposed development falls under the right of way of a proposed network. The system will thus help regularizing the development activity and help identify the unauthorized construction activity taking place in the area. The approach also helps identifying alternative route alignment more efficiently.

2 INTRODUCTION

2.1 The study area

Rawalpindi is the fourth largest city of Pakistan hosing approximately 2.2 million persons. Rawalpindi lies between 33° - 28' and 33° - 48' north latitudes and 72° - 48' and 73° - 22' east longitudes. The city is bounded by Islamabad area on north and east and with motorway and Taxila cities on west. The Rawalpindi area spreads to 250 square kilometers on the south-western side to the national capital of Islamabad. Rawalpindi area falls under the jurisdictional responsibility of Rawal Town (RT), Rawalpindi Cantonment Board (RCB) and the Rawalpindi Development Authority (RDA). Rawalpindi is a historic city in the Potohar Pleatu. The city was declared as interim capital which witnessed serious housing shortage in the city with the increased business opportunities. Till then, the city grew tremendously but the infrastructure and services could not keep pace with the population growth.

It is estimated that the population of city will reach 3.2 Million persons by the end of 2020 (Population Census Organization, 1998). Population expansion in Rawalpindi region since 1972 has given in Table 1.

Year	Rawalpindi Municipal Corporation Area	Rawalpindi Cantonment Area	Rawalpindi Development Authority Area	Total
1,972	373	242	245	859
1,981	457	338	322	1110
1,998	782	628	486	1890
2,010	1030	864	629	2520
2,020	1280	1100	762	3150

Table 1: Population growth in Rawalpindi (Thousand persons). Source: Population Census Organization, 1998

The table shows that population of the study area increased continuously with time. Each part of the study area witnessed a steady rise in its population. Rawalpindi city housed 373, 000 persons in 1972 and, by year 2010, the figure is estimated to reach 1, 000, 000 persons. Rawalpindi Cantonment housed 245, 000 persons in 1972, which is now estimated to reach 629, 000 persons by year 2010. Population in Rawalpindi

Development Authority area also increased from 245, 000 to 629, 000 persons since 1972 to 2010. Similarly the total population of the study area was around 859, 000 persons; which is estimated around 2.5 millions presently. The growth of the City is restricted on the north side by Islamabad city. Similarly on the north-eastern side, Islamabad Highway and National park are the physical barriers (CDA, 1960). As such, the existing trend of the city is towards south and south - western directions. Adiala road, Dhamial road, Chakri road and Girja road are the main corridors for the growth, where development has already started in the form of private housing schemes and road side linear pattern of housing. In addition, nearness of Lahore - Islamabad Section of the Motorway with interchanges at Chakri and Kashmir road, has further opened up this area for development. These are major radial traffic arteries serving the city population and lead to outside city. They play an important role to open southern part of the city for development activities. The future growth of the City has therefore, been planned in these directions. (CDA, 1973)

2.2 History of Traffic Planning In Rawalpindi

In 1960, Doxiadis prepared first plan of the metropolitan area covering Islamabad to Rawalpindi cities. It proposed a grid iron pattern of wide roads for Rawalpindi area as well (Fig. 1, Rawalpindi Master Plan 1960). This master plan followed grid iron pattern of major roads with a right of way of 600 feet and 1200 feet. (Doxiadis, C.A 1960) The plan in Rawalpindi never came into implementation due to absence of necessary institutional arrangement to incorporate Rawalpindi. It was not mandatory for RT, RCB and RDA to follow the guidelines and design.

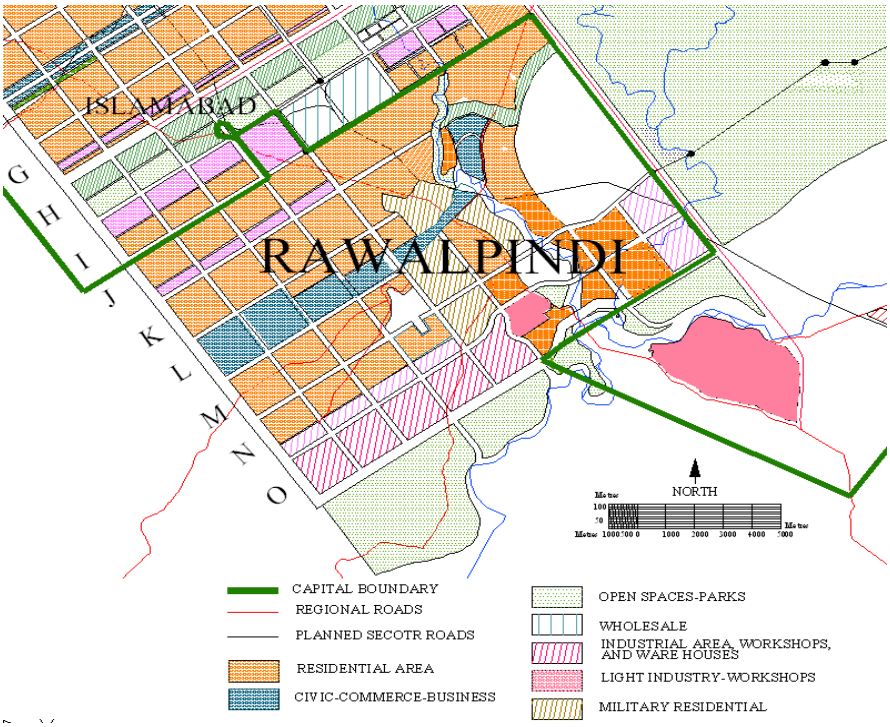

Figure 1. Master Plan of Rawalpindi (1960-2000)

Secondly, a new master plan was prepared for the period 1996-2016. This is a legal document to guide and control physical development of the city. It provides arrangement of land uses and connection links between three parts of Rawal Town, Rawalpindi Cantonment and RDA area. Master plan proposed a road network comprises of arterial roads, major roads and secondary roads. The categorization is based on nature and volume of traffic (National Highway Authority, 2001). Whereas, the planning of minor roads have been left to the three local authorities (Government of Punjab, 1996).

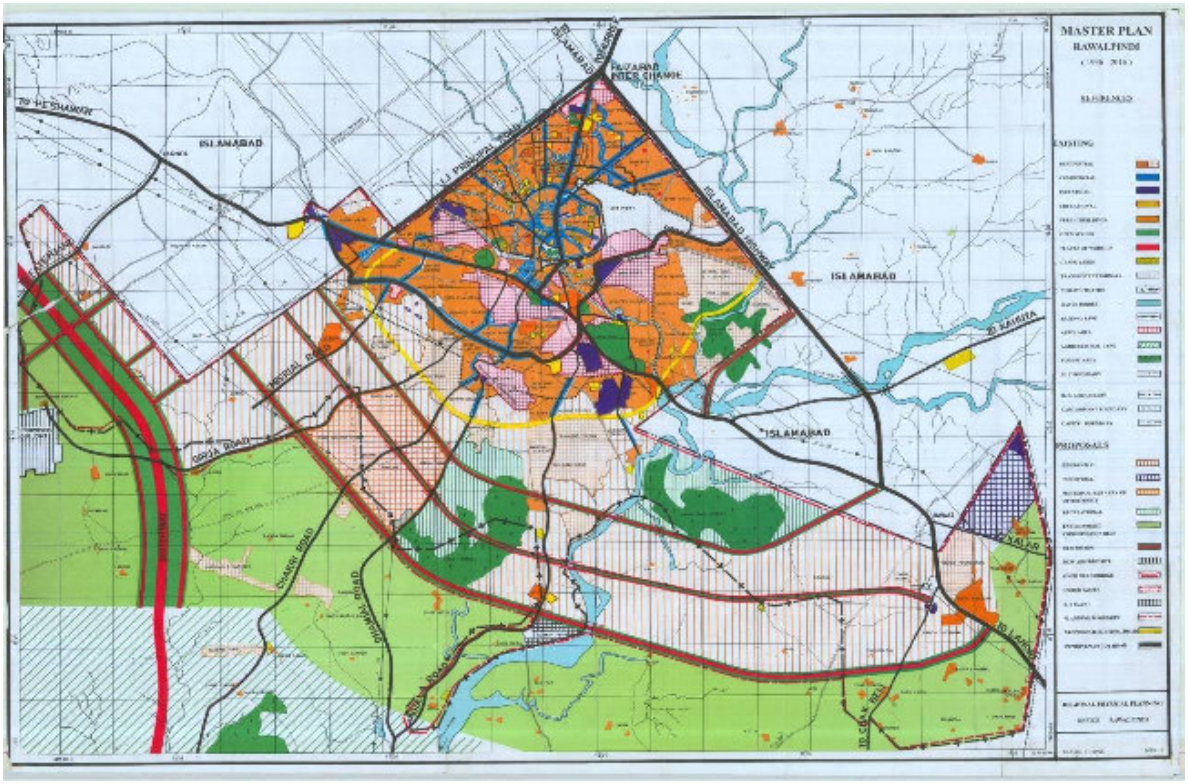

Figure 2 Master Plan of Rawalpindi (1996-2016)

RDA has prepared Guided Development Plan providing a network of Ring Roads and Arterial roads connecting city's urban and peripheral areas up to Motor Way. Six numbers of Ring Roads and seven numbers of Arterial Roads make complete network of the proposed future 'Guided Development'. RDA has proposed 400' ROW width for Arterial Roads and 800' ROW width for Ring Roads. The reserved 'right of way' area of these thirteen proposed roads is under development. (Fig. 3, Guided Development Plan of Rawalpindi, 1996-2016)

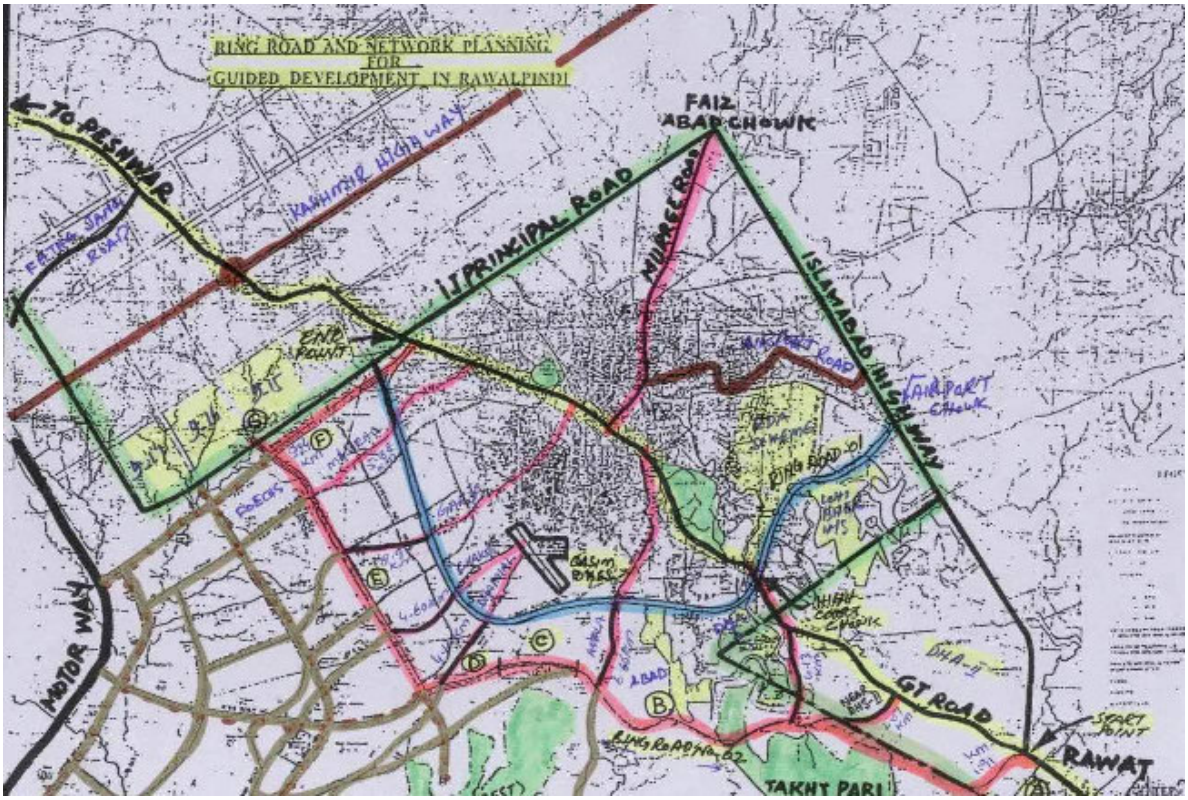

Figure 3 Guided Development Plan of Rawalpindi (1996 to present)

3 PROBLEMS AND ISSUES

For the development of transportation corridors, development plans are superimposed on topographic survey maps which are mostly outdated and do not represent the actual on ground position. In some cases, the survey plan to be used for this purpose has been prepared more than two years earlier.

As shown in Figure 4, the proposed road developments plan is superimposed on the paper based survey map of the study area. As a result of mismatching the temporal characteristics of datasets, the actual on ground situation is not realized properly. Revision of topographic survey also takes considerable time and effort. It is observed that a fresh survey in the study area can cost approximately Rs. 400 per 1000 Sq. meter land.

Figure 4 Right of Way of proposed Ring Road II overlaid on Survey Plan

Considering the other factors like environmental constraints, availability of manpower and the prevailing law and order situation of the area, the process of planning and development is seriously affected by this traditional method. Secondly, for land acquisition, the plans are superimposed on cadastral maps which are mostly paper form. Printing the development plans on them usually distorts scale of drawing and it does not give a holistic view of the area covering other details like location of infrastructure services through the area etc.

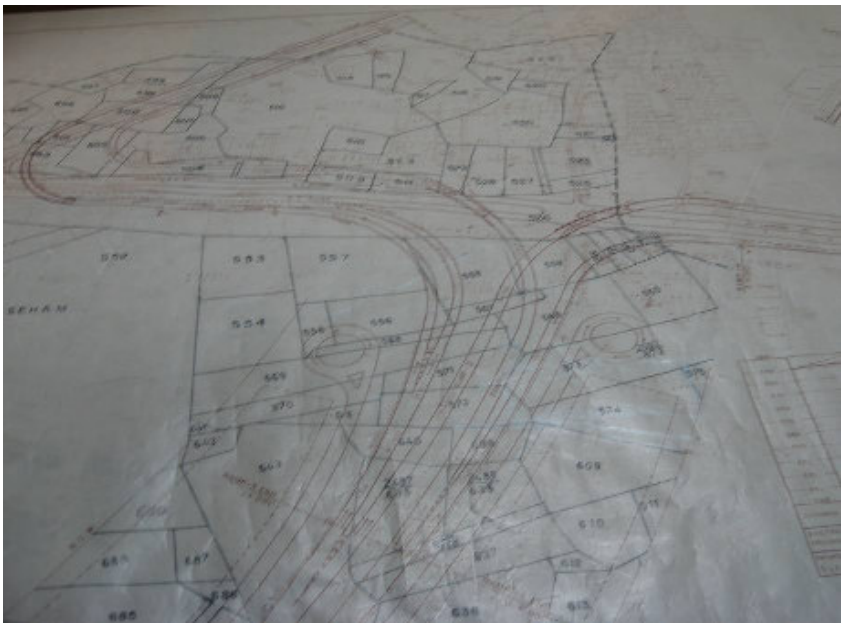

Figure 5. Proposed Ring Road II Plan overlaid on cadastral map for land acquisition planning

Figure 5 is showing such an example where the proposed ring road plan is superimposed on land ownership map of the study area.

4 DATASETS USED

The datasets used in study include map data, satellite images and the text data of the study area. The details have been shown in figure below:

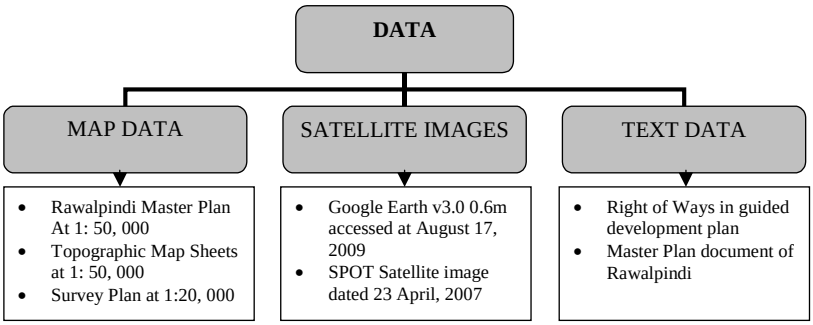

Figure 6: Data used in the research

5 METHODOLOGY

The study proposes a GIS based coordinated approach to prepare and finalize the road development plan. It suggests that the satellite imagery be used as a base map and the other map data be overlaid on this base map for planning and development of the area. The study used the following methodology to identify the existing development within the proposed road right of ways of guided development plans

- Digitization, Georeferencing through GPS coordinates and Mosaicking of the Guided Development Plan
- Generating road right of ways through buffer operations
- Georeferencing and Mosaicking and Image Enhancement of satellite images
- Stacking satellite imageries over Guided Development Plan and Digital Survey Maps
- Georeferencing Digital Survey Plans and updating survey map through visual image interpretation
- Performing vector overlay analysis (Clip function etc.) to map the construction within the right of way of the propose roads

6 DATA ANALYSIS

When the guided development plan is overlaid on the satellite image of the area, on ground situation becomes much clear than the digital survey sheets. Visual recognition of locations and objects become more simple and efficient. By performing overlay analysis and “Clip” operation in ArcGIS, structures falling within the right of ways were separated from the other structures that do not fall in the road right of way. In this way, the procedure of identifying unauthorized buildings became efficient and more accurate.

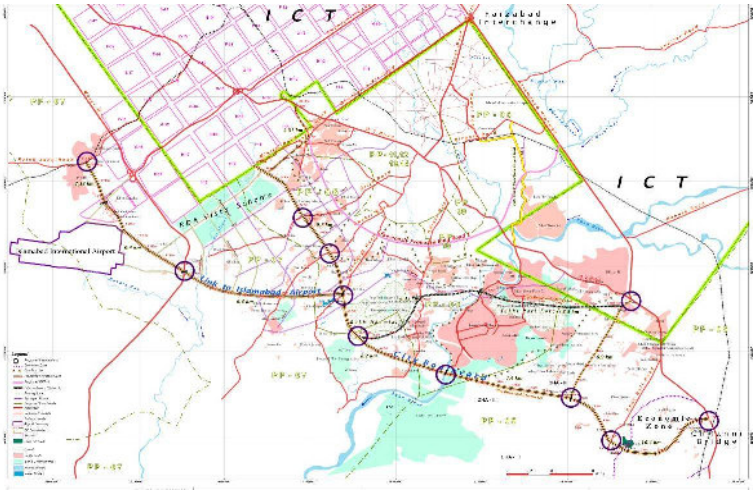

Figure 7. Guided Development Plan of Rawalpindi

Figure 7 shows the transportation maps of the study area.

The guided development plan was superimposed on the satellite image of the area as a first step to identify unauthorized structure falling within the road right of ways in the study area. (Figure 8)

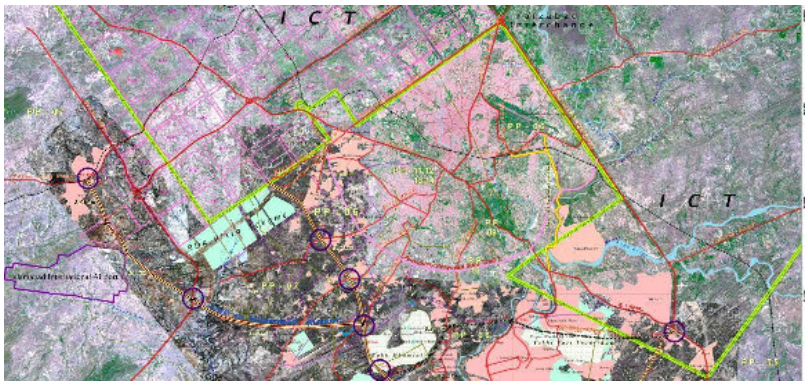

Figure 8. Rawalpindi Guided Development Plan superimposed on satellite imagery

Road right of ways were created through "Buffer" command in ArcGIS. The identified the location of road right of way lines in on the satellite image. (Figure 9)

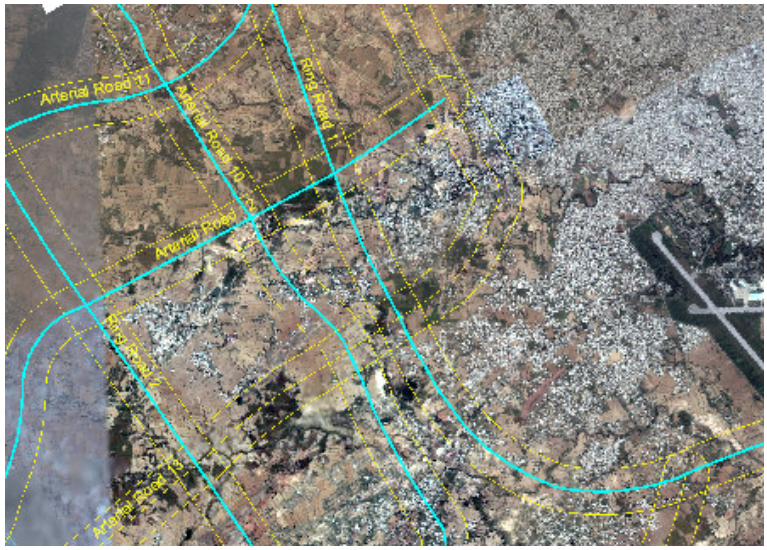

Figure 9. Proposed roads with Right of way boundaries superimposed on satellite imagery

When the built up area layer was stacked on the road right of way lines, the buildings falling within road areas were identified and the "clip" operation was used to separate these unauthorized construction. (Figure 10)

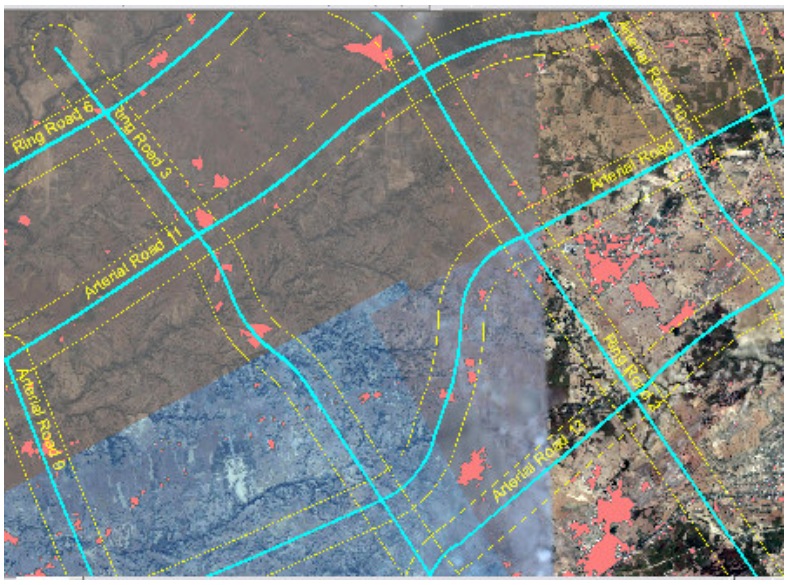

Figure 10. Extraction of built up areas along the proposed roads with Right of way, superimposed on satellite imagery

Below is a rough comparison of the estimated cost and time required to obtain data regarding development in the study area. Which shows that the plan updating and construction activity monitoring through satellite imagery is less expansive (almost four times) and time saving as compared to that using traditional method of topographic surveying. The ability to easily preview the temporal changes over a given area is also a plus point of using satellite imageries.

Mode of Data acquisition	Estimated price for 25 km^2 area (Rupees)	Estimate time of acquisition
Topographic surveying	800, 000	At least one month
Satellite image mapping*	200, 000	3-4 days for ordering and receiving imagery

Table 2: comparison of estimateed cost of data collection through topograpihc surveying and satellite imagery

* Data is taken from SUPARCO Pakistan and processed, digitized at office

7 RESULTS & DISCUSSION

The research shows that Geographic Information Systems and Satellite imageries can be efficiently used in monitoring the areas reserved for planning of traffic corridors. It is suggested that the authorities should identify geographic location of the proposed building on satellite imageries prior to the grant of plan approval. The process will ensure that the road right of way remains preserved and the buildings do not encroach these reserve areas. A quarterly updating of satellite imagery is also desirable to keep a track of current construction activities in the area.

The process of GIS overlays does not only give an overall picture of the development activity in the area but it can easily identify the unauthorized development activities that fall within the road right of ways. Secondly, it can result in preparation and updating of land use map of the area. Once location coordinates of a proposed development are entered in the GIS data, the location can be identified on the map. The method can be beneficial to identify whether the proposed development activity falls within the declared right of way or not. This process will ensure the preservation of road right of ways. Regularly updating the satellite imagery will result in a quick aerial view of the area to identify ongoing unauthorized development.

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Assessment and Simulation Methods for Green Building Planning

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1 ABSTRACT

Steering measures of the future will be based on life-cycle analysis. It is expected to experience a similar effect as currently seen by Energy Performance Certificates. The introduction of the Energy Performance Certificate led to a significant improved energy efficiency of new buildings during the past years. These improvements were not exclusively driven by using more insulation material, but also by better planning (compacter shapes) and more efficient materials and technical equipment.

The European wide research in the area of LCA uses different methods, whereby the comparability, which is mandatory for steering measures, is affected. At the moment no environmental evaluation system is available that enables LCA in an efficient way in the planning phase of buildings.

Today a concept for a simple creation of an integral LCA of a building using standardized interface to existing data sources is missing. This LCA should be applicable during the different stages of the planning process (application, lodgement and tendering). This enables the consideration of LCA-aspects during early planning stages already.

The concept should be aligned with stakeholders to achieve an Austrian-wide homogeneous incorporation of this LCA-concept in funding guidelines and regulation of construction and renovation buildings.

To improve the planning process and to ensure the comparability of the LCA-results, a standardised interface to existing data structures has to be elaborated. Thereby the effort for creating LCAs is reduced and simulation of different variants is facilitated. This improves the possibilities for building optimization during the planning process.

Current LCA assessments provide several indicators, which can only be correctly interpreted by experts. Based on existing assessment concepts, standards (e.g. CEN TC 350) and stakeholder's expectations, a proposal of a uniform set of indicators shall be defined. The quality of the decision process will be boosted by an interpretation guideline, which helps the planner and decision maker defining the essential indicators.

Another sector, which is faced with huge amount of data and several participants of the planning process, is the automotive sector, which already provides an established system for data management and LCA. The acquired knowledge creating LCAs in this sector shall be analyzed and transferred to the concept.

During the preparation of data for the LCA-approach, the available LCA-data for materials and production processes shall be evaluated according to the method, data quality, level of transparency and the up-to-dateness. Appropriate to the system boundaries, the consumption during the usages phase of the building shall be broken down and aligned using sampled data from already existing buildings.

2 LIFE CYCLE ASSESSMENT IN THE BUILDING AREA

In the early 90ies standards for life cycle assessment (LCA) were developed with the aim to describe and analyse the environmental impact of products, processes and companies in a standardised way. Because of the complexity of buildings it was impossible to do a LCA according to the standards and so the evaluation of buildings was done with criteria and points using check lists. A few years later research results in the area of LCA of buildings were presented, and gave the hope that LCA could be used in practical application.[1, 2]. Today LCA of buildings is increasingly establishing as tool and getting a fix component in the standardisation of sustainable buildings. [3]

By now several buildings evaluation systems have been developed worldwide. These systems are using some aspects of LCA like the consideration of life cycle stages „Cradle to Grave" or „Cradle to Cradle", but because of the complexity of buildings they are following a streamlined approach. Also, this is the case in Austria, where the environmental evaluation tools use a streamlined approach by focusing just on single life

cycle stages or include just specific parts of a building or only specific impact categories like global warming potential.

2.1 Currently State of Development and Existing Problems

In Austria, among other systems the building evaluation system Total Quality (TQ) was developed. Since 2003 the pilot phase was finished and the service for evaluation and certification was offered in Austria. Like in other countries, this evaluation system is constantly improved in line with new requirements and knowledge. In 2008 the system was revised and renamed in Total Quality Building (TQB). Based on the work of TQ the development of the klima:active standard started in 2005. This building standard was available in 2008 for both, residential building and office building. Within the framework of klima:active the main focus is on reducing the emissions of CO2 and on the supply of a comfortable indoor environment.

In April 2008 the organisation Sustainable Building Alliance (SB Alliance) registered in Paris was established. The executive board consists of Alain Maugard (President CSTB , France), Dr. Martin Wyatt (BRE Group, UK) and José Joaquim do Amaral Ferreira (FCAV, Brasil). Dr. Eva Schminke (DGNB, Germany) has a status as observer. The Aim is to bundle the activities in the area of building evaluation and promote the use and development of collective standards, even with the problem of national specifications. The environmental evaluation systems implemented in Austria to reduce the CO2 emissions are using a streamlined LCA approach. This streamlined approach focuses on selected life cycle stages (e.g. the use phase) or evaluates some aspects just in a qualitative way.

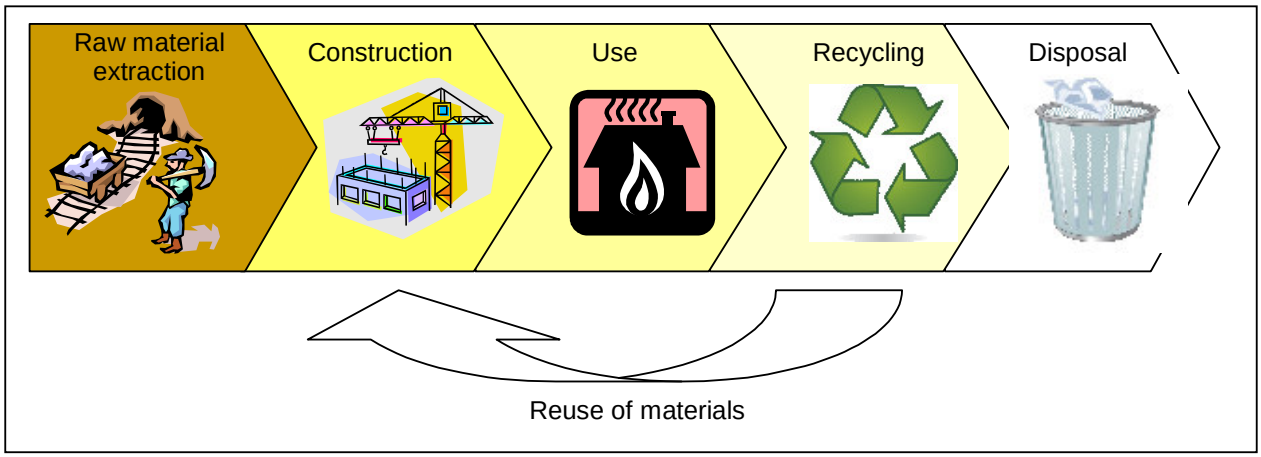

Fig. 1: Life cycle stages of a building

LCA considering all life cycle stages (see fig. 1) has the advantage that all emissions beginning with raw material extraction and construction and ending with the disposal are considered. Funding guidelines that implement the results of such a LCA in the planning phase do not have just the effect, that the CO2 emissions are reduced. Also resource management will benefit, because recycling relevant criteria supporting a higher material reuse will be already considered in the planning phase. This results in a further improvement of climate aims of the Kyoto protocol, because of further reductions of CO2 that can be reached by the use of resource efficient materials.

Due to the complexity of buildings a total LCA was not considered in the funding guidelines up to now.

2.2 Solution

To enable the use of LCA as tool in daily life it is necessary to combine the already developed methods and data with the existing data systems in the planning phase.

In the meantime the basis for doing an extensive LCA of a building is available because of different research and standardisation initiatives of the last years. This basis can be used in daily use approach. Therefore the following steps are required:

- Harmonising methodologies for life cycle assessments
- LCA/LCC data for building materials and building processes
- Guidelines for Interpretation

- Data exchange among trades

This results in a LCA concept that enables to manage the complexity of data of buildings and makes LCA available in a easy way in the planning phase for architects and decision makers. This is the basis for a nationwide development of directives for the awarding of funding for the construction and restoration of buildings.

2.2.1 Harmonising Methodologies for Life Cycle Assessments

Current methodology for the calculation of the IBO list of ecological generic data for building materials have to be adjusted to the new standards of CEN TC 350 if required. A detailed documentation of the new methodology has to be written. In the future this shall assure that LCA can be done by different companies in the same way and warrants a fast grow of the LCA database. A further step to reproducible results is the definition of possible options like assumptions in the use or end of life phase.

2.2.2 LCA data for building materials and building processes

LCA data for building materials and building processes have to be updated, harmonised, and collected. The collection comprises:

- LCIA data for the production of building materials and of materials for building services
- LCIA data for the service life of building materials and of materials for building services
- LCIA data for transport, building, and deconstruction processes
- LCIA data for building waste management processes

2.2.3 Guide for Interpretation

The results of a state of the art LCA can just be interpreted with expert knowledge. A guide for interpretation has to be written to support designers and decision makers in determining the relevant indicators for LCA/LCC assessments.

2.2.4 Data Exchange Among Trades

To accomplish data exchange across different trades an interface for LCA data have to be proposed. This can be based on existing data interfaces like the IFC interface [4] or new development. This format should contain ecological and economical data along with technical data.

3 OUTLOOK

The approach shown in point 2 was the basis for a tender in the founding line “Haus der Zukunft plus” (Austrian Federal Ministry for Transport, Innovation and Technology). This tender was done in cooperation with IBO – Oesterreichisches Institut für Baubiologie und -oekologie, AEA – Austrian Energy Agency and POS – Sustainable Architects. The publication of the evaluation result is expected in June 2010. If the evaluation is positive it is planned to test the data exchange in a pilot project starting in 2011.

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Assessment of Governance Strategies for Climate Adaptation in Flanders/Belgium

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1 ABSTRACT

Climate discourse in recent decades has mainly focused on the issue of mitigation. Through a better understanding and assessment of climate challenges, adaptation arises as a complementary strategy to mitigation. Vulnerability in relation to climate change is seen as a function of exposure, sensitivity and adaptive capacity. Adaptation can influence sensitivity while mitigating impacts on the exposure to climate change. (IPCC, 2007).

Adaptation requires space for climate on a local scale and should therefore be incorporated into the structure of amy given place or region. Consequently, however, implementation has to overcome local resistance. (IPCC, 2007) In this first part of a broader investigation into adaptation, the climate change challenge is situated in the Flemish context. Assessment of an appropriate framework in the international literature is followed by a delineation of the relation between space, demand and supply, and policy. A first step is taken towards the development of a climate scan tool to narrow down adaptation options and strategies. At this point, qualitative spatial implementations will be investigated through research by design in order to assess integrated and integral adaptations.

2 INTRODUCTION

CcASPAR, an acronym which stands for 'Climate change And Changes in SPAtial structures in Flanders – Research project' (2009-2012), funded by the Institute for Innovation through Science and Technology (IWT) and is oriented towards preparing policy in the domain of adaptation possibilities in response to climate change. The aim of the research is to formulate a spatial adaptation strategy for Flanders (SAS). Research into climate change is very much on the worldwide agenda and Flanders and Belgium are no different. It is time to develop strategies that anticipate the potential effects of climate change and to investigate new investments in spatial developments, particularly with regards to how the latter can be made sufficiently resilient against those effects. The research project's social relevance relates to its answering of the question as to how existing spatial structures in Flemish society can be adapted to confront the growing effects of climate change. (Leinfelder, 2008) The research questions 'What should we do?' and 'What can we do?' form the foundations of this project. The latter has also sought an adequate translation of the concept of 'adaptation' to the Flemish context. A SAS will have to take a number of issues into account, at the very least for the purposes of defining strategic action in the Flemish context. This means that, in addition to paying attention to physical space, such a plan must also take stock of the relational social network space in which the project or process is to come about. In this paper we point to a number of forces which define the existing spatial, plannological and policy context which will need to be taken into account in developing a SAS for Flanders.

3 WHICH ISSUES WILL A FLEMISH SPATIAL ADAPTATION PLAN HAVE TO TAKE INTO ACCOUNT? – A FEW CONFLICTING FORCES.

3.1 The Existing Spatial Context

3.1.1 Location, density and fragmentation

Flanders/Belgium lies in the Rhine-Meuse-Scheldt (RMS) delta, placing it in the economic heart of the European Union that surrounds Brussels, the European capital. Federal Belgium consists of three quasi-autonomous regions: the Flemish, Walloon and Brussels Capital regions. It is for administrative reasons that this paper focuses only on Flanders. Of course, in relation to climate change, this delineation is purely arbitrary: neither climate nor spatial structures or systems cease to exist at administrative borders. This institutional division aimed at making the country governable nevertheless errects the first barrier to addressing cross-border problems such as climate change.

Within the RMS delta, Flanders/Belgium lies at the intersection of economically strong regions such as the Dutch Randstad to the north, the German Ruhr region to the East, London to the west and the Paris and Lille-Roubaix-Tourcoing urban zones in France to the south. (RSV, 2004 and L. Boelens, 2008) As a result of its location, Belgium is, to a great extent, a transit country. Flanders alone has around 6000km in main and regional roads (not including local roads) which simultaneously connect and divide the spaces between settlement structures.

In comparison with other delta regions in the world, the RMS delta ranks on the low side for population density with just 6.4p/ha over an area of 53 000km². (L. Boelens, 2008) Of course, this says nothing about the factors which govern the division of space or which qualities are achieved. It only gives an indication as to size. It gives an impression of the spatial pressure which goes hand in hand with the socialisation of space, i.e. its accessibility and the ratio of private to public spaces.

Belgium has 10.6 million inhabitants of which 6.16 million live in the Flemish Region (456 inhabitants/km²), 1.05 million in the Brussels Capital Region (6497 inhabitants/km²) and 3.45 million in the Walloon Region (205 inhabitants/km²). (Federal Department for the Economy, 2008) According to the Flemish Spatial Structure Plan, the regional policy plan, Belgium and particularly Flanders and Brussels are among the most densely populated regions in the world. (RSV, 2004) Nevertheless, with 4.56p/ha, Flanders is below average for both the RMS delta and the compared overall delta average. This notwithstanding, Flanders is subject to significant spatial pressure. An historically developed spatial spread followed by unbridled suburbanisation and internal and European/global external development pressure have given Flanders a highly idiosyncratic spatial morphology. This so-called ‘nebular city’ is characterised by endless overlapping construction forms that often severely deface existing open spaces. In Flanders, one never has the real sense of driving into or out of a city.

One result of this characteristic morphology is that space becomes highly fragmented. This fragmentation can also be identified in other Flemish/Belgian structures such as governments, administrations and institutions. This has lead to a situation where a large number of actors and stakeholders from various domains dictate terms with it comes to spatial issues. The fragmented space is also in direct proportion to the increased pressure on available space because new or additional developments generate an even greater demand for space.

3.1.2 3.1.2 When and how did we forget?

In the contexts of the CcASPAR project, a number of climate scenarios have been developed in order to determine the respective structures’ sensitivity to change. These scenarios are in line with the models developed in the Netherlands and those of the IPCC. The primary effects which have been taken into account are water, temperature and variation. High water as a result of potential flooding via the seas or rivers. Low water as a result of reduced rainfall in summer, a drop in the water table resulting from infiltration problems because of the landuse and a gradual increase in consumption. Heat stress in the summer and, although milder winters have been predicted, it has been shown that very cold dips are a possibility, thus resulting in greater temperature extremes which could have an impact on the relevant structures and systems. Variation in the distribution of these effects is difficult to estimate, hence the importance of taking this parameter into consideration. In 2007 it was shown for the first time that human activities where the main cause of variances in precipitation observed between 1925 and 1999. Between 40° and 70° latitude – comprising the majority of Europe – precipitation levels have increased by an average of 62mm per century. The contribution of human activities to this figure is estimated at 50% to 85%. (MIRA, 2010)

Of relevance to the Flemish/Belgian case, it appears as though humankind has had a lobotomy at some point in its history. Belgium and the Netherlands have lived with water for centuries. This experience has been translated into settlement structures and specific forms of land use. In Flanders, people have traditionally not built in areas that are subject to flooding. Not a single historical church in Flanders has ever been threatened by water. This changed in the 1960s and 70s when an omnipresent belief in the ultimate manufacturability of society combined with a blind trust in technical solutions. People forgot or ignored the historical waterways and started building on top of them with all the predictable consequences.

3.2 The Plannological Context

3.2.1 Plannological context

Although some zoning plans existed in Belgium beforehand, regional planning has formed the basis for the division of space since 1962. In 1980, spatial planning was fully regionalised which meant that the regions were at that moment given full jurisdiction over their respective territories. This is seen as the first palmy period for spatial planning and order. Then there was a transition period from the above-mentioned regional planning to structure planning. From 1996 to 2005, there was a second palmy period for structure planning. Structural planning is characterised by the fact that the respective plans are binding for the government. They are a representation of a scientifically grounded, desired spatial structure. The three policy levels, namely local, provincial and regional, function according to the subsidiarity principle. By means of planning processes, the orientational structural plans are translated into spatial execution plans, which are binding by law for individuals. As figure 1 shows, the question at this moment is, what will be next? Will the line of planning as it is today be followed and the existing tools be modified, or will there be a new planning course with new planning tools to develop, regarding the climate challenges that are upon us?

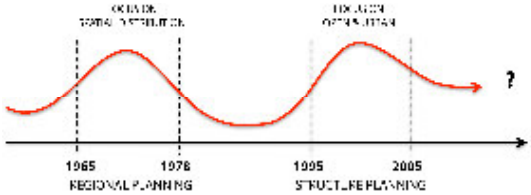

Fig. 1: Two palmy periods of planning in Belgium/Flanders

The Royal Decree of 1972 regarding the designation and application of regional plans can be seen as an obstacle for the transition from regional planning to structural planning. At the time, namely, a univocal key was introduced for regional plans, offering legal certainty with regards to the designation and use of any given piece of land. This key otherwise does not take such issues into account as, e.g., the quality of the landscape, environmental or climatological fragility or socio-cultural identity. There is no mention of any 'total economic value' (Ahlhorn, 2009), in which economic, functional and other values are incorporated in the equation. Under the weight of legal certainty, the only thing that counted in the regional planning is the economic function and/or value of a place. As such, this does not say anything about the intrinsic qualitative foundations of regional planning itself.

Structural planning, however, is better equipped to deal with uncertainty about the future. And yet, it cannot completely come to fruition because of a tradition and a culture that continue to exert influence from the past. The degree of freedom still inherent to orientational structural plans for quite liberal interpretations, are outweighed for reason of legal certainty, when the latter are converted into spatial execution plans. In complying with the regional plans, all intended uses are designated in precisely delineated zones, where the applicable criteria are described which define the function and in many cases also the intended form of subsequent developments. There is, however, another possibility: why would one not embrace a system where people must earn legal certainty through sound argumentation? In such a case, one would have to demonstrate that a certain function or programme is appropriate for a certain area; one would have to evaluate both the intrinsic and added value in each case. We could even evolve towards a fluviology instead of a plannology, as suggested by Luuk Boelens (2009), with the significant element being a shift from 'survey before plan' (plannology) to the planning activity 'of the survey itself'. Local knowledge could then be reintroduced at any moment as part of a continuous process.

3.2.2 Conflicting levels of government

Within the principle of subsidiarity, one could claim that the higher the level of government, the more abstract the visions and concepts become. Although in and of itself, this is not a bad thing, it can lead to tensions within the process for two main reasons. Firstly, in higher plans and administrative processes, there is often no direct relation with the local area. Information on the actual localities is usually contained in more extensive collections, hence the tendency for a place and its needs to be reduced to a variable within the accountant's equation. Indeed, the section on spatial accounts that is appended to the Flemish Spatial Structural Plan is a literal translation of this. (RSV, 2004) Through the exertion of political pressure, people

have succeeded in reducing an integrated document into a variable in a spreadsheet; which makes it all the more controllable (and negotiable) for the politicians. Secondly, and as a consequence of the distance, the abstraction and outdated data, the local plan still to be developed can easily be steered beyond the contexts of the locality in question. Thus do top-down plans often meet with resistance due to a lack of up-to-date and above all local knowledge. Not only in relation to figures but also their incorrect assessment of the times and the sensitivities which influence decision-making in the repective policy domains. In relation to current developments, large infrastructural works at the regional level have often met with resistance during implementation within the local context.

3.3 The Policy Context

3.3.1 Thirteen policy domains

With the introduction of the Flemish government's BBB project of 2006 (roughly translated by Better Governmental Policy), the Flemish government was restructured into 13 homogenous policy domains. A homogenous policy domain is a collection of policy areas which, from the point of view of the individual and the policy itself, form a coherent whole. Jurisdictions which logically go together are subsumed under the same policy domain. Of those 13 tracks, each of which was supposed to have a delegated minister with his/her own cabinet and administration, there are 8 + 1 (Spatial Planning, Residential Policy and Monumental Heritage) that directly impinge upon spatial considerations. Consequently, and in the case of Spatial Planning, not all jurisdictions that logically belong together have in fact been brought together. This, too, opens the door to potential conflicts.

3.3.2 The primacy of the political, rationality and the prison of the "present place"

The primacy of politics has nothing to do with politicisation. It refers to the clear division of labour between politicians, administrations and civil society. The principle is that policy must be formulated by political representatives, because they are democratically elected. The Flemish policy tracks supports the government in its tasks: it takes care of the preparation, execution and evaluation of policy. Civil society is actively involved in the preparation, elaboration and execution. Neither the administration nor civil society have decision-making powers. Those are reserved for the politicians.

The result is that decisions are taken in the contexts of a political rationale, that is, by a lay instead of a specialist, in the contexts of short-term thinking as a function of an electorate rather than with regards to rational-technical considerations. A problem which, among others, is described well by Dowell Myers (2005) in 'Escaping the prison of "the present place"', where he points to the term of office which holds 'society and all its challenges' imprisoned in the present. As a result, priority is given to ad-hoc solutions for the issues that dominate the public agenda.

4 FRAMEWORK AND ADAPTIVE CAPACITY

According to Barry Smit et al. (2000) and in line with Hans-Martin Füssel and Richard J.T. Klein (2006), there are two distinct but not independent reasons why adaptation is important with respect to climate change and variation. Firstly, because people realise that the impact of climate change can itself be changed and in many cases reduced. People can adapt the sensitivity of the respective systems and structures. In this context, people ask themselves, 'What adaptations are likely?' Secondly, research into 'adaptation' is regarded as preparatory to policy. There, the question is, 'What adaptations are recommended?'

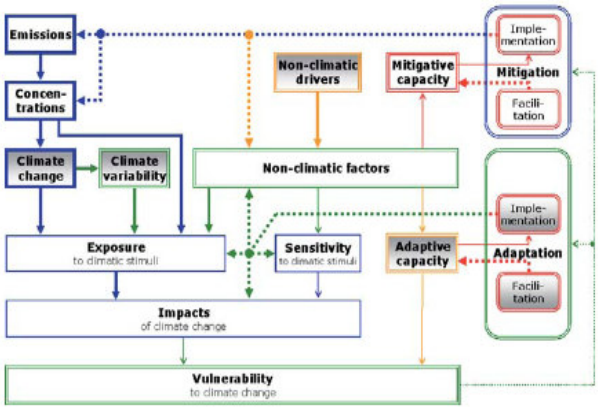

Fig. 2: Adaptation policy assessment (Füssel, H., M. and Klein, R., J., T.)

The conceptual framework forwarded by Hans-Martin Füssel and Richard J. T. Klein (2006) is abstract enough to leave the necessary development space open with respect to the Flemish/Belgian context. Specifically for this framework, the combination of natural and socio-scientific perspectives is aimed at identifying areas of vulnerability. “The natural sciences tend to apply a physical-flows view (system-dynamics diagram), [...] The social sciences tend to apply an actor system view (influence diagram), which emphasizes the flow of information and the relationship between different factors that determines social decision-making [...] the two notations interpret the nodes and arrows very differently. In system dynamics, nodes represent stocks, sources, and sinks of conserved quantities, such as materials, water, money, or numbers of humans or other species. The arrows represent flows of these quantities [. . .] Influences, on the other hand, [...] represent knowledge and beliefs, about how the value of variables affects the value or probability distributions on other variables, which may reflect knowledge on material flows, or of other evidential relationships.” (Morgan and Henrion, 1990, Section 10.7) (Füssel-Klein, 2006, p 311) It is the combination of both perspectives which enables the conceptual framework to comprehend (or perhaps contain) the complex relations at play. Identifying the vulnerability with respect to climate change is aimed at providing argumentative support for certain policy options which reduce the risks associated with climate change. The framework strikingly points to a dual capacity which the system must have if it is going to be able to adapt. It must have a facilitating capacity, in order to enable the acquisition of ‘adaptive capacity’. Adaptive capacity provides knowledge, mechanisms, protocols, funds, technology, platforms and other elements which enable society to mitigate, or at the very least, anticipate the relevant challenges. In addition, the system must also possess the capacity to validate this adaptive capacity by implementing it. One inherent feature of this framework is its steering capacity, due to its adoption of both perspectives. It can, in this sense, be regarded in a vectorial sense. The residue – the current state – represents the finality of the adopted policy at one specific point in time.

The remainder of the research will need to investigate to what extent the conceptual framework referred to above can be followed. In any case, the effects of climate change, insofar as they impinge upon (the use of) space, can rarely be reduced to the jurisdiction of one policy domain or sector alone. One could call this the integrative capacity of climate change. The space in which such a plan or process comes into being always involves a multi-actor context, as explained by Carton (2007), comprising many domains, each with its own rationality. If we in Flemish/Belgian society are to boost our capacity to deal with the effects of climate change, then an integrated approach is essential (see section 3.3). This requires a diagonal integration of policy, both with regards to content (alignment of policy visions) but also procedurally and instrumentally (pooling concrete initiatives). At different policy levels and within different sectors, it has been acutely obvious that certain objectives can no longer be realised because they conflict with those of other policy domains. The construction of a solid (communications) platform by and for the respective stakeholders appears to be of immense importance. (Allaert, 2008)

If we were to return to the past armed with the two questions posed at the beginning of this section, then we could state the following: in relation to the spatial organisation of Flanders, one can consider the Flemish Spatial Structural Plan (SSP, see 3.2.1) as a scientifically founded document that answers the question ‘What adaptations are likely?’ The SSP describes the current state of affairs (3.1.1) including trends and evolutions via which to formulate a desirable spatial structure or development vision for Flanders. The critique that the

SSP lacks genuine vision has been voiced often enough. Especially at times where society seeks answers to spatial challenges. The inability to respond to the current mobility problems, e.g., speaks volumes. The question 'What adaptations are recommended?' used to be answered by means of a rough translation of the SSP into a variable on a spreadsheet (see 3.2.2). Whenever the characteristic relations are ignored, however, there is a risk of adding to the fragmentation of which we have already spoken. The question is, however, whether we have the luxury of being able to ignore those relations again, in the face of the challenges posed by climate change.

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Bridging the Physical and the Virtual: Creating a Social Network via Media-Enhanced Street Furniture

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1 ABSTRACT

The U-Streetlight is a 5-year R&D project aiming to develop an intelligent street light system and its applications to provide urban living information services as well as media service to the residents. This paper presents some of its outcomes which are more related to the applications of the system rather than the hardware itself. This research starts from the development of a game-engine based simulator for the U-Streetlight system, focusing on the function of orchestrating collective lighting observable from specific viewpoints. Thus, it is possible to predict and design the deployment as well as its media content before physically installing expensive hardware units. The role of intelligent street furniture as infotainment device, however, soon becomes in question as citizens are already enjoying numerous information services through cell phones with so much ease. Beyond just simulating the U-Streetlight system, we try to expand the realm of its service both on physical and virtual world. Here, the U-Streetlight becomes a connecting bridge between two worlds. The virtual world is called USL World, (U-Streetlight World), a Google Earth-based interactive 3D environment. Camera-equipped or bluetooth-enabled cell phone users can use the visual marker generated on the streetlamp display, to instantly get connected to the USL World Network. The users then have a choice of selecting available locations such as shops, event spaces, and facilities. Using popular social networking tools such as Twitter, or its own media blogging tools, users can create social networks anchored in specific urban places existing on in both worlds. They can also enjoy location-based entertainment services such as free coupons, free Wi-Fi access, instant MP3 music download, and so on. This paper illustrates the development of these systems from the simulator to the USL World, and discusses how a smart space can be implemented via this type of intelligent street furniture.

2 INTRODUCTION TO THE USL PROJECT

The intelligent streetlight is not an alien term anymore when it comes to implementing smart space scenarios on the street. Free Wi-Fi access and LED art are among the common functions we benefit from this new breed of urban facility. The U-Streetlight (USL) is a 5-year R&D project sponsored by Seoul city government, aiming to develop a multi-purpose intelligent streetlight system and applied business models. A USL unit is an LED-lamp equipped streetlight with information kiosk and emotive light functions in its basic form. It can also host modularized device units such as surveillance camera, Wi-Fi Access Point, and air pollution sensor. The information kiosk module provides everyday living information such as realtime bus schedule, taxi call, and weather information to the residents through touchscreen interface (Fig. 1 & Fig. 2). A few hardware prototypes have been fabricated and installed experimentally, and we are looking forward to deploying a set of USL units in months to the places like U-Eco City test bed site in Korea.

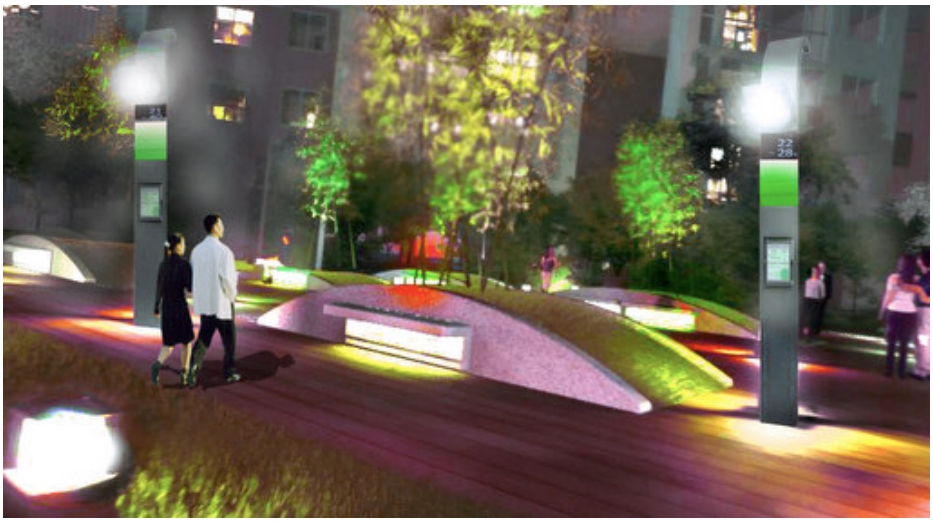

Fig. 1: A typical urban life support with the USL

This paper presents some of outcomes in this project more related to the software applications of the system rather than the implementation of the hardware itself. It is interesting to see the transition of research focuses as it reflects the common paradigm shift in the effort of implementing such intelligent urban facilities. We will briefly introduce the use of USL as urban sensor node, and move to the game-engine based simulator for the U-Streetlight system which was developed at the beginning of the project. This tool focuses on the function of orchestrating collective lighting event in which the USL works as an actuator to the urban media environment. Then, we will introduce the latest USL development. It incorporates three components: Physical USL, USL mobile, and USL World which is virtual USL. Here, social networking issue is presented on the street via intelligent street furniture. In this sequence, the role of USL is transforming from Sensor, Actuator, then to Mediator in the intelligent urban system.

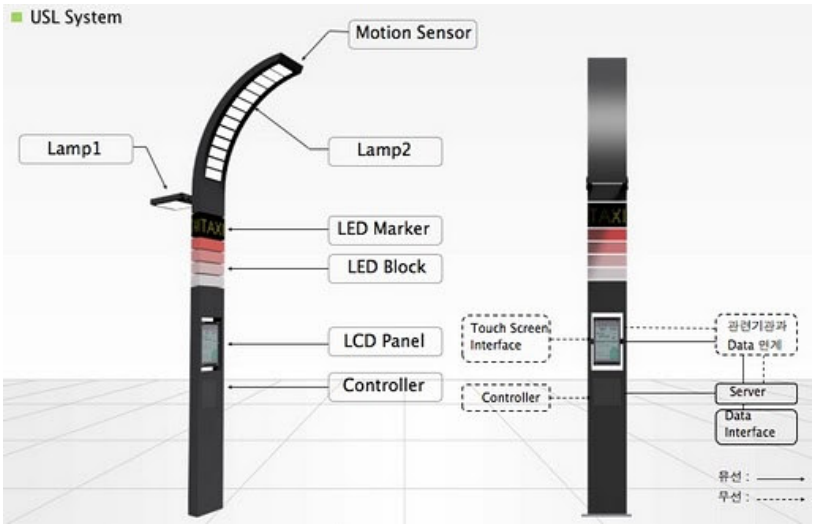

Fig. 2: Basic components of the USL Unit

2.1 Urban Sensor

Being able to host modularized sensor devices like surveillance camera or air pollution sensor, the USL has been considered a powerful sensor node of the ubiquitous sensor network. Crowd counting was one of the major sensing functions implemented at the early stage of the project (Fig. 3). It utilizes the surveillance camera unit built into the USL unit. The number of passers-by could be automatically calculated, by sending the image stream to a vision-based crowd counting software on the server. Although it needs a sophisticated algorithm to organize the collaborative counting with the network of USLs, we can effectively grasp the traffic amount, and thereby reason about the marketing potentials of a commercial district. We have also recently implemented the software so that we can count the number of people trying to contact with the USL by bluetooth or visual marker, or download some information from specific USL. This sensing function can provide more meaningful data out of the numbers of people with specific intents along with their profiles and spatiotemporal information. As more sensing devices become available due to the recent outcomes by other related research groups the role of USL as a urban sensor continues to be promising in this project.

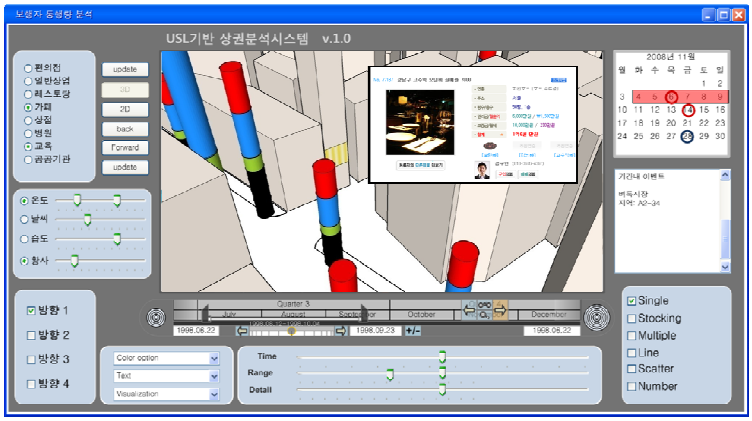

Fig. 3: Crowd counting application (adopted from SONG & JANG 2009)

2.2 Urban Actuator

The USL becomes an actuator as a urban media, providing emotional entertainment the residents. By using this type of urban object harnessed with sensors and display devices connected with the communication network, it is possible to transform the urban space into a digital media player. Urban media in such a scale allows unforeseen emotional service for the public. Each USL unit operates as a kind of image pixel constructing a bitmap of media screen in this scenario. The media screen generates a sparse image which transforms an urban district into a display panel observable from a distance. The patterns can be recognized as just an abstract lighting pattern from the street level viewpoint, but the result may be better recognized as a meaningful imagery from a certain point of observation in the city.

It requires huge investment to realize and physical result may be irreversible. We developed a simulator-cum-controller of the USL media fabric for this reason. The simulator lets us preview the USL patterns in an interactive 3D environment. The USL designers can import the 3D digital model, layout the virtual USL units, and simulate lighting patterns from various media using the simulator. It is possible to predict and design the deployment as well as its media content before physically installing expensive USLs using this simulator. The system also allows the access from mobile contents senders to respond to the collaborative mobile art scenario. Eventually, the system will be developed into a control platform of the physical city and USL network (Fig. 4 & Fig. 5). The simulator was developed based on a game-engine, and it has networking ability. The simulator or the actual USL unit is manipulated through the USL server. Any authorized user is allowed to send data (text, image, movie) to the server using a mobile device and the the fabric becomes a media board displaying a collaborative media art.

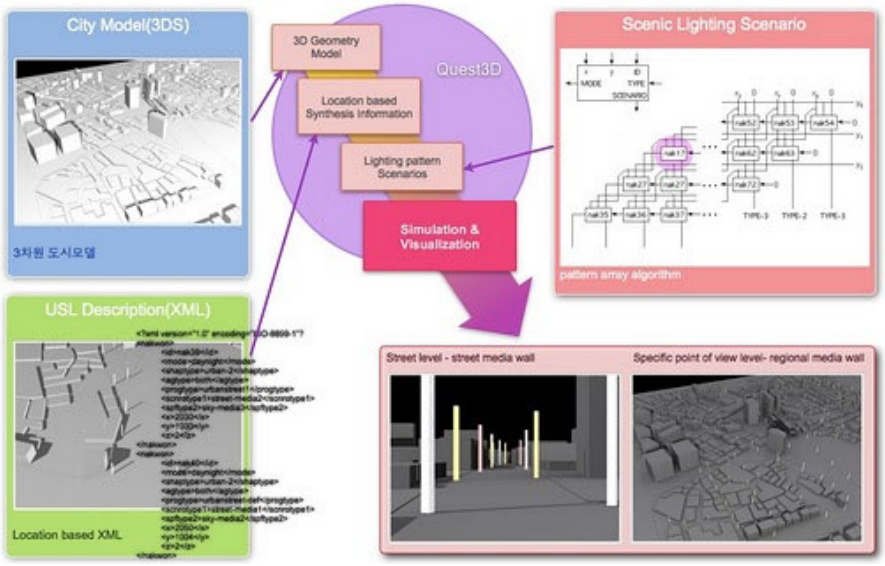

Fig. 4: Application structure of the USL Simulator

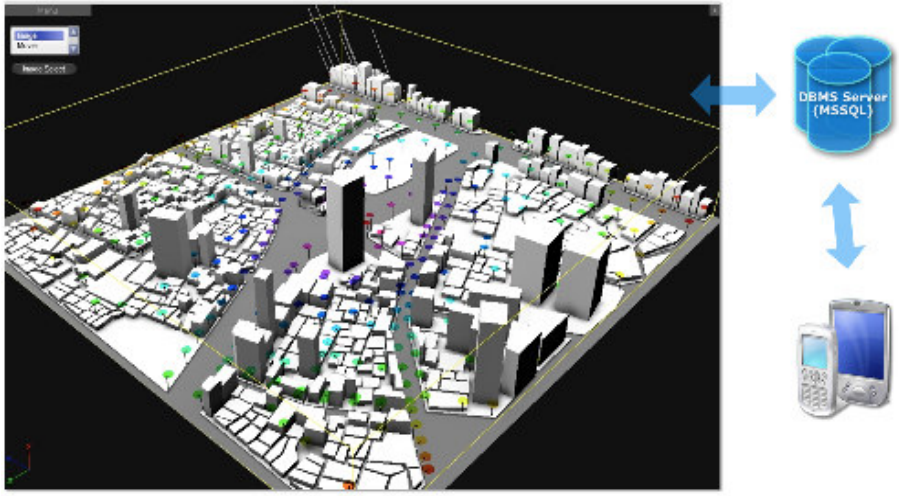

Fig. 5: Screetshot of the USL Simulator

2.3 Urban Mediator

The role of intelligent streetlight as infotainment device, however, soon becomes in question as people are already enjoying numerous information services through cell phones with so much ease. For example, any mobile phone users can acquire the weather information or find out nearby restaurants suitable to their tastes. Accordingly, most of information services by fixed facilities seem to become as obsolete as public phone booths nowadays which suffer from its raison d'etre. Our immediate answer was that public information service should still respond to the needs by digitally lesser people even if the mobile ubiquity is available. Furthermore indoor LBS is still not accurate enough. USL can be transformed into indoor facility similar to information kiosk, and provides accurate location based information. While keeping these reasons for maintaining the kisosk function, we came up with the idea of using USL as an urban mediator which enables communication between people both in real and virtual world. Camera-equipped or bluetooth-enabled cell phone users can use the visual marker generated on the USL display, to instantly get connected to the USL World Network. The users then have a choice of selecting available locations such as shops, event spaces, and facilities. Using popular social networking tools such as Twitter, or its own media blogging tools, users can create social networks anchored in specific urban places existing on in both worlds. They can also enjoy location-based entertainment services such as free coupons, free information access, instant MP3 download and so on. The USL Mobile Application lets people use their mobile phones to leave media notes at points of interest and share their experiences with other people in real time through the USL World (Fig. 6).

Fig. 6: USL World Main User Interface

3 IMPLEMENTATION OF THE USL WORLD

3.1 Spatially mediated social networking

Beyond just simulating the USL system, we are trying to expand the realm of its service both on physical and virtual world. Here, the USL becomes a connecting bridge between two worlds. The virtual world is called USL World. USL World is a web-based application hosting a 3D city viewer within its frame. It utilizes the Google Earth plug-in module as the viewer, which basically displays one of major business districts of Seoul. We built a city model using SketchUp program and loaded the model data as KML format. Major landmark buildings and main street facades are texture mapped with photos. This static modelling process wirll be replaced by the dynamic model generation method i ncorporation with GIS database towards the end of the project.

The user can freely navigate through the city model as in google earth viewer. The sidebar menu provides a named street viewpoint list. Viewpoint items can be bookmarked by the user. A volumetric marker shows up to indicate the target area when the mouse cursor rolls over each viewpoint item so that the user can grasp what to see.

Utilizing available open APIs, we also added some living information services such as bus stop information to the USL world. Virtual USL units are also deployed. The USL World is a replica of the physical world with USLs embedded twitter API. Each USL has unique twitter ID. As someone writes to the USL ID on the twitter, a 3d text column appears reflecting the most recent message (Fig. 7), creating a dext-based datascape.

Fig. 7: Text colums appear on the street of USL World linked with Twitter communication

3.2 Interaction with visual markers

The QR-code based 2D visual marker system was introduced to facilitate the interactions with the physical USL world as well as the virtual USL world. For example, when a person uses a cameraphone to match with the QR-code displayed on the USL unit, she can instantly get connected to the USL server. Then, she is able to use the media blog or twitter connected to that specific USL post. She can use infotainment menu interface on her smarphone which appears as AR object over the USL scene. QR-code match also guides the person to the equivalent location on the USL World. Both physical and virtual USL world provide sharable social networking tools and media blogs where users can create spontaneous online community.

Compared with the the anonymous and sometimes intrusive LBS services, this visual contact-mediated social networking ensures the quality of the community, and generates more meaningful data as it deals the specific user groups with specific intents and user profiles. It is a realitvely easy to connect both worlds by this method, and enhaces the space-mediated social networking in term of business models. We are trying to develop more business-oriented scenarios using this model. (Fig. 8).

Fig. 8: A QR Code-based USL World Scenario

4 CONCLUSION

Experimenting with various street event scenarios now, we expect the integration of a semantic engine in the long run so it is possible to find out meaning correlations between messages and places, and also between various factors such as activities and time. AR based application is being developed to provide more exciting interface to the user. These scenarios may not work as expected when deployed in mass scale, and new emerging technologies may call for fundamental changes of the concept. The sensor-autuator-mediator roles, howerver, seem to be still effective in general for this kind of intelligent street system development.

5 ACKNOWLEDGEMENT

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Bus Stop 3.0 – Bus Stop of the Future – Multifunctional Centers for Regional Developement

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1 ABSTRACT

"Bus Stop 3.0 – Bus Stop of the Future" represents the future of public transport stops and bus stops in particular serving as multi-functional centres for innovative urban and regional development. This project examines the demands and challenges related to the expansion of functions and comfort of a bus stop and integrates it as a meeting place for social interaction in its environment and thereby improves the usage and usability of public transport. "Bus Stop 3.0 - Bus Stop of the Future" is analysing technical specifications and wishes to upgrade normal bus stops to local and regional communication centres. The research is conducted within the framework of a Living Lab in the city of Schwechat where various scenarios of future bus stops were developed.

To prepare and look at the current "State of the Art", a Geographic Information System (GIS) was used to collect, analyse and visualize the state of the art on public transport with respect to socio-demographic attributes and location information. Wishes and needs for public transport and the wanted specific user requirements on bus stops of public transport users as well as of non-public transport users have been evaluated by an online questionnaire and focus groups and are presented in the final documentation. Within the project, a Best Practice Database (BPD) has been developed. About 110 national and international examples show implementations on bus stops for innovative meeting and communication places as well as the needed technical infrastructure or as connection points and charging stations for e-mobility. Numerous practices provide interactive features, allowing riders to explore routing maps, browse community message boards and given the internet connectivity by wifi. Independent electrical power for these features can be gathered, for example via photovoltaic cells embedded within the bus station or by vertical or horizontal wind generators. Any number of other information services (from local supply companies, tourism, public authorities, transportation authorities, on demand taxi services) can be offered as well at the "Bus Stop of the Future". Last but not least, a modular concept of a "Bus Stop 3.0 - Bus Stop of the Future" has been designed.

The `Living Lab Schwechat` served in the development of scenarios from the theoretical and real introduction of possible prototypes for an intelligent bus stop.

2 STATE OF THE ART

Most attempts to design intelligent bus stops are concerned with customary electronic passenger`s information systems, which announce the departure of the next means of transportation and indicate, perhaps, a little additional information or advertisement. Nowadays the real classical bus stop exists of a stand with a time table, a sign of identification and a bus shelter with seats. Often lighted advertising is part of the bus shelter (for example the "Citylights" at the bus stops in Vienna and its surroundings).

Figure 1: Current Bus Stop in Schwechat, Main Square (Source: own illustration, CEIT Alanova, 2009)

Features of a well designed bus stop should include:

- Safe and direct ways to all areas of access at a bus stop

- Enough waiting area with the possibilities of sitting and/or leaning and/or take shelter
- A wide range of information serving
- Enough lighting
- Comfortable and accessible possibililities of entrance
- Guidance system for visually impaired people

In cities you can find on frequently used bus stops time table displays, which show the passengers the waiting time of the next bus (so called dynamical passenger information system). More statically or dynamically services are usually not available, just the opposite occurs: Many bus stops don´t have any bus shelter and/or lighting and/or seats.

All of this is basically a static part of the bus stop with no ability for users to interact with the surrounding environment e.g. other customers, local business or communities.

3 THEMATIC MAPS TO ANALYSE AND VISUALIZE INFORMATION AT "BUS STOP 3.0"

Geographic Information Systems (GIS) serve many purposes, among them are to collect and store data, to analyse and visualize information. The use of GIS in "Bus Stop 3.0" focuses on the analysis of the bus stop itself by (geo)locating bus stops and bus line frequencies as well as on visualizing the sociodemographic environment. Furthermore, a combination of qualitative (questionnaire) and quantitative (demographics) data has been employed to set the stage for future spatialization processes and their visualizations. For example, the questionnaire's result on well perceived stops and not so nice ones is available for querying in an IMS environment as in the Figure 2 for Schwechat is shown below.

Figure 2: Well perceived (green) and not well perceived (red) Bus Stops (Size indicating the numbers mentioned); Results from questionnaire (Source: own illustration, Geologic Dr Benedikt, 2009)

A main advantage of using a spatial information system, like a GIS in the context of "Bus Stop 3.0", is to collaboratly design and allow to research the living environment where these bus stops lie in.

In the future GIS will be developed as a Spatial Monitoring System on the effects of technological innovation on the sociodemographic environment. It will focus on tasks, like keeping track on how many families are attracted by bus stop innovations, how many companies are additionally established, what kind of technological usage is appropriate for students and etc. It is designed to allow the city's planning institutions to closely follow the usage and development of a bus stop and it's surroundings and eventually move bus stop locations as well as to enhance the quality of citizen participation through technologically enabled interaction at "Bus Stop 3.0".

4 WISHES AND NEEDS ABOUT A "BUS STOP OF THE FUTURE"

4.1 Online Questionnaire

To interact with bus stops using state of the art technology in general and mobile devices in particular is essential for a "Bus Stop 3.0". In 2009, an online questionnaire was started in spring with the duration of two months, where users and potential customers were invited to participate. Issues were set for the general use of a bus stop as well as the possible use of new technologies. 504 people answered the online questionnaire (in total 549 questionnaires including the paper questionnaire). Different web pages provided the online-link to the questionnaire (for example the webpages of BMVIT/ways2go, VOR - Verkehrsverbund Ostregion, City of Schwechat, Verein CORP – Competence Center of Urban and Regional Planning and the research institute CEIT Alanova).

The poll ratings reflect the discontent with the state of the art (60% feel unpleasant waiting at a bus stop). Reasons for the discontent for example are the timeliness of the busses, less cleanliness and safety. Only 6% supported the need of technology at a bus stop. Obviously those polled could hardly imagine, that a bus stop could be more than a waiting area, where you are usually only a few minutes waiting for the bus.

The questionnaire focused on different subjects to be evaluated:

- Attitudes to the bus system respectively to the public transport
- The usage of a bus and its needs
- The usage of a bus stop and its needs
- Current intensity of using Information and Communication Technology (ICT)
- Attitudes of possible developments

In addition to the wishes of "more seating accommodations" and "dynamical passenger information system", also "ban of smoking", "better weather protection" and "better lightning system" had been adressed. Also creative ideas, like the possibility of heating in the wintertime or cooling in the summer, were called.

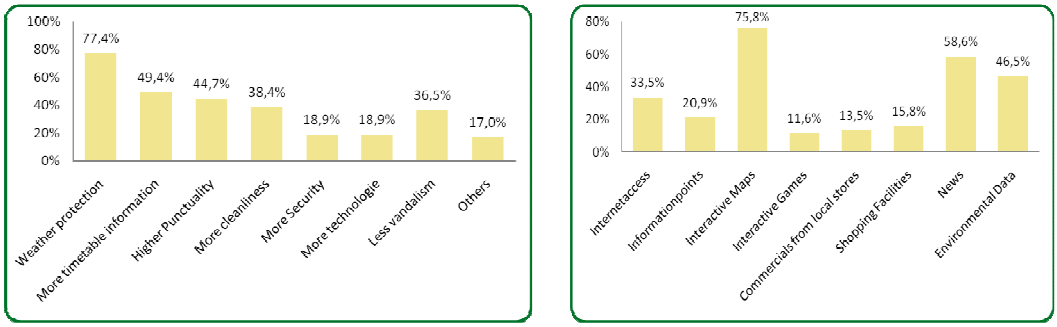

Figure 3: Improvement suggestions of wishes and needs at a bus stop (in %) (Source: own illustration, CEIT Alanova, 2009)

The called demands are the same through the different age classes, which means the wishes are align with the improvement suggestions.

4.2 Focus Groups

The focus groups increased the understanding of the user requirements for the online questionnaire. The target groups and the result of their needs and wishes for a "Bus Stop of the Future" are:

- Students: Mostly called were "seating accommodation", "food supply", "passenger information system", "infoscreen" and the "availability of free internet (handy)".
- Senior citizen: Their wishes for a future bus stop were "infoscreen", "weather protection" and the "current dates of events in the community".
- Enterpreneurs showed a great interest in new services at bus stops, since their target groups can be probably reached with appropriate advertisement. At a bus stop an advertisement can be pleasant and the acceptance is higher, when waiting for the bus.

The people of the focus groups were citizens or companies in the `Living Lab Schwechat`. Such a `Living Lab` allows to correspond to the knowledge of the `research citizens´ as well as their personal wishes, images and ideas. This was very helpful for designing a customer-friendly, future product like "Bus Stop 3.0".

5 NATIONAL AND INTERNATIONAL BEST PRACTICES

In addition to the validation of the results of the survey and of course to discuss possible future features of "Bus Stop 3.0", so called national and international Best Practices were collected and analysed and documented in a database. In that way it was possible to design a modular concept of a "Bus Stop of the Future" and to create visual examples of a "Bus Stop 3.0" prototype.

About 110 examples of Best Practices have been collected and classified into seven different categories (design, shopping, energy supply, ICT, routing, games and accessibility). The Best Practices range from designing a concept to implement a project/prototype. Furthermore some features, which are not implemented at a bus stop yet, were put in the database because of relevance of "Bus Stop 3.0".

With about 50 examples of Best Practices of information and communication technology (ICT) applications, ICT tools are an integral element of "Bus Stop 3.0". Because of that, such ICT applications are discussed in this paper.

A variety of software and hardware solutions are currently available for functions ranging from real time passenger information, internet access and digital signage to location and context based information and guidance systems for visually impaired passengers. These various applications need only be integrated to provide the functionality identified for the „Bus Stop 3.0" prototype. Today's ICT solutions are largely driven by the Internet. With this in mind, both wired and wireless solutions can be considered for delivering connectivity to "Bus Stop 3.0". However, in terms of cost and flexibility, the most promising solutions are wireless technologies including WiFi Mesh, WiMAX and LTE. These solutions can be applied in an ad hoc fashion to deliver connectivity to specific bus stops or "Bus Stop 3.0" itself can become an element of broader wireless initiatives including citywide wireless projects.

5.1 The Bus Stop as an information point

A number of cities offer public transportation information including route planners, timetables, disruption information, real-time tracking, ticketing, etc. This information is made available at displays mounted at public transportation stops. Services such as „Quando" for Vienna, Lower Austria and Burgenland and "Scotty" bring public transportation to the Web and to the smart phones of travellers. Travel information services are also becoming available to the visually impaired. The „RAMPE Project", for example, is an interactive, acoustic Information System for a better mobility of blind people. A number of Austrian cities (Salzburg, St. Pölten and Graz) offer audio departure information to visually impaired by pressing a button.

Figure 4: An interactive touch screen on the "Opera" bus stop in Paris offers a digital map to the passengers. (Source: http://www.lepost.fr/article/2010/01/30/1915197_abri-bus-multimedia-a-l-opera-2-plus-de-details.html, 2010)

Regardless of the technology, advertising can play a key role in funding the delivery of ICT services to "Bus Stop 3.0". Digital signage is a fast growing medium that allows the delivery of targeted (by location, context and even demographics) ads to consumers. The signs are becoming increasing sophisticated and interactive (e.g. games, information queries, e-coupons, etc.). Beyond digital signage, the explosion in the smart phone market has led companies such as Google, Nokia, etc. to develop GPS-backed applications that can deliver advertisements, sale information, and coupons based on users' travel history and shopping habits.

5.2 The Bus Stop as a meeting point

Location-based services and the increasing number of smart phones are being combined with Web 2.0 applications to create new services. Location-based social networks are arising. They allow users to share information on places, social gatherings, music, street art and much more. Through services like Sociallight, FIND IT, Qype, Yelp, Whrrl and many more, users are leaving digital graffiti, digital sticky notes, georeferenced photos, reviews and a variety of other digital „crumbs" in their paths for their friends or the general public to retrieve.

In addition to supplying information and entertainment to passengers, ICT can help their experience waiting for buses to be more pleasant. CCTV monitoring can ensure their safety while sensors automatically manage lighting and weather protection at "Bus Stop 3.0".

The reduction of barriers at bus stops is mostly realised through ICT and increased modern conveniences. Bus terminals, bus rapid systems (BRT) and rendez-vous bus stops are encouraging such developments. Bus stops for demand ("Bedarfshaltestellen") encourage the usage of bus stops in rural areas.

Figure 5: Example for a Bus Rapid System in Bogota, Colombia (Source: http://www.globalurban.org/Issue1PIMag05/MagHome.htm, 2010)

5.3 The Bus Stop as a sustainable model

"Bus Stop 3.0" should incorporate energy saving technologies such as LED lighting and low power ICT solutions. Moreover, the addition of renewable energy technology cannot only reduce the overall carbon footprint of the bus stop, but can also allow it to be sited in locations with limited or no external power sources. The main renewable energy sources that can be incorporated into "Bus Stop 3.0's" design are wind and solar, with the latter more suitable to most locations. However, location will be a major factor in the effectiveness of such solutions in generating energy for the bus stop. The renewable energy supplying "Bus Stop 3.0" could be integrated into e.g. local or regional concepts of climate protection.

Where conditions are favorable for renewable energy, in addition to power lighting and ICT solutions, the energy can be used to allow travellers to charge their mobile devices while they wait. „Bus Stop 3.0" could also incorporate a charging station for an electro-scooter or -bicycle.

Figure 6: The „Solar Bus Stop in Freiburg, Germany, produces 1.700 kWh/year and its electricity is fed into the grid. (Source: http://www.vag-freiburg.de/wir-ueber-uns/klimaschutz-bei-der-vag.html, 2010)

Remarkable for all Best Practices is, that in urban areas there are the most innovations at bus stops and a further development in rural areas is still neglected. But in these rural areas the project team sees a great potential for converting a bus stop into a multifunctional center (legal discussions about the needed area of additional features of a bus stop could be excluded).

6 THE CONCEPT OF A "BUS STOP OF THE FUTURE"

Because of the evaluated needs of the user (analysis of the focus groups and questionaire) and the analysis of the collected best practices a modular concept was developed. To this, different types of a "Bus Stop of the Future" were designed.

Basically all technologies used within the project are already available, technically possible and socially accepted. The pioneering innovation of "Bus Stop 3.0" is based upon a special linking of these technologies to support the interactivity and communication at a public transport stops to enhance social interaction in a local and regional community.

From the research results of the surveys and the analysis of the Best Practices following characteristics for a "Bus Stop for the Future" this can be appointed:

- Feature for orientation for the public transport
- Feature for orientation for urban and rural areas
- Place of information, communication and local supply
- Meeting point
- A protected, saved and convenient waiting area

Based on the research results a list of technical and non-technical features of a "Bus Stop of the Future" could be drawn. The "Bus Stop 3.0" prototype can be put together of six modules, which are:

- 1.Comfort
- 2.Information
- 3.Accessibility
- 4.Energy
- 5.Safety
- 6.Service

Because of the modular and flexible structure of the "Bus Stop" prototype, modifications for user-friendly and specific aplications are possible. The modules and respective the components can be easily upgraded to the actual state of the art. Such an example of a "Bus Stop of the Future" is shown in the figures below:

Figure 7: „Bus Stop 3.0 - Bus Stop of the Future" by day, night and bad weather, Schwechat, Main Square (Source: own illustration, CEIT Alanova, 2009)

Based on the state of the art (see Figure 1), the bus stop in Schwechat were visually converted to a prototype of “Bus Stop 3.0” with combining five of the six modules: 1. Comfort, 2. Information, 3. Accessibility, 4. Energy and 5. Safety. Additional features range from “more seats”, “video surveillance”, “weather protection” and “better lightning system” to modernizations such as “dynamical passenger information service” and “digital black board”, etc.

7 CONCLUSION

“Bus Stop 3.0” is a project aiming at the developement of a bus stop as an interactive place to communicate as well as a location for advertising of local service providers. The concepts worked within this project were focused on both: the bus stop and its integration within the surrounding living places. The use of a bus stop is not limited to exiting or entering a bus but to interact with technology, services, information and, well, other customers. “Bus Stop 3.0” tried to escape the infinite loop of well known facts and well known resulting conclusions with regards to demographic development and technological usability. The project was supported by local politicians, decision makers, commercial institutions, public transportation authorities and the local community and schools in the City of Schwechat. An important part was played by the citizens, who participate in the project within the framework of a `Living Lab`.

All results of this project-study are presented in the final documentation, that will be offered by the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT). A mid-term aim will be the involvement of the results of “Bus Stop 3.0” into existing traffic concepts and to be a sustainable contribution when using public transport.

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CentropeMAP and CentropeSTATISTICS – Cross-Border Geodata Infrastructure with User-Defined Thematic Maps

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1 ABSTRACT

Growing together – together we grow. This is the head note of Centrope, the dynamic cross-border region between the Czech Republic, Slovakia, Hungary and Austria. Cross-border access to standardised spatial data sets is essential for a common development of this region in the near future. CentropeMAP provides an interface for geodata stored in four different countries since 2003 when the project was initiated on behalf of the Eastern Austrian Planning Association PGO, a co-operation of the three Austrian federal provinces Lower Austria, Burgenland and Vienna with a base map of the region created with GIS software. For the first two years data exchange happened only offline, exchanging GIS layers on CD-ROM.

Figure 1: The Centrope Region. Source: http://centrope.com/, April 2010.

The CentropeMAP server was set up in the year 2005 and hosts a map server as well as geodata and a map viewing client. Since this time there has been free web access to all CentropeMAP-related datasets. The user receives maps showing data from servers all over the region together in the same view. Recently the extension CentropeSTATISTICS was added, featuring statistic data for the whole region for download and map view. Also the statistical data comes from local authorities and is merged to a single table for the whole region. These tables can be queried, exported, aggregated, and even visualised at the CentropeMAP portal. Twice a year representatives from all partner regions meet to discuss the further development of CentropeMAP and CentropeSTATISTICS. The CentropeMAP applications and files are hosted on a Linux server. All geodata and viewing applications for CentropeMAP and CentropeSTATISTICS use open source software.

2 THE CENTROPEMAP PROJECT

2.1 The Centrope Region

Centrope is a cross-border region consisting of several regions in four countries:

- Austria: federal provinces Burgenland, Lower Austria, and Vienna;
- Czech Republic: South Moravia (Jihomoravsky), South Bohemia (Jihocesky) regions;

- Slovakia: Bratislava (Bratislavsky) and Trnava (Trnavsky) regions;
- Hungary: Györ-Moson-Sopron county.

It was founded officially in 2003 by the Kittsee treaty (Kittsee is a town in Burgenland, Austria) within an Interreg-IIIA project. Since the enlargement of the EU in the year 2004 there are great potentials for integration, collaboration and developing synergies in the border quadrangle. The Central European Region is rapidly growing together and represents an attractive and strong region in economy, labour market, science, research and development, cultural activities, politics and administration, regional development, transportation, and other fields of action.

2.2 Background of CentropeMAP

CentropeMAP was started by PGO, the East Austrian Planning Association (a co-operation of the three Austrian federal provinces Lower Austria, Burgenland and Vienna), in 2003 with a base map of the region. During the first and second years, datasets were exchanged only by snail mail distribution of CD-ROMs among the project partners, but of course there was no way to guarantee that the same datasets were used within the whole region because nobody could make sure the the content of the CD-ROMs was spread to all people being in touch with data of the region.

Print-ready maps were generated and made available for download from the CentropeMAP website which was also launched in 2003. Furthermore, some basic statistic datasets were put together in a download area on the website. While CentropeMAP was in its early development phase, it had already turned out that direct online access to different servers becomes more and more important dealing with cross-border data exchange, providing geodata as web map services and statistical data via online databases. Therefore the CentropeMAP web map server was set up in 2005. It gives access to the current project data store using web map services which are hosted directly on the server, or by the local authorities of the provinces and regions. Most of the local authorities configured separate web map services especially for the use within the CentropeMAP project, some also have existing services on their official administrations' servers which can be used in CentropeMAP.

2.3 Project Status 2010

The CentropeMAP web mapping application (see figure 2) features some hundred different map layers from all parts of the Centrope region. Many fields of interest for spatial planning experts are covered (topic categories according to ISO 19115[1]): biota, boundaries, economy, earth cover, elevation, environment, farming, geoscientific information, imagery and base maps, inland waters, planning and cadastre, society, structure, transportation, utilities and communication.

All layers could be turned on and off separately until 2010. However, this structure had a significant disadvantage: To receive information for the whole region from different servers, one separate layer for each server had to be activated. Therefore, in April 2010 a new layer structure was introduced using cascading WMS, which means that data from different servers are buffered at the CentropeMAP server and converted into one single map image which is then delivered to the client. So for each layer now only one single click is needed to retrieve information from all distributed servers. Most of the layers have legend items included; some remotely hosted web map services, however, do not support legend generation. Besides, there is a printing function where PDF documents can easily be created. Two so-called gazetteers help to search for points of interest or municipalities by offering a keyword search joined to the geodatabase. The search results are highlighted in the map when the mouse pointer is placed over a search result. An online dictionary allows the user to add translations of single expressions into one or more of the five languages English, German, Czech, Slovak, and Hungarian.

[1] ISO 19115 "Geographic Information - Metadata" is a standard of the International Organization for Standardization (ISO). It is a component of the series of ISO 191xx standards for Geospatial metadata. ISO 19115 defines how to describe geographical information and associated services, including contents, spatial-temporal purchases, data quality, access and rights to use. The standard defines more than 400 meta data elements, 20 core elements. (Source: http://en.wikipedia.org/wiki/ISO_19115)

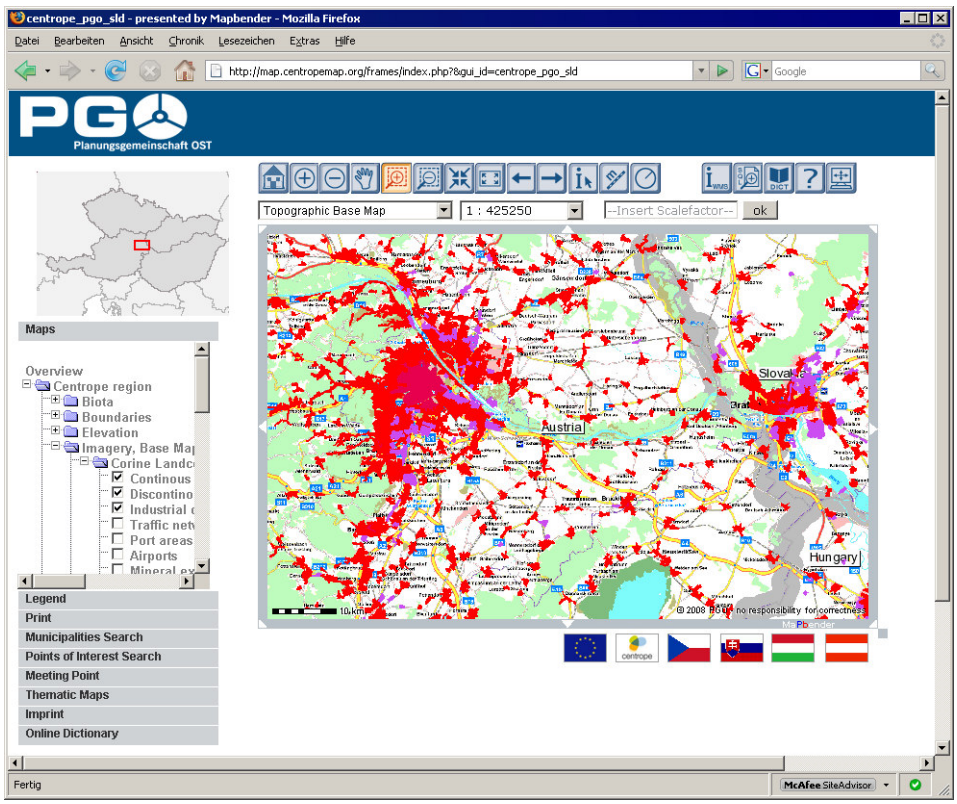

Figure 2: The CentropeMAP web map service client.

The CentropeMAP website (see figure 3) is available in five languages (German, English, Czech, Slovak, Hungarian). It offers information about the region, the project, and also a lot of downloadable material from maps and tables to workshop protocols. Also the CentropeMAP help ("How to Use" guides for CentropeMAP and CentropeSTATISTICS) are offered multilingually. The upgrade of CentropeMAP including CentropeSTATISTICS was on air for testing purposes since the beginning of the year 2009, and it has finally been made available to the public in April 2010. At this time, also the graphic stylesheet of the CentropeMAP website has been improved. Throughout all parts of CentropeMAP grey and blue colours are dominating, which are the code coulours of PGO.

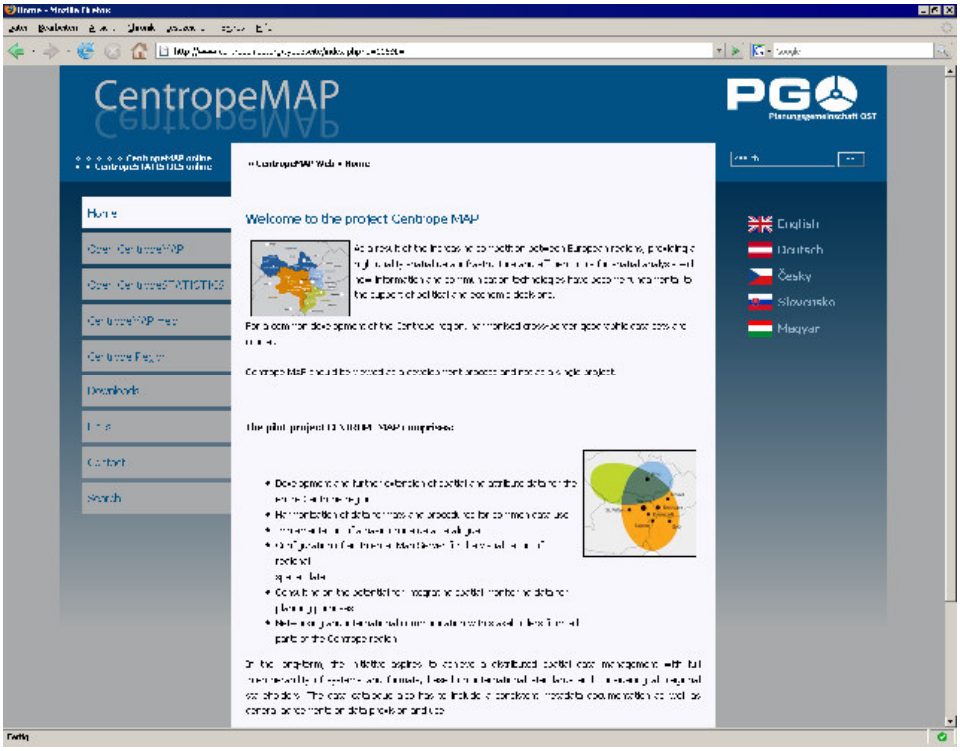

Figure 3: The CentropeMAP website.

3 TECHNICAL IMPLEMENTATION

3.1 Server Hardware, Operating System, Software

The CentropeMAP applications and files are hosted on a Linux server. All geodata and viewing applications for CentropeMAP and CentropeSTATISTICS use open source software, for example UMN Mapserver, Geoserver, PostgreSQL (with PostGIS), Mapbender, Typo3, and some in-house developed PHP and Javascript code.

3.2 System Architecture

The Mapbender map viewing client is the heart of the CentropeMAP system. It gives access to all embedded web map services, manages user access rights and hosts the web interface for map viewing. CentropeMAP uses WMS standards up to 1.1.1 and WFS 1.0.0, WCS are currently not in operation.

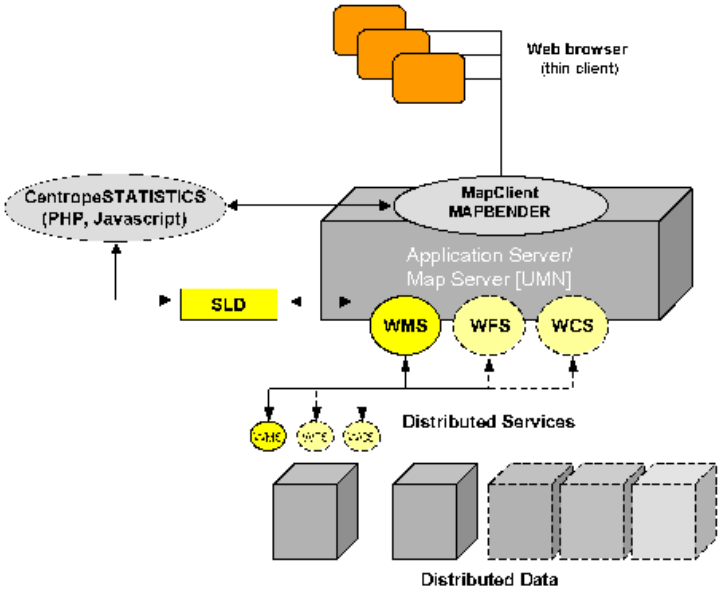

Figure 4: CentropeMAP system architecture.

Mapbender composes the GetMap requests and sends them either to the own map servers (UMN and Geoserver) or to the distributed servers in other parts of the Centrope region. CentropeMAP's own map servers now also use cascading WMS to interact with the other map servers within the region to return only a single image per thematic map layer.

The CentropeSTATISTICS extension is a PHP, SQL and Javascript application interacting with Mapbender. It is developed and kept up to date by CEIT Alanova. Thematic maps are created with Styled Layer Descriptor (SLD[2]). The statistic data are linked with an XML generator which allows the user to create chloroplethic thematic maps on the fly. There are two ways to work with CentropeSTATISTICS:

Basic mode: In the basic mode certain maps are predefined. The user selects a theme (e. g. "Age Group Percentage 2008, 80 years and older") and immediately gets a preview. With just one more click the map is created in the CentropeMAP main window. The basic mode is meant for quick access to frequently queried data and for users who do not often work with statistical data.

Expert mode: In the expert mode the user selects a theme (e. g. "Population Indicators: Age Group Percentage (by year)"). Then the query parameters have to be defined (in our example, you would have to select a year). In the next step the table is shown that contains all data from which thematic maps can be created, and, in addition, also other useful data (in our example, you would find both the absolute and the percentage values of age groups 0 to 14, 15 to 60, 60plus, and 80plus). At this stage the statistic data can also be exported for use outside CentropeMAP in CSV[3] format. The user selects the desired column and can then

[2] SLD is an XML standard defined by the OGC to define the appearance of map layers.
[3] CSV is a common file format for moving tabular data between two different computers. Each line in the CSV file corresponds to a row in the table. Within a line the table cells are separated by commas (or, in German speaking countries, by semicolons).

choose the grouping method, the number of classes, and a colour ramp. Again, a preview is shown like in the basic mode, and with one more click the map is transferred to the CentropeMAP main window (see fig. 5).

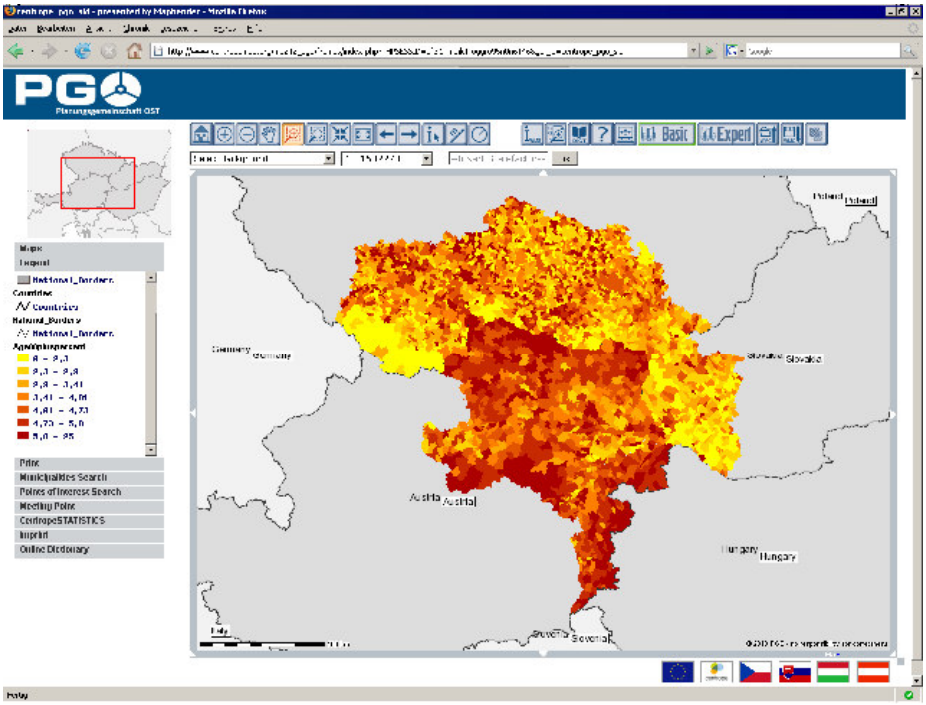

Figure 5: Statistic map created with CentropeSTATISTICS (showing percentage of population aged more than 80).

3.3 Styled Layer Descriptor and Web Map Services

SLD describes the appearance of layers in a web map service when the data are delivered to a client. A map layer has a default style which is defined for standard display. However, this style can be overruled by attaching a SLD document to this layer (as fas as the map server supports SLD). In the GetMap request, the SLD code can either be directly added to the URL of the request or it can be saved in a separate file of which the URL is referred to in the GetMap request. This may bring along the advantage that a GetMap request always refers to the same URL, but the SLD file at this URL may be altered by user interaction. Of course, the SLD URL can be anywhere, it need not be stored at the same server as the geodata. It is therefore a great advantage of SLD to customise layers of web map services without influencing the way other users see this layer.

However, only a few map servers which are referred to in CentropeMAP accept GetMap requests containing SLD information. If all servers of the CentropeMAP project partners interpreted SLD documents, there would not be any problems matching the styles of layers from different servers containing the same information. If this can be changed, the cross-border geodata integration in CentropeMAP will make a big step forward.

SLD is also the main technique behind CentropeSTATISTICS: The user-defined maps are created through SLD only. The layer containing the geodata for the statistical map has a pre-defined transparent layout so that it is invisible without any attached SLD document. As soon as the user creates their own map layer from statistic data, their selections are converted into a SLD document on the CentropeMAP server. The map view is refreshed then, containing the SLD URL as part of the GetMap request of the statistics layer. Also a timestamp is added to this request. These timestamp characters are ignored by the mapserver, but Mapbender only reloads a layer when the request string has changed, so the timestamp ensures that every GetMap request is different from the one before, causing the client to load the new map on refresh.

4 OUTLOOK

Nowadays spatial datasets are usually fragmented throughout Europe. Each country has its own geodatabase, not necessarily paying attention to the data situation in neighbouring countries or regions. INSPIRE, the European initiative for a common spatial data infrastructure, is working on standards for cross-border geodata infrastructure in addition to various other policy initiatives. CentropeMAP is not part of the

INSPIRE network, but we try to follow these standards as closely as possible because INSPIRE compliancy is an important basis for future compatibility with similar projects, databases, or networks. CEIT Alanova is also involved in Plan4all , the European Network of Best Practises for Interoperability of Spatial Planning Information, which helps the CentropeMAP project proponents to act as “mental partners” of INSPIRE and therefore obey the given guidelines.

The goal is to use web map services which are already online for multiple other purposes so that there is no additional effort necessary to feed CentropeMAP with geodata. The layer styles could be adapted using SLD, if the countries’ servers supported this technique. Twice a year there are meetings with representatives from all partner regions to discuss the further development of CentropeMAP and CentropeSTATISTICS and help to ensure that all efforts are put on a solid, official ground.

Still, an important prospect is the option to emphasise interactivity. From the technical point of view, there is the possibility to let the user draw directly into the map. User-generated content can be stored in the CentropeMAP geodatabase. There have already been a few CentropeMAP project spin-offs in the past few years where digitising tools were in use. Of course, if one thinks about extending user rights, user management becomes more important than before. If the digitising tool were open to everyone, everyone would have the possibility to change or delete content generated by others, and the doors would be widely open for spam content or other kinds of abuse. So, from today’s point of view, enhanced interactivity might be restricted to special user groups.

Chancengleichheit beim Zugang zu Mobilität. Analyse der Verkehrsbefragung „Mobiliät in Deutschland (MiD) 2002“ unter ausgewählten Gender-Aspekten – am Beispiel der Region Hannover (Niedersachsen, Deutschland)

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1 ZUSAMMENFASSUNG

Voraussetzung für die gleichberechtigte Teilhabe am öffentlichen Leben ist Mobilität, d. h. die Möglichkeit, Ziele für bestimmte Zwecke in einer angemessenen Zeit zu erreichen. Mobilität ist dabei abhängig von der Lebenssituation und den sich daraus ergebenden Alltagsanforderungen, also von den Tätigkeiten und Aufgaben, die ein Mensch in verschiedenen Lebensphasen zu bewältigen hat.

Der Alltag ist der zentrale Aspekt städtischen Lebens neben den besonderen Veranstaltungen wie Festen und Feiern. Er umfasst die Regelmäßigkeit des Alltags mit seinen Verrichtungen (Art der Arbeit) und Bewegungen im Raum (Mobilität und Kommunikation auf verschiedenen Ebenen), die dazu erforderlich sind. Erwerbstätige Familienväter haben andere Ansprüche an Mobilität als Seniorinnen, alleinerziehende Mütter andere als Jugendliche. Stark beeinflusst wird die Mobilität auch durch zeitliche, räumliche und soziale Strukturen. Alltagstauglichkeit von Mobilität ist ein wesentlicher Aspekt für die Gleichstellung der Geschlechter in einer Gesellschaft. Es ist außerdem ein Indiz für die Funktionsfähigkeit einer lebenswerten und erfolgreichen Stadtregion.

Die Region Hannover (Land Niedersachsen, Westdeutschland) hat sich zur Beachtung des Gender Mainstreaming Prinzips verpflichtet. Ziel ist eine gleichberechtigte Teilhabe aller Menschen in unterschiedlichen sozialen Rollen, was bedeutet, dass die unterschiedlichen Lebenssituationen und Interessen von Frauen und Männern von vornherein und regelmäßig zu berücksichtigen sind. Eine wichtige Voraussetzung dafür ist die Kenntnis der Unterschiede:

Gibt es geschlechtsspezifische Ungleichheiten beim Zugang zu Mobilität und welche sind das gegebenenfalls? Gibt es unterschiedliche Probleme, unterschiedliche Bedürfnisse bei Männern und Frauen?

Um dies am Beispiel der Region Hannover herauszufinden, wurden die Daten der Untersuchung „Mobilität in Deutschland (MiD) 2002“ im Hinblick auf genderspezifische Fragestellungen ausgewertet.

Die daraus resultierenden Ergebnisse vermitteln ein differenzierendes Bild von der Mobilität der Einwohnerinnen und Einwohner und bieten damit eine Grundlage für gender-bewusste Entscheidungen in einer nachhaltig orientierten Verkehrspolitik.

Die Untersuchungsresultate zeigen tendenziell eine Ungleichheit zwischen Männern und Frauen beim Zugang zu Mobilität. Gravierende Unterschiede der Mobilitätsmuster und –strukturen ergeben sich aber erst aus der Kombination von Geschlecht und Lebensphase.

Die Herangehensweise an diese – meines Wissens bundesweit einmalige – gender-differenzierende Auswertung der MiD-Daten sowie die Auswertungsergebnisse im Einzelnen und die daraus abzuleitenden Anforderungen an eine gender-gerechte Stadtregion sind Inhalt dieses Beitrags.

2 PLANEN FÜR WEN? – EINE VERKEHRSBEFRAGUNG GIBT AUFSCHLUSS

2.1 Anlass

Anlass der Überprüfung der Chancengleichheit beim Zugang zu Mobilität in der Region Hannover war die geplante Neuaufstellung des Nahverkehrsplanes 2008. Die Gleichstellungsbeauftragten der Region gaben zur Vorbereitung den Auftrag zur Erarbeitung von Leitlinien und Empfehlungen zur Integration von Gender Mainstreaming in einen Nahverkehrsplan an zwei PlanungsFachFrauen. Als ein wichtiges Ergebnis wurde daraus deutlich, dass ein Teil dieser Arbeit eine genderdifferenzierte Datenauswertung sein müsste, um verlässliche Annahmen über die Mobilitätsmuster und –strukturen der hannoverschen Bevölkerung treffen zu können. Gängige Thesen der Verkehrsplanerinnen und Verkehrsplaner wie „Es haben doch sowieso alle ein Auto...“ oder „Erwerbstätige bestimmen die Mobilitätsströme...“ konnten für die Region Hannover nicht einfach angenommen werden. Denn in der 2001 gebildeten Region Hannover - mit ihren 1,127 Mill. Einwohnern auf 2.290 km² in 21 Gemeinden - befinden sich 70% der Wohnstandorte und 80% der

Arbeitsplätze in fußläufiger Entfernung zu einer S-Bahn oder Stadtbahnhaltestelle. Das hohe Interesse an Mobilitätsdaten für eine nutzerspezifische Planung des öffentlichen Personennahverkehrs rührt auch daher.

2.2 Statistische Grundlagen

Die Möglichkeit der genauen Auswertung wurde dadurch unterstützt, dass die Region Hannover die bundesweite, repräsentative Stichprobe MiD 20021 „aufgestockt“ hatte und so Daten aus 4.581 Haushalten analysieren konnte – insgesamt 30.125 Wege von 10.514 Personen. Die Auswahl der zu Befragenden wurde nach dem Zufallsprinzip aus dem Einwohnermelderegister vorgenommen. Im ersten Schritt wurden Daten zur Person und zur Haushaltssituation erhoben. Später erhielt jede im Haushalt lebende über 14 Jahre alte Person einen Wegefragebogen, in dem sie für einen vorgegebenen Stichtag ihr Verkehrsverhalten festhalten musste. Erfragt wurde dabei Anzahl, Länge, Zweck der Wege und das benutzte Verkehrsmittel. Für Kinder gab es einen speziellen Fragebogen. Durch das Instrument dieser sog. Wege-Protokolle ist es möglich, die bei anderen Verfahren auftretende systematische Überschätzung der eigenen Weg bei männlichen Befragten und die Unterschätzung bei weiblichen Befragten zu korrigieren und darüber hinaus früher unsichtbar gebliebene Teile des Verkehrsgeschehens wahrzunehmen.

Die Darstellung der Ergebnisse dieser Befragung und deren statistische Auswertungen wurden unter ausgewählten Fragestellungen vorgenommen. Die Gründe für das Verhalten der Befragten, positive oder negative Emotionen, die damit verbunden waren, können nur auf Annahmen basieren. Die gewählten - meist geschlechtsspezifischen - Fragestellungen und die Referenzgruppen versuchen insgesamt den Blick auf eine eher sozial-kulturelle Dimension von Mobilität zu lenken und weniger die „klassische“ meist technische Betrachtungsebene wiederzugeben. Fragestellungen sind z.B.:

- Haben Frauen in der Region Hannover andere Mobilitätsvoraussetzungen als Männer?
- Können geschlechtsspezifische Mobilitätsmuster (Wegeketten) belegt werden? Welches Muster ist weiblich, welches männlich?
- Welche Auswirkungen hat das Alter der Menschen auf ihre Mobilitätschancen und -muster? und
- Welche Auswirkungen hat die Beschäftigungssituation der Menschen?

Anhand von gezielten Auswertungen nach sog. „Referenzgruppen“ werden unter Genderaspekten die wichtigsten statistischen Ergebnisse - Wegehäufigkeit, Wegedauer und Wegeentfernung sowie Mobilitätsmuster in Form von Wegeketten - handhabbar gemacht.

Folgende Referenzgruppen wurden für die Auswertung gebildet, da bei ihnen aufgrund bestimmter Rahmenbedingungen ein ähnlicher Grad an Mobilität sowie ähnliche Bedürfnisse vermutet werden:

- Erwachsene alleinlebend: Ein-Personen-Haushalt, Person mind. 18 Jahre (Singles aber auch Alte)
- Erwachsene aus Haushalt ohne Kind: Zwei- und Mehr-Personen-Haushalt, kein Kind unter 18 Jahre
- Alleinerziehende erwerbstätige Frauen: mind. Zwei-Personen-Haushalt, ein Kind unter 18 Jahre
- Familienhaushalte mit Kind(ern)
- Seniorinnen und Senioren sowie Schülerinnen und Schüler/ Jugendliche: 6 bis 17 Jahre

3 ZUGANGSBEDINGUNGEN DER BEVÖLKERUNG ZUR MOBILITÄT

Eine hohe Relevanz für das Mobilitätsverhalten der Bevölkerung und gleichzeitig eine hohe Geschlechterrelevanz haben die unterschiedlichen Zugangsbedingungen der Bevölkerung zur Mobilität. Diese variieren u.a. sehr stark nach dem Wohnort und der damit verbundenen Lebenssituation, aber auch nach dem Alter und dem Einkommen.

3.1 Nicht jeder Haushalt verfügt über einen PKW

Entgegen der immer wieder zu hörenden Annahme „es haben doch sowieso alle ein Auto“, zeigt die Auswertung, dass in einem Viertel der befragten hannoverschen Haushalte kein Pkw vorhanden ist.

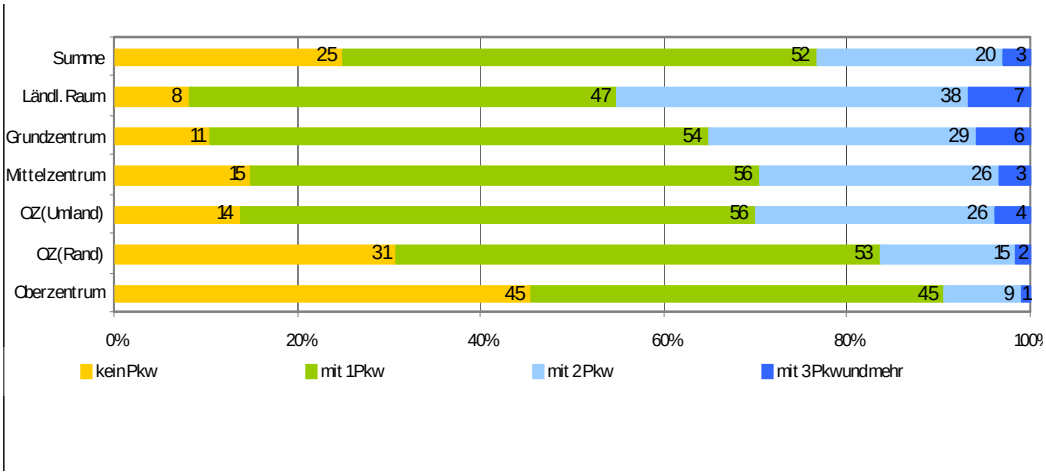

Fig. 1: Anteile von Haushalten mit und ohne Pkw (in %)

Im Kernbereich von Hannover sind sogar 45% der Haushalte ohne eigenes Auto, im direkten Umland hingegen nur 14%. Im ländlichen Raum benötigen allerdings auch 8% bereits ein drittes Auto.

Neben der ungleichen räumlichen Verteilung zeigen sich auch geschlechtsspezifische Unterschiede: In Haushalten ohne PKW leben in der Region Hannover 21% der befragten Frauen, aber nur 12% der Männer.

3.2 Viele Frauen haben keinen Führerschein

Führerscheinbesitz ist die erste Voraussetzung, um den im Haushalt vorhandenen Pkw auch nutzen zu können – dies ist bei 71% der befragten Männer und 62% aller Frauen der Fall. Die folgende Abbildung zeigt, dass der Führerscheinbesitz sich erst bei den jüngeren Generationen angleicht.

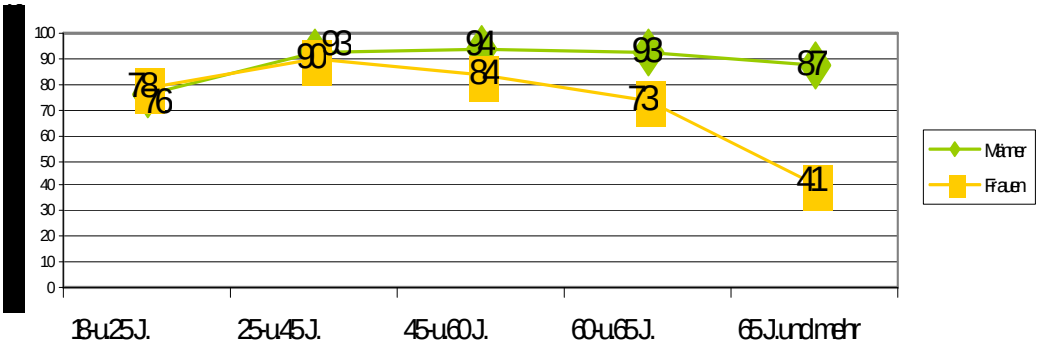

Fig. 2: Führerscheinbesitz von Männern und Frauen nach Altersgruppen (in %)

Hinzu kommt, dass neben dem Führerscheinbesitz auch die Pkw-Verfügbarkeit eine entscheidende Bedeutung beim Zugang zur Mobilität insbesondere der Frauen hat. Die Frage „Wie oft können Sie über ein Auto verfügen?“ beantworteten 60% der Männer, aber nur 45% der Frauen mit „jederzeit“. Die jederzeitige Verfügbarkeit zieht sich bei den Männern durch alle Altersgruppen, ist allerdings bei der älteren Generation besonders ausgeprägt. Auch zwischen Stadt und der übrigen Region variiert die Pkw-Verfügbarkeit.

4 MOBILITÄTSMUSTER UND -STRUKTUREN

4.1 Wie lange, wie häufig und wie weit sind die Menschen unterwegs?

In der Region Hannover sind werktags fast 90% der Befragten wenigstens einmal am Tag unterwegs. Den höchsten Mobilitätsgrad haben Kinder zwischen 6 und 14 Jahren (95%), bei den älteren Personen über 65 Jahre macht er nur 75% aus. Die nachfolgenden Ergebnisse, die im Hinblick auf die genderspezifischen Fragestellungen vor allem die Unterschiede zwischen den Geschlechtern, Altersgruppen und Referenzgruppen herausarbeiten, zeigen, dass vor allem die Kombination von Geschlecht und Lebensphase für die Art der Mobilität von Bedeutung ist. Die Ergebnisse beziehen sich dabei nur auf die mobilen Personen.

4.1.1 Männer sind länger, Frauen häufiger unterwegs

Durchschnittlich legt jede Person in der Region Hannover von montags bis freitags 3,7 Wege pro Tag zurück. Bezogen auf einen 7-Tage-Durchschnitt sinkt der Wert auf 3,3 Wege.

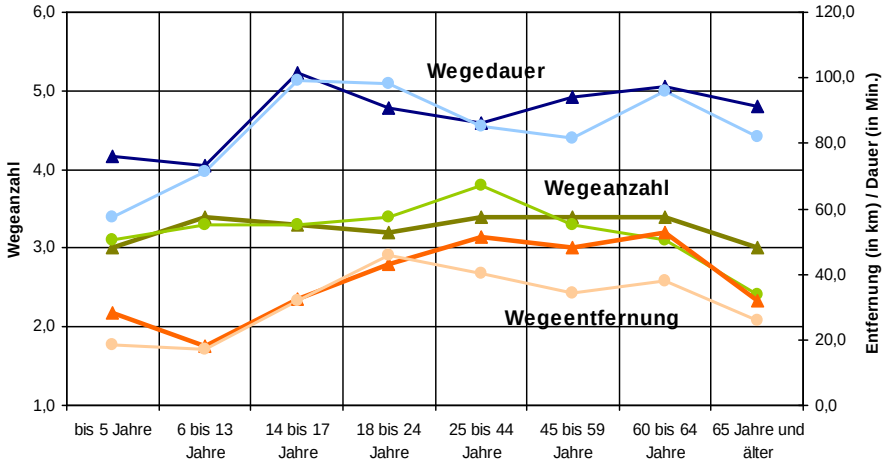

Fig. 3: Durchschnittswege von Männern und Frauen nach Altersgruppen

Während die Anzahl der Wege bei den befragten Frauen und Männern kaum voneinander abweichen, liegt in der Länge der täglichen Wege ein deutlicher Unterschied: Mit durchschnittlich 41,8 km überwinden die Männer deutlich größere Entfernungen als die Frauen mit 33,6 km. Dies betrifft besonders die Altersgruppe der 25- bis 64-Jährigen.

Die kürzesten Wege legen Kinder unter 14 Jahre und Ältere über 65 Jahre zurück. Letztere benötigen für die geringen Distanzen jedoch überdurchschnittlich lange Zeit. Die meiste Zeit verwenden Jugendliche zwischen 14 und 17 Jahren für ihre Mobilität, gleich, ob Junge oder Mädchen.

4.1.2 Frauen mit Kindern legen die meisten Wege zurück

Frauen zwischen 25 und 44 legen im Durchschnitt die meisten Wege zurück. Dabei liegen alleinerziehende Frauen - meist in teilzeit erwerbstätig - ganz vorn und sie verbringen auch die meiste Zeit damit (104 Minuten). Die Entfernungen, die sie dabei zurücklegen sind mit durchschnittlich 5,9 km pro Weg eher gering. Das Charakteristikum „viele kurze Wege in relativ langer Zeit“ ist eindeutig weiblich.

4.1.3 Männer aus Haushalten mit Kind(ern) nehmen die weitesten Wege in Kauf

Männer im Erwerbstätigenalter legen die weitesten Wege zurück. Dabei liegen die befragten Männer aus Familienhaushalten ganz vorn, bei dieser Referenzgruppe sind es täglich 53 km. Dies liegt leicht unter der Entfernung, die Vollzeit-Erwebstätige im Durchschnitt zurücklegen, eine Bevölkerungsgruppe, die zu 68% aus Männern besteht. Der durchschnittlich Weg eines männlichen Erwerbstätigen ist 15,4 km lang. Trotz der Ungleichheit bei den Wegelängen unterscheidet sich die Wegedauer nur geringfügig. Hieraus lassen sich Schlüsse auf das genutzte Verkehrsmittel schließen!

4.2 Womit sind die Menschen unterwegs?

Bei der Wahl des Verkehrsmittels im Personenverkehr unterscheidet die Verkehrsstatistik in Motorisierten Individualverkehr (MIV) = Pkw + Motorrad, in Öffentlichen Personennahverkehr (ÖPNV) und Nichtmotorisierten Individualverkehr = Fahrrad- + Fußverkehr. Im Bundesdurchschnitt werden deutlich mehr als die Hälfte aller Wege (58%) individuell motorisiert zurückgelegt. In der Region Hannover liegt dieser Anteil bei 50%. Der ÖPNV und das Fahrrad werden vergleichsweise häufiger genutzt. Nach dem Geschlecht sieht die Verteilung wie folgt aus:

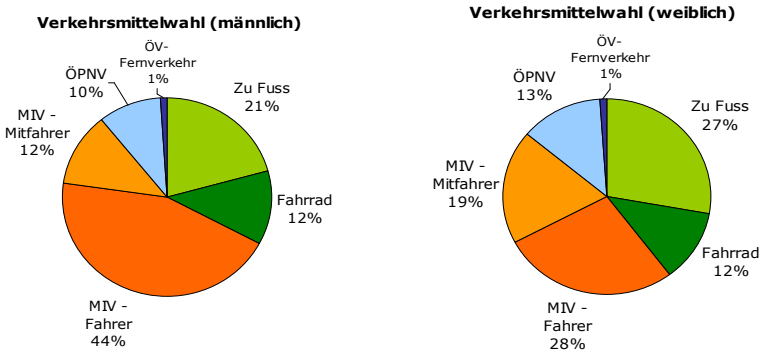

Fig. 4: Verkehrsmittelwahl nach dem Geschlecht (in %)

In dem Kreisdiagramm zeigt sich, dass Männer den Pkw intensiv selbst nutzen und Frauen eher mal mitfahren. Zu Fuß oder mit Bus und Bahn sind ebenfalls anteilig mehr Frauen unterwegs.

Besonders auffällig bei der Verkehrsmittelnutzung sind wieder die Unterschiede in Abhängigkeit von Geschlecht und Lebenssituation: Männer nutzen ab dem Erwachsenenalter in allen Haushaltssituationen den Pkw intensiver als Frauen. Frauen nutzen den Pkw dann mehr, wenn Kinder im Haushalt leben. Und wenn sie teilzeit erwerbstätig sind, noch häufiger. Eine intensive ÖPNV-Nutzung zeichnet die Gruppe der Schülerinnen und Schüler mit 24% bzw. 22% sowie die alleinlebenden Frauen, meist Ältere, mit 19% aus. Ähnliches gilt für fußläufig zurückgelegte Wege, hier liegen die alleinlebenden Frauen mit 40% weit vorn.

Das nachfolgende Diagramm beschreibt die Verkehrsmittelnutzung der Referenzgruppen im Detail:

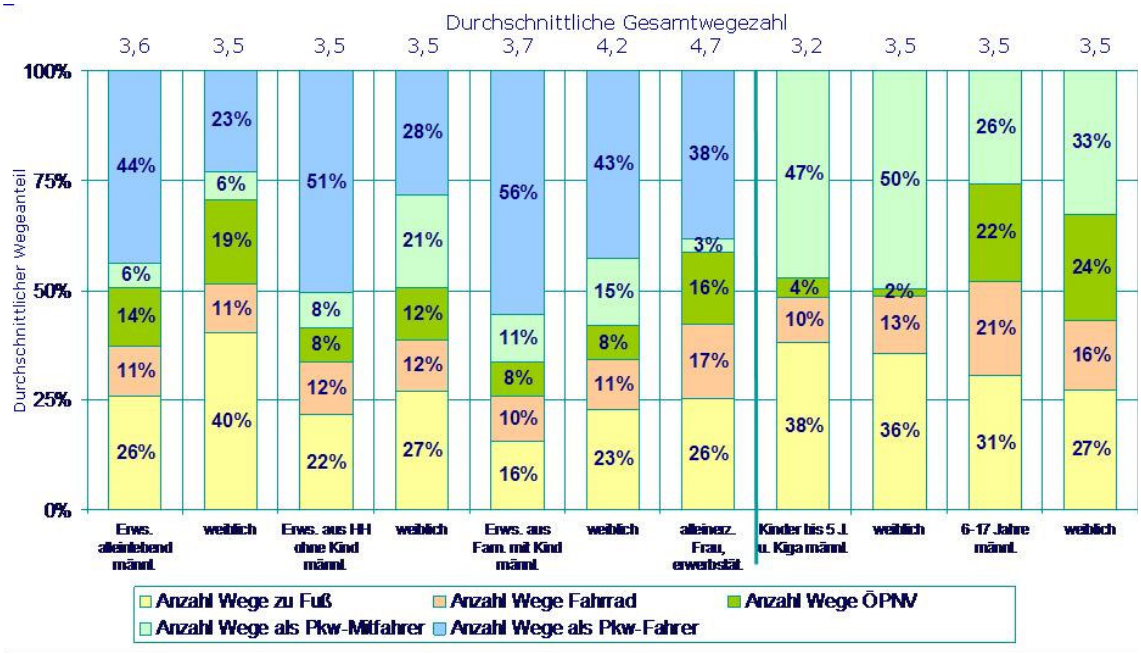

Fig. 5: Verkehrsmittelnutzung nach Referenzgruppen

4.3 Warum sind die Menschen unterwegs?

Erwerbstätigkeit und Ausbildung sind für die Frauen und Männer in der Region Hannover nur einer von vielen Anlässen, sich auf den Weg zu machen: Lediglich rund 30% aller Wege dienen diesem Zweck.

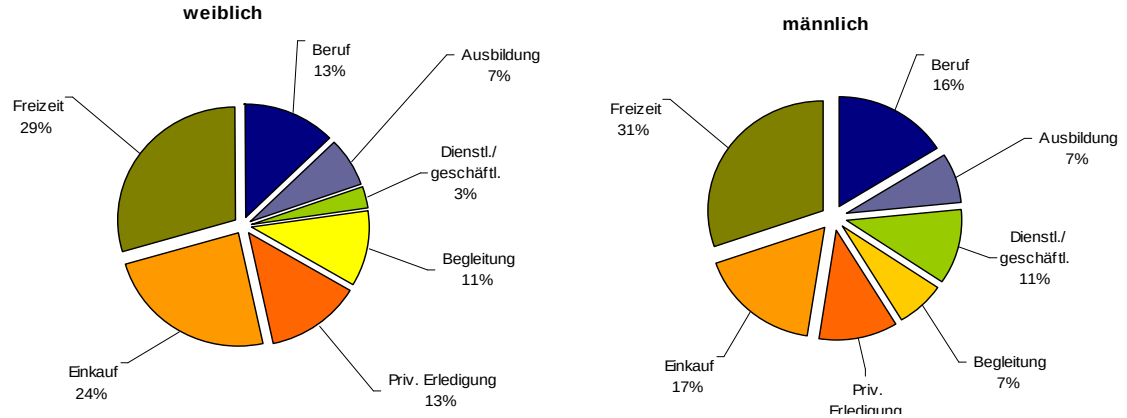

Fig. 6: Hauptwegezwecke nach Geschlecht (in %)

Geschlechtsspezifische Unterschiede werden besonders deutlich, wenn die Wegezwecke hinsichtlich ihrer Bedeutung zusammengefasst werden. In Anlehnung an die EU-Studie „Women and Transport“ (2006) ist folgende Kategorisierung sinnvoll:

gewinnbringend - Wege in Zusammenhang mit Erwerbstätigkeit und Ausbildung (22% - w/33% - m)

Versorgung - Wege in Verbindung mit häuslichen Tätigkeiten/ Familienangelegenheiten (45% w/34% - m)

Freizeit - Wege in Verbindung mit Freizeitaktivitäten (33% w/33% m).

Das heißt, Männer sind eher gewinnbringend unterwegs, Frauen für Haushalt und Familie.

4.4 Wegeketten

Bestimmte Lebenssituationen erfordern ein hohes Maß an Mobilität. Bis zu 4,7 Wege pro Tag werden von Familienfrauen zurückgelegt, somit haben sie spezifische Anforderungen an Mobilität, um ihre Erwerbstätigkeit und Versorgungsarbeit täglich zu erledigen: Ihr Alltag erfordert die Bildung von Wegeketten.

Gut ein Viertel aller Wege führen direkt zum Einkauf/ Erledigung, dicht gefolgt vom direkten Erreichen des Arbeitsplatzes mit gut 20%, ebenso viele Wege haben mehr als ein Ziel. Die am häufigsten benannte Wegekette besteht im Verkoppeln verschiedener Besorgungen auf einem Weg. Das Holen und Bringen von Personen ist Teil von beinahe jedem vierten Weg. Daneben gibt es viele Lösungen, die sich in Abhängigkeit vom Geschlecht und der Lebenssituation deutlich unterscheiden. Aus den Wegeprotokollen lassen sich sowohl die Verknüpfungen von Wegen als auch die Komplexität der Wege der einzelnen Personen belegen. Um Unterschiede zu erkennen, die sich aus der Kombination von verfügbarer Zeit und zu erledigender Wegezahl für verschiedene Referenzgruppen ergeben, wurde bei der Auswertung der Hannover-Daten ein „Komplexitätsindex“ entwickelt, der das Zusammenwirken von Wegezahl und dafür verwendeter Zeit sichtbar macht. Dabei wird deutlich, dass die Wege von Frauen komplexer sind, besonders, wenn sie sich in Erziehungssituationen befinden. Besonders deutlich ist der geschlechtsspezifische Unterschied beim Weg von und zur Arbeit: Die meisten Männer begeben sich direkt dorthin und anschließend wieder nach Hause; Frauen erledigen auf dem Weg häufig Besorgungen, sie begleiten Personen und begeben sich auf dem Weg zu Freizeit-zielen.

Sind Mann und Frau Vollzeit erwerbstätig, machen sie auch annähernd gleich komplexe Wege. Haben beide mehr Zeit für andere Tätigkeiten (teilzeit/ arbeitslos), ändert sich nur das Wegebild der Frauen: Das der Männer bleibt oder wird weniger komplex, das der Frauen wird deutlich komplexer. Ab dem Rentenalter gleicht sich die Komplexität der Wege von Männern und Frauen an.

5 EMPFEHLUNGEN FÜR EINE LEBENSWERTE STADT/REGION

5.1 Zusammenfassung der Unterschiede

Genderspezifische Unterschiede bei den Mobilitätsbedürfnissen und der Wahl von Verkehrsmitteln, den Wegezeiten und Wegekombinationen sind nicht offensichtlich, sie ergeben sich aus mehr als dem Geschlecht; die soziale Rolle und das persönliche Umfeld sind entscheidend:

Ältere alleinlebende Frauen sind besonders im Stadtgebiet von Hannover eine bedeutende und bzgl. ihrer Mobilitätsanforderungen vermehrt zu berücksichtigende Gruppe: Sie verfügen nur selten über einen Führerschein und noch seltener über einen Pkw, sie gehen zu Fuß oder nutzen den ÖPNV. Sie versorgen sich selbst und häufig auch andere, so dass sie gut erreichbare Versorgungseinrichtungen benötigen. Zusätzliche Mobilitätseinschränkungen durch Behinderungen müssen für die Älteren mit berücksichtigt werden.

Familienfrauen benötigen ein hohes Maß an Mobiliät: Die tägliche Erledigung von Erwerbstätigkeit und Versorgungsarbeit erfordert die Verknüpfung von Wegen und eine entsprechende Anbindung von Einrichtungen derKinder- und Altenbetreuung, von Versorgungseinrichtungen sowie von Arbeitsplätzen.

Schüler/innen und Jugendliche legen die kürzesten Wege zurück, haben den höchsten ÖPNV-Anteil und benötigen mit die längste Zeit für ihre Wege. Jugendliche Mädchen legen großen Wert auf Sicherheit und sich Wohlfühlen auf öffentlichen Wegen und in öffentlichen Fahrzeugen.

Junge Frauen haben mittlerweile häufiger einen Führerschein als junge Männer. In den Abend- und Nachtstunden werden für sie (und ihre Eltern) Sicherheit und Qualität zur bedeutendsten Seite von Mobilität.

5.2 Mobilität in Zeiten gesellschaftlicher Veränderungen

Mangelnde (gefühlte) Sicherheit erfordert zunehmend Begleitwege. Sichere Fuß- und Radwege sowie eine kleinräumliche Erschließung durch den ÖPNV könnten bei gutem Service entgegenwirken. Die Bedeutung von Freizeit nimmt zu: In der Region Hannover dienen 70% aller Wege Zwecken außerhalb der Erwerbstätigkeit. Dem weiteren Anstieg des motorisierten Individualverkehrs kann nur eine auch darauf zielende Verkehrsstrategie entgegenwirken. Empfehlungen lauten: 1. „Region der kurzen Wege“ durch Erhalt und Stärkung nutzungsgemischter Strukturen 2. Berücksichtigung von Alltagsmobilität und Sicherung einer eigenständigen Mobilität für Jung und Alt 3. Zeitliche und räumliche Erreichbarkeit u.a. durch Barrierefreiheit.

6 VERWENDETE LITERATUR UND DATEN

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1 - Mobilität in Deutschland (MiD 2002), Haushaltsbefragung zum Personenverkehr im Auftrag des Bundesministeriums für Verkehr, Bau- und Wohnungswesen, mehr dazu unter www.mobilitaet-in-deutschland.de

Cohering the spatial and strategic planning in the Czech Republic

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1 ABSTRACT

Over the last 7 years, there was a substantial progress in the Czech planning disciplines. The spatial planning gained a new law introducing new tools. Structural Funds became the main driver for the strategic planning, which became embedded in national, regional and local levels of governance. The integration of spatial and strategic planning is beginning to be re-introduced. Despite the progress, there is still a vast amount of learning and experience sharing yet to come, to push for example the new planning law and the tools it offers into the full practise. There is also a lot of work to tune the tools, which would allow to measure and monitor the development effects against desired and stated strategies. On a positive side, the local client base is slowly gaining some practical experience. But what is still missing is:

- suitable formats of institutional support,
- products geared to improve skills of the key local government decision makers (elected),
- broadening and restructuring of spatial planers´and urban orientated education,
- improvements in sharing the benefits arising from stakeholder's experiences.

2 DEFINING RELATIONSHIP BETWEEN PLANNING AND STRATEGIC PLANNING

To determine a direction of local development and to approve local plans is the Czech communities basic right. Planning (spatial and strategic) is a key tool, by which Czech communities steer their development and safeguard private and public benefits. In the Czech Republic during the last two decades there was however a little connection between the vertical planning integration. Missing was also the horizontal integration between the strategic planning and the spatial planning. This was despite the fact, that both types of activities are significantly interdependent on each other. The strategic planning relies on spatial limits identified by spatial planning and the spatial planning relies on projected type of desirable development indicated in the strategic plan and in follow on action plans[1]. In the Czech Republic the spatial planning is strongly based in law, whereas most of the strategic planning remains outside the legal regulation. As from 2007, the new spatial planning law 198/2006Sb. came in force and introduced new types of planning documents aiming to re-establish the vertical integration of spatial planning between the different governance levels, but this new law does not refer to strategic planning. The hierarchy of planning documents and the interconnection with strategic planning is only now being re-invented. See Picture 1, illustrating diagram, which describes the interconnection and hierarchy of various Czech planning documents.

2.1 International and local intervention into Czech planning

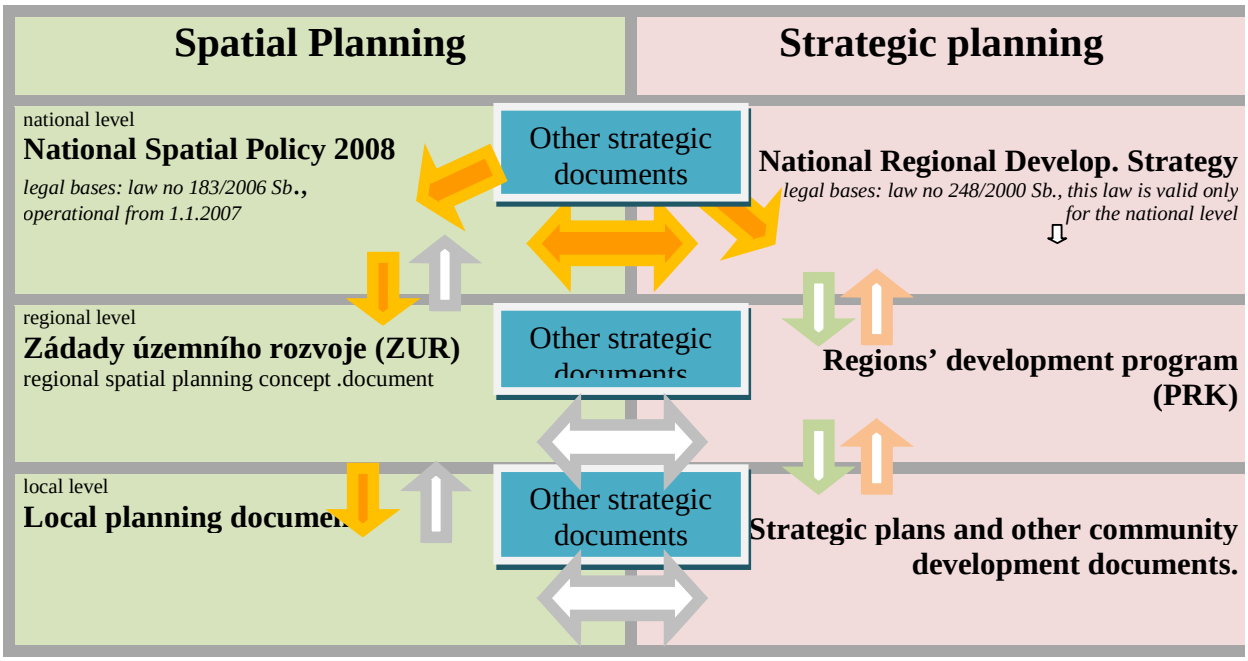
Two decade back, the initial international Technical Assistance (TA), which the post communists´ regimes received, has not concerned itself much with planning. Only after a great amount of explaining and lobbying various funders, the UK knowhow fund grant was received in 1994 to supply than totally absent knowledge on strategic planning to the City of Prague[2]. This action had established strategic planning in the Czech cities. Most of the later EU TA to the Czech ministries and institutions usually also included the strategic planning. The TA force was however geared mainly to prepare the Czech administration for the SF and usually finished at the level of national and later regional strategic documents.

Direct international intervention to spatial planning was relatively small, as it was felt by donors, that the issue was one of a national responsibility. Whereas it is relatively easy to succeed with the TA directed to strategic planning (because any strategy can be perceived as a system overlay), it is much more difficult to provide a successful TA to spatial planning. The nature of such TA is more of a "repair job". And to do a successful repair, one has to deeply understand not only the object of the repair, but also the habits and abilities of its users. In the early 1990, the international TA had not seemed to be overflowing with the relevant knowhow related to spatial planning knowhow transfear. Despite this, some indirect intervention

[1] MILAN PŮČEK, page 3, Strategické verus územní plánování: Urbanismus a územní rozvoj, vol 1-2/2009, UUR

[2] Lllewellyn Davis acted as consultants, the contract value was then around GBP 600 000

took place in a more general way. There was an EU advisor stationed at the Czech Ministry of Regional Development (MMR) and from 2001 also this ministry has received some TA. Since the mid 1990 a conscious attempt was made by the Czech administration to prepare and pass a new planning law and in this respect, some TA was received from selected German states, especially the Westphalia. Since 2003 the Czech universities started sparingly participating, on the EU ESPON[3] research and on the 4rth and further Research Framework Programs[4] (mainly as subcontractors) and some of this gained knowhow had seeped into their teaching.



Picture 1: Relation between the spatial and strategic planning (Source: adapted from Kašparová, Půček (2008) viz.www.uur.cz. Arrows marked in full colour represent legally binding relationships)

2.2 The national cohesion attempts

National attempts to cohere the strategic and spatial planning were for a long time floored by the departmentalization of the MMR where the spatial and strategic planning was, and still is, covered by two different departments. Research into any form of planning remained limited for number of years. The national research programs have not quite seen the planning disciplines as an actual academic subject. Until the year 2005, the MMR had no research budget. There was also an insufficient expert research or expert support geared to the needs of the policymakers. The Ministry of Education research programs relied heavily on the academic input, which set up research priorities often far devoid from any contact with practitioners, or stakeholders.

3 THE STATE OF ART OF PLANNING IN THE CZECH REPUBLIC

3.1 The drivers for spatial planning and strategic development

In early 1990, the initial spatial planning driver in the Czech Republic was to profit on the newly established landownership rights, which were gravelly restrained by the previous regime. The second driver was to accommodate restructuring of economic development (industrial zones and commercial zones). The third driver was the strong position, in which the Czech communities found themselves in early 1990 (at that time, there was yet no regional level established). The fourth strong driver was the rising environmental protection awareness and the rights of the civic society to information access, which had to be accommodated. The fifth and the probably the foremost driver to spatial planning was to provide investors with security, predictability and risk reduction.

[3] www.espon.eu
[4] http://cordis.europa.eu/fp7

On the site of the strategic planning one of the first drivers was the public accountability and the need to justify the distribution of public investments and public grants funding. The second driver was to coordinate various sectoral investments, especially in the regional context. The third driver was to motivate private investment into specific areas. The forth driver was to satisfy the private investors needs to be aware of public investments interests and intentions. The fifth driver was the need of the newly formed Czech regions (2001) to differentiate themselves against the self governing local communities and to gain control over their administrative areas by actioning regional strategies and steering regional investments.

3.2 The barriers to Czech spatial and strategic planning

The system political transition had caught the Czech planers, the politicians and the administrators totally unprepared, when considering the democratic formats of governance and administration. This was because the majority of them had no previous relevant experience and no concept knowledge, where they "were steering the boat too". The language barrier was very high for majority of the local elected representatives and practising and administering planners. They were therefore not able to benefit from the international experiences available in literature and on webs. Also, the predominantly Western consultants often lucked understanding of the post socialist culture, its high level of technical expertise, creativity and specific local peculiarities. This caused theirs consultation efforts often being wrongly pitched and of an insufficient impact.

The previous system legacy - The previous regime planning was strong, technically very competent and was underpinned by a centrally planned economy, which sufficed the strategic input. The Czech Planning law, when conceived in 1976, was a very modern and quality document, which later had to face adjustments of the new societal requirements. Since 1989 this planning law undertook several revisions and the planning process faced various and sometimes fairly humorous hiccups.

The institutional instability, luck of continuity, foresight and leadership - The relevant ministry (MMR) was and remains one of the most unstable Czech institutions, as it historicly has the highest turnover of ministers (deputies ministers and directors are on such occasions usually also exchanged). Its quality research institutions were dismantled in mid 1990 and nothing had replaced them until today. The remaining institutional support[5] is weak, narrowly pitched and not at all proactive or creative.

Sweetening the planning: Some anecdotic issues arisen, like the fact, that the communities just freed from a long oppression of the centralist system have felt, they need no planning. And some of them actually refused to produce the local plan, claiming that the law gave them the right to adopt the local plans, but no duty to have to prepare them. This little barrier actually has been removed only by the new planning law. But meanwhile, on the side of public aid investment programs, it was stipulated, that the existence of an "adopted local plan" was a precondition to accessing any of public funding. This was well though measure and it made the Czech local communities to "plan" at the fastest possible time and not forgetting the public participation!

The new law teething problems - It took 17 years to pass the new planning law. The new law sill does not address or acknowledge the relationship between the spatial and strategic planning. Also, as everything new, it has to be "run in". Hence the law needs to be adjusted and adjusted...

The "weak client" - Planners´ potential clients - the local authorities, were facing similar transitional difficulties and were unable to act as a "competent client". This had produced a situation of "a blind leading the blinds". The system had not collapsed mainly due to the already mentioned creativity and past technical grounding, which often supplanted for the missing knowledge.

Policies and strategies in the city of Ústí nad Labem: Source: city web www.usti-nl.cz, information on strategic documents provided by the city and information in public domainthe city of Ústí nad Labem is an independent entity of 870 ha, with cc 94 000 inhabitants. It is a seat of a regional administration and it also carries certain administrative responsibilities for surrounding communities which were delegated by the state. The city has regulative and strategic documents, which all help it to deal with development. The city also has number of departmental strategic documents, like energy, education, est. Ústí was one of the first municipalities, which have developed the community planning (US Technical Assistance) and it had already implemented 3 community plans. The city is also a member of the Czech Healthy Cities Network and the

[5] www.uur.cz,www.cer.cz, www.czechtourism.cz

Czech Union of Towns and Villages. Land Use Plan - the most relevant tool that the city has is its spatial planning document, the Land Use Plan. Present plan is from 1996 and despite several amendments, this plan is now dated. City is required by the law 183/2006Sb to produce a new planning document by 2014. This document is now under preparation and its completion will take approximately 3½ further years.City's Development Strategy until 2015 - this document was approved in 2007 by the City's Assembly. It is a key document, stating the direction, in which the city should develop.Integrated Urban Development Programs - IPRMs were prepared in order to access funding from the Structural Funds 2007-2013, Operational Program Severozápad (ROP SZ) and the Integrated Operational Program (IOP). One of the IPRMs is focused on the city centre and it is to be a tool for improving attractiveness of Ústí's central location. The other IRPM is prepared to help with management of public places and regeneration of run down housing estates. However the major city problem (a vast amount of brownfield land) remains unaddressed by its IPRMs.

The education and academia failure – The Czech planners education is still based in the schools of architecture, which are usually devoid of state of art geographic, economic, environmental sociology and demographic inputs, as these subjects are toughed by other schools, then are the technical Universities, which educate the planners. Cooperation between various types of Czech Universities is still fairly limited. To our best knowledge the Urban Economist qualification does not exist in the Czech Republic, but the regional planners, economs and administrators are being educated in several universities. Serious gaps in this type of the Czech higher education were also demonstrated by its uncompetitiveness, when participating for example in the ESPON spatial[6] and Framework research programs.

Refusal of the cities locally elected representatives to lay open the development cards – When the Czech communities accepted that they have to operate the spatial planning, they still continued to shy from the strategic planning and with an exemption of of Prague, by the year 2005, there were only a very few strategic plans in existence.

Leveraging strategies: The WHO[7] supported local NNO, the Czech Healthy Cities Network[8] started to implement the Agenda 21 amides its members, also introducing the instrument of strategic planning. Any progress in strategic planning however only appeared really visible, in 2007 when it became apparent that the integrated regeneration approaches are the "must", for all the larger cities. Simple fact was, that to argue the priorities in the cities IPRMs, (which gave cities the access to money pots of the SF), the cities have to have their strategy in place, on which their IPRM could be based. By mid 2008 all large Czech cities posted on their web sites the City Strategic Planning documents approved by their elected assemblies.

Luck of cooperative and participative culture - One of the main barriers to Czech planning (spatial and strategic) is the luck of culture to work on issues in a participative and a cooperative manner. This was easier to fix in smaller rural communities than in larger cities, whose administrations are more powerful and where usually exists a layer of technical staff fronting the relevant elected members. However, the IPRM drive brought some improvements, thou sometimes these approaches were very formalistic.

Invoking cohesion: Early after the year 2000, when the pre-accession funding became available the rural program initiative LEADER[9] had achieved the impossible. The vision of an access to grant finance both for private sector and for public sector have helped to remove all barriers. Firstly it "cohered" the self governing communities, (which had often ostracized each other for a hundred of years) into forming micro-regions and secondly it brought them behind one table with the local private sector. The outcome was a formulation of a micro-regional strategy and an implementation action plan for accessing the EU funding both for public and private stakeholders. Similar, this time the regional cohesion of stakeholders was visible during the year 2007. Then all the Czech regions eagerly renewed their strategic documents in order to represent their "strategic interests" in the future structural funding programs.

3.3 The policies and their phasing

Policies covering the spatial and the strategic planning are described in the Picture 1. This picture also illustrates the hierarchy of various planning documents, their legal bases and their interdependencies. The

[6] There was no Czech beneficiary in the 2008 ESPON research award - see the www.espond.eu
[7] www.who.int
[8] www.nszm.cz
[9] http://ec.europa.eu/agriculture/rur/leaderplus/pdf/library/methodology/139_en.pdf

first National Spatial Policy was blissfully passed by the government in 2006. Its 2008 version was approved in summer 2009, after problems in preparation of the regional spatial planning documents (ZURs) have appeared. Then the regional stakeholders´ lawyers argued, that for the self government, the 2006 version of the National Spatial Policy was not binding, as it lucked any legal bases. Only the new planning law had introduced this verticality between the planning documents. The National Regional Development Strategy[10] was also updated in line to support the 2007-2013 Structural funding objectives and to allow regions to have a national document to refer to in their regional strategies.

Doubling efforts: In the Zlín region, in the year 2008, there existed two separate databases of brownfields. One of them, the "publishable one" was "owned" by the planning department, the other one was "owned" by the strategic department. The strategic department database was relatively extensive, but it was not an active one and the strategic department had lucked the GIS media and mainly "the legal reason" for publishing their gathered data. On the other hand, the planning department had the GIS media and the "legal publicity rights" to publish its data, which theoretically was in an analyzable format. But their data was dismally inadequate. The Zlín region needed strategic analyses for its brownfields situation to justify and reason its ROP proposal for a regional demolition program. Only at the point of tender for this analytical document, the tendering consultants´ inquiry, lead to the realization of the duplicity. This is by all means not a unique example and further examples of duplicity between the efforts of the strategic planning and the spatial planning departments can be quoted from other self governing units.

3.4 Competencies for the spatial and strategic planning

Despite the theory illustrated by the Picture no. 1, in practise, there is so far limited interconnection between the spatial and strategic planning documents, especially at city or regional levels. These disciplines usually sit in 2 different departments, which are empowered by two different ways. The strategic planning is a clear self-governing activity and usually has political leadership connections (these departments are actually physically located close to their elected executives). On the other hand, the planning section falls mainly under the state administration transferred duty (but for the part of local plans commissioning and approvals). Consultants usually have to work really hard on getting the two sides around one table. Although many cities and all the regions now have their strategic documents in place, these documents are often formalistic and sometimes they do not grasp the actual cities needs. In the case of regions, these documents seldom focus on integration of regional investments. Integrated Regional Investment programs are still not in existence, mainly because there are no funding drives for them.

Policies and strategies concerning land management in the Ústí region (Source: regional web www.kr-ustecky.cz): Ústecký region has an area of 5 335 km2 (6,8 % of the Czech Republic) and population of 820 000 (8 % of inhabitants of the Czech Republic). Usti Region has 46 cities, where lives 80,7 % of its inhabitants, and 354 villages. Its neighbouring regions are Saxony (Germany), Liberec Region, Karlovy Vary Region and Central Bohemia Region. Its location predestines the Ústí region to a significant position in terms of an international economic and cultural co-operation though which the region gradually integrates into European structures. The concentration of industry and population is representing, in terms of the Czech Republic, important market, well accessible from Prague and also from neighbouring Saxony.

Ústí region was long considered to be one of the most underdeveloped Czech regions, but last few years the regional development have encountered substantial improvements. Some of it was due to an injection of national development programs and strategic investments[11]. Ústí region has a number of strategic documents, from which the most relevant are the following:

Sustainable strategy for the Ustí region 2006–2020

The Ústí Region's sustainable development strategy aims to establish a framework for long-term development of the Ústí Region, and a vision for the period up to 2020, along with the main priorities for that development. Adopted by council in 2006.

Ústí region Development strategy 2007 – 2013

The programme as a basic tool for policy implementation was adopted by region´s council in 2007.

[10] http://www.mmr.cz/index.php?show=001024004003, approved 17. 5. 2006 by government degree no. 560

[11] an international rail and motorway connection, strategic industrial zone, 15 billion program to mitigate open cast miming activities, program support for underdeveloped regions est.

However, number of major strategic issues are not addressed by the existing strategies and most of the implementation measures to existing strategic priorities are week, condemning the Ústí Region to lagging on the tail of the Czech regional economic performance.

4 LESSONS LEARNED

In the Czech Republic, in the last 20 years, there was a pendulum swing from a very formalised rigid planning system to a virtual panning anarchy and then back to relatively strict spatial development regulations, which the new planning law tries to invoked. There was also a stride back to introducing the local and the regional development strategies. The upgrading of the skill base for spatial planning without an outside intervention proved to be difficult and slow, causing unpredictable legislative and follow on program effects. The low level of academic input, the "weak client", the absence of stakeholders imput and the consultants and administration inexperience have all caused delays in formulating, focusing and adapting the spatial and the strategic planning requirements. Coping with the ambitions and determination of various level of governance also had its troubles. The experience had shown that when an action is required by the lower levels of governance a "motivation program" needs to follow. An update on the "stakeholders´ reality" and "hand on" experience is needed to be brought into all considerations for legal changes. The best practise and stakeholders experience learned by doing is of an extreme value and therefore it should be collected, publicised and promoted. The new legal instruments have their "running in time". Meanwhile a nationally based good quality methodological support, vast amount of training and nationwide experience sharing is required to achieve the right "tuning".

4.1 Recommendations

- Encourage setting up of an institutional support for regional and urban development by providing enabling funding.
- Support setting up of the best example and experience sharing sources.
- Commission and encourage research activities within institutions.
- Enable broad participation of stakeholder in the spatial and urban research
- Encourage and support a common platform of top Czech practitioners (layers, developers, key regional and local planning staff, bankers, ect.) which would address planning and urban development issues.
- Support platform of practitioners, which have experience with application of the new Planning law.
- Improve and modernise education of planners and of urban planners
- Establish education for developers and local government strategic departments´ staff.
- Set up motivation schemes for skill improvement of the elected representatives.

Comprehensive Urban Renewal: More than Building Regeneration: a Case Study in Vienna

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1 ABSTRACT

How can the Viennese Urban Renewal Model develop the ground floor zone of historical urban fabric? How can a comprehensive planning approach restructure and reuse the building blocks at ground level, including courtyards and street spaces? Sustainable urban development requires more open and green areas, sufficient local supply, social infrastructure and convenient traffic solutions. All these characteristics interact with the ground floor zone, street spaces and common areas within the urban fabric of the city. The ground floor zone and surrounding open spaces establish the quality of life and are key to the image of the cities. The city of Vienna, like a number of other cities, has a growing problem with vacant ground floors and deactivated desolate street (common) spaces. The negative influence of private traffic, and the disappearance of retail outlets are the main reasons for the current situation. The symbiotic relationship between the many user groups, local residents, small retail outlets and small-scale local economy are obvious. This coherence impacts on the quality of life in the neighborhood. How and if is the historical urban fabric transformable and transferable? The results of the research project are not only implementable on the existing urban fabric, but also on the new development areas in between. The studies and findings ares addressed not only to the urban renewal department, but to all relevant City departments (urban planning, housing subsidy, traffic planning, environmental protection, architectural/urban design, green planning and business development), delivering transferable and typological planning procedures and methods.

2 INTRODUCTION

The city of Vienna, like a number of other cities, has a growing difficulty with vacant ground floors and deactivated desolate street (common) spaces. The vacancy in Vienna becomes noticeable and widespread only at the level of ground floor zones. This development does not seem as dramatic as those completely empty buildings and blocks in some other post-industrial or post-socialist European cities. Furthermore increasing rates of vacant ground floor areas at street level show that this development is not as harmless as it appears.

The value and usability of both the ground floor zones and the public spaces reflect upon the quality of life and image value of an urban area.

The ground floor areas and their spatial structures with adjacent spaces such as courtyards, streets, squares and green spaces create the character of the urban quarters. Their neglect causes an undoubted depreciation of the environment and the surrounding neighbourhood.

In the development of the urban structure in Vienna, the local supply enterprises like groceries, small shops and small apartments have been the traditional users of the ground floor area on the street and in small flats.

In many areas of the city today, the ground floors are increasingly losing users and usability. The city of Vienna, like a number of other cities, has a growing problem with vacant ground floors and deactivated desolate street/common spaces. The negative influence of private traffic, and the disappearance of retail outlets are the main reasons for the current situation. The symbiotic relationship between numerous user groups, local residents, small retail outlets and small-scale local economy are obvious. This coherence impacts on the quality of life in the neighbourhood. The symbiotic relationship between the ground floor uses, the street, the local supply and the inhabitants of structures is linked very closely.

3 CURRENT SITUATION OF GROUND FLOORS IN VIENNA

The unused existing ground floor spaces results in lost built stocks. In addition, the vacancy of ground floors weakens the identification of the inhabitants with their neighborhood.

This phenomenon can be observed in many cities. Their ground floor zones show in spite of all the similarities of their urban structures also significant differences related to the nature of street spaces - such as height, width and design of the spaces between the building blocks, the intensity of the (stationary) traffic, the legal regulations of rents and property matters.

The rising vacancy rate in the ground floor, because of the replacement and closure of the small(est) enterprises creates a downward spiral not only in the problem zones of the cities. The restructuring and re-use of the ground floors as small(mini) garages for the new residential units, which have been recently built on top of historic buildings, changes the character of a street spaces in the ground floor zones.

3.1 Migration of citizens

The scarcity of available public spaces and green spaces causes an exodus from the cities to the suburbs as the urban households prefer more open-green spaces and low emission environments. More land consumption, more infrastructures, new social institutions such as schools, kindergartens, public transport and more traffic are the common results. The migration to the suburbs and the growing urban sprawl 'Zwischenstadt' burden ultimately the city governments due to the rising infrastructure costs. The growing private traffic between the central areas of the city and residential areas around the city causes more motor traffic emissions; this development set further migration in motion: Circulus Vitiosus.

3.2 Small(est) enterprises and store closures

The local supply enterprises (like small business, retail and offices) are dependent on the current customers coming from their district.

The presence of the pedestrians on the streets vitalizes the street life, reduces motorized traffic and supports the local economy. The number of small(est) enterprises is over 90 % in Europe: Vienna and other Austrian cities are making no exception.

The small-scaled structures of existing local supply are increasingly weakened. More and more retails and other enterprises established in ground floors are closing.

3.3 Stigmatized by traffic emissions

More than half of the population in Vienna claims to suffer from constant noise. Dust is further a serious problem. Longer distances between work, housing and traditional weekend houses cause more and more traffic. This means not only increasing greenhouse emissions, but also a negative development of street spaces in urban areas. The controversial role of traffic planning and the conflicting objectives and trends of economic and environmental policy support the negative development. The small scaled urban traffic planning requires immediately new ways and innovative solutions, which are carried out by decentralized local politics.

3.4 Mini-garages versus retails

The retail spaces in the ground floor zones, which are outside the main shopping streets or market places, off the pedestrian zones and traffic-calmed places are no longer in demand. They increasingly turn to be idle spaces.

The lack of retails in short distance causes more car traffic and insufficient local supply. The typical uses of the ground floors like retails, cafes and restaurants or small offices has the character of semi-public places. More vacancies in the ground floor zones causes less interaction between closed and open spaces, public and private spaces at the street level.

The existing ground floor spaces are permitted to be converted into the closed small garages in last decade. The garages (mainly for 2 cars) often belong to the owners of the new penthouse apartments on top of the historic blocks. These mini garages built in the former spaces of local supply and retails transformed in recent years the street facades of the street level into the death zones. The 'dark caves' of garage entrances and exits has been turned to usual elements of ground floors not only of the new buildings but also at the historical facades of the building blocks.

The required car parking places for each new housing unit or new office areas play an important role in this development. The local government believes that the creation of new parking lots as the key to their political success. Reducing the parking lots in the streets to create green/common places causes protest actions of the people living in and around these streets.

To date, the house owners and housing management companies do not consider that the ground floors as rentable areas for retails and small enterprises are profitable enough if rented out. The ground floors of the

new housing buildings of the block structures are usually service spaces like car parking areas and garbage space showing introverted facades.

Better rental income, better marketing opportunities and subsidies are the basic motivations of property owners' decisions for mini garages.

Although the urban renewal and urban planning authorities are obviously positioned against this development, the relevant legal instruments are not in place to stop this process. In this case the decision-making authority and responsibility lies also within the local politics.

3.5 Viennese block redevelopment program

Vienna has a historical housing stock with around 30 % of all apartments built before World War I. The importance of these inner city districts lies in their urban variety, their (still) existing mixture of functions, and their flexibility, as well as their capacity to absorb new functions, new lifestyles and immigrants. (Potyka 2006)

The block redevelopment as an urban renewal program of City of Vienna seeks a comprehensive improvement of entire blocks with different owners by combining housing redevelopment with other measures to improve living conditions more generally. (wohnfonds_wien 2010)

Today, there is a growing necessity for comprehensive and interdisciplinary planning methods in participative and cooperative process with the co-operation of stake-holders, urban renewal authorities, investors and tenants.

The research project 'win wi(e)n' develops strategies for the improvement and recycling of ground floor zones in the urban fabric of Vienna with all regulative, legislative and financial components in cooperation with the planning authorities operating in different fields of urban planning. The main target of the project is a sustainable restructuring and reusing of the blocks at ground level, including courtyards and street spaces- as a comprehensive planning approach.

Interviews, hearings and case studies in other cities (Berlin, Leipzig and Basel) as well as the analyzing of recent cultural initiatives are some of the methods defining the way forward in planning.

The block renewal program is a convenient method instigated by the housing renewal authorities in Vienna as it also targets the improvement of the ground floor zone and open spaces of block structures including the following aims:

- Opening the block courtyards of historical urban fabric to create accessible green spaces
- Creating common spaces between the building blocks, green parks and street spaces for different social groups of a urban renewal area
- Implementation of a block renewal management, coordinating stake holders, tenants, retail outlets and service facilities
- Redefinition of the density of urban fabric on the basis of the new master plans for the urban renewal area.

Although the urban renewal program is geared towards a comprehensive urban revitalization of the whole neighborhood, its implementation has fallen short of target particularly with regard to ground floor zones and open spaces. Without a coherent modernization of the whole block area with open spaces and ground floor facilities, there is no real sustainable success.

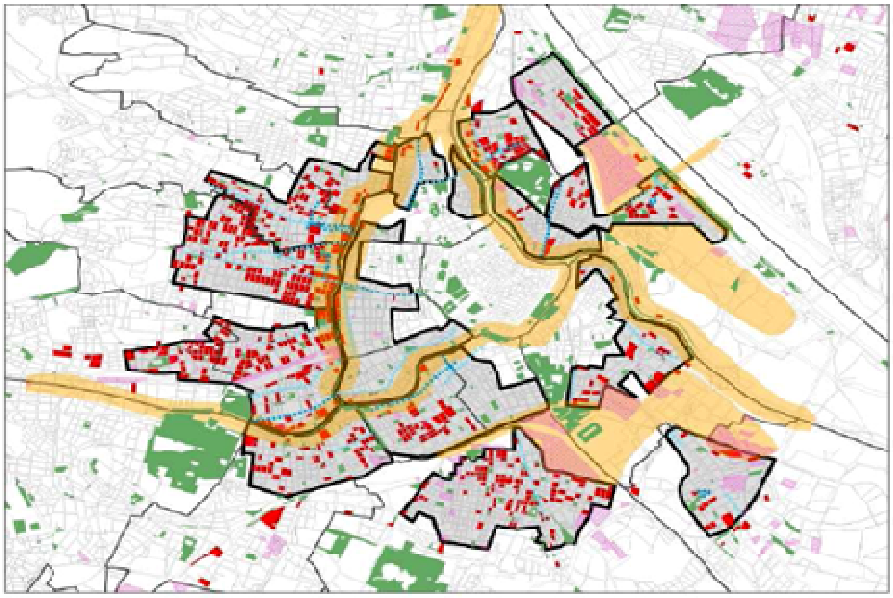

Figure 1. Target areas of urban renewal in Vienna; 2005, Gerhard Berger, City of Vienna

The targets of urban renewal remain rarely achievable because of the contradictory interests of property owners, local policy and public planning authorities.

4 THE RESEARCH PROJECT WIN WI(E)N

In the context of this research project, the urban block renewal program was analyzed as well as the barriers and obstacles within planning processes to develop new methods and strategies, to assist the program achieve its aims.

A recent block renewal area - Stuwerviertel in Vienna - of the urban renewal authority in Vienna has been analyzed in a simulation and implementation model to test the feasibility of the planning solutions and methods of the research project, as well as to confirm the transferability of these, on the basis of:

- Interviews with the planning, building and controlling authorities for urban renewal, urban development, building legislation, urban traffic and local organizations, residents, tenants, investors and stake-holders
- Case studies of European practice in urban renewal programs
- Evaluation the urban block renewal program in Vienna and the building legislation, planning policy and local financial support programs
- Thematically related studies and events on block renewal programs, renovation, participation, local district management
- The participatory project for Max-Winter-Place in the pilot area Stuwerviertel.

5 CONCLUSION

The findings of the research project 'win wi(e)n' are addressed not only to the urban renewal department, but to all relevant City departments (urban planning, housing subsidy, traffic planning, environmental protection, architectural/urban design, green planning and business development), delivering transferable and typological planning procedures and methods.

The results of the project are implementable measures for an enduring and sustainable restructuring of the ground level zone with new strategies for organization, regulation, planning guidelines and planning. In addition, a number of sustainable proposals for redesign and planting of the ground floor zones and open spaces require more detailed analysis.

Over the last few decades the urban renewal program 'the block renewal' in Vienna had the physical building regeneration as prime objective. An extension of the current urban renewal practice is absolutely necessary

to keep the versatile use of the urban fabric and to improve the quality of life in Vienna's high density urban areas to keep the households in the central areas of the city. The following measures are recommended:

- Knowledge transfer, communication and cooperation of all departments of urban planning and urban politic
- special support and subsidies for small(est) enterprises of ground floor zone
- special and effective subsidies and customized information services for the entrepreneurs to start and to develop small business
- more subsidies and information for the greening measures in the courtyards and street spaces
- innovative measures for the reduction of car traffic and traffic calming methods
- extension of housing subsidies to support the non-residential uses in the ground floor zones
- abolition of the regulation of the obligatory car parking lots units within the building block, for the new built 'penthouses' on top of them
- further development of urban renewal methods to regenerate the neighborhood as a whole

The following measures support retail and small(est) enterprises for a reusing and transformation of ground-floor-zone:

- effective financial support for startups (in the ground floor-zone),
- active information and know how transfer (specially for migrant enterprises of ground floor-zone) but also for landlords and tenants,
- no restriction of use in the ground floor zone (specially for smallest enterprises)
- no functional zoning for ground floors (open and flexible usability)
- sufficient financial support (subsidies) also for the renovation of the non-residential-spaces of ground floors
- exemption from various fees, charges and rates specially for new comers (retail, small entrepreneurs) of ground floor zones
- controlling of rental price level not only for housing but also for commercial uses
- The following measures are addressed to public hand and public authorities for an efficient (re)use of ground floor-zone:
- cooperation of all players and stake holder; inhabitants, tenants, neighborhood organizations, local authorities, local governments, local community-based organizations, house owners and NGO's
- unconventional architectural planning solutions
- elimination of contrary strategies and practice of planning and legislative authorities
- novel legal tools to p'rovide the implementation of measures (like common spaces for children and tenants in the ground floors, bicycle parking spaces, greening etc.)
- coordination and merging of different financial supports for housing, greening and business development.

Monitoring the gentrification and the risk of displacement of the existing inhabitants during the urban regeneration process has been an additional target of the field studies in the pilot area. Over the last centuries this area has been the location of the new comer migrant families mainly from Eastern Europe. There is to further to state that the period of the field studies has been extensive enough to survey the consequences of urban renewal activities in the pilot area. Since there is no urgent pressure from the property market or severe difficulties through mass immigration, a gentrification process takes over ten years in Vienna. Finally, as with every city development scheme, legislative regulations of the local government play a major role in accomplishing sustainable and eminent results for urban space areas. In this very case the appropriate use of vacant ground floors and deactivated desolate street (common) spaces.

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Das Klimaschutzprogramm der Stadt Wien – ein Beitrag zu mehr Lebensqualität in Wien

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1 ABSTRACT

For the past 10 years, Vienna has had a broad climate protection programme known as KliP Vienna. It was enacted in 1999 by the city council and is valid until 2010. KliP´s goal of preventing an increase in annual emissions of CO2 equivalents by 2.6 million tons by 2010 was already achieved in 2006. In fact, the city has thus far successfully avoided the annual emission of 3.1 million tons of CO2 equivalent.

The Vienna Climate Protection Programme, Update 2010-2020, the so-called KliP II, was agreed upon by the city council one year before the current KliP is set to end, thus the climate protection programme will function properly without any interruption.

The City of Vienna´s climate goal is a reduction in greenhouse gas emissions per capita of 21% when compared to 1990 by the year 2020. This shall be achieved through the measures of KliP II which consists of 37 sets of measures with a total of 385 individual measures in the following five fields of action:

- Energy production
- Use of energy
- Mobility and city structure
- Procurement, waste management, agriculture and forestry, nature conservation
- Public relations

The implementation of the planned measures will allow Vienna to prevent the annual emission of 1.4 million tons of greenhouse gases in the period from 1990 to 2020. When the 3.1 million tons of annual greenhouse gas emissions that have so far been avoided are taken into consideration, the emissions of approx. 4.5 million tons of annual greenhouse gases will have been prevented.

2 DAS KLIMASCHUTZPROGRAMM DER STADT WIEN

2.1 Ausgangslage

1999 hat der Wiener Gemeinderat das Klimaschutzprogramm (KliP Wien) beschlossenen und damit die Zielsetzung und Stoßrichtung der Klimaschutzpolitik der Stadt Wien bis 2010 festgelegt.

Die Zielerreichung der insgesamt 36 Maßnahmenprogramme in den fünf Handlungsfeldern

- Fernwärme- und Stromerzeugung
- Wohnen
- Betriebe
- Stadtverwaltung
- Mobilität

wurde von der Österreichischen Energieagentur im Auftrag der Magistratsdirektion-Klimaschutzkoordination (MD-KLI) evaluiert.[1] Dabei zeigte sich, dass mit Ende 2008 bereits 3,1 Mio Tonnen CO2-Äquivalente vermieden werden konnten (das absolute Ziel von 2,6 Mio. Tonnen CO2-Äquivalente war bereits im Jahr 2006 erreicht worden). Es ist daher zu erwarten, dass im KliP-Zieljahr 2010 eine deutliche Übererfüllung des ursprünglichen Zielwertes in Tonnen CO2-Äquivalenten erreicht werden wird.

[1] „Evaluierung der Umsetzung des Klimaschutzprogramms (KliP) der Stadt Wien“, Österreichische Energieagentur, 2009

2.2 Reduktion der in Wien verursachten Emissionen

Betrachtet man jene Emissionen, die im Einflußbereich der Stadt Wien liegen, so sanken die Treibhausgas-Emissionen Wiens im Zeitraum von 1990 bis 2006 um rund 6 %, absolut gesehen von 5,58 Mio. Tonnen auf 5,25 Mio. Tonnen CO2-Äquivalente.

Ausgeklammert sind bei der Betrachtung die Emissionen aus dem Sektor Energieversorgung, die dem EU-weiten Emissionshandel unterliegen, sowie die außerhalb Wiens stattfindenden, aber laut internationalen Gepflogenheiten Wien zugerechneten Verkehrsemissionen, weil diese nicht durch Wiener Klimaschutzmaßnahmen beeinflussbar sind.

Im Zeitraum 1990 bis 2006 ist die Bevölkerungzahl von rund 1.498.000 auf rund 1.664.000 Personen gestiegen. Bildet man den Pro-Kopf-Wert, zeigt sich eine Verringerung der spezifischen Emissionen um rund 15 %. (von rund 3,7 Tonnen CO2-Äquivalente auf rund 3,2 Tonnen CO2-Äquivalente).

Die maßgeblich stärksten Erfolgsfaktoren in dieser Entwicklung sind laut Evaluierung der Österreichischen Energieagentur[2]:

- der massive Ausbau der Fernwärme (vor allem darum, weil die Fernwärme in Wien rund 96 % der benötigten Energie aus Abwärme aus den Müllverbrennungsanlagen sowie aus Kraft-Wärme-Kopplungsanlagen von Wien Energie bezieht)
- die thermisch-energetische Gebäudesanierung (gepaart mit hohen energetischen Standards im Neubau)
- die konsequente Forcierung des „Umweltverbundes“ (Öffentlicher Verkehr, Radverkehr, Fußgänger/-innen-Verkehr), allen voran der Ausbau und die Attraktivierung des Öffentlichen Verkehrs (ÖV)
- der weiter steigende Einsatz von erneuerbarer Energie.

Die Evaluierung zeigte darüber hinaus, dass durch das KliP auch beträchtliche volkswirtschaftliche Effekte bewirkt werden konnten. Im betrachteten Zeitraum 1999 bis 2008 lösten zum Beispiel die untersuchten Maßnahmen ein Investitionsvolumen in der Höhe von rund 11 Mrd. Euro aus. Der Wertschöpfungseffekt über diesen Zeitraum betrug rund 25 Mrd. Euro. Darüber hinaus wurde ein beachtlicher Beschäftigungseffekt ausgelöst: im Jahr 2008 konnten rund 56.600 Arbeitsplätze gesichert werden, das entspricht 7% aller unselbstständig Erwerbstätigen in Wien.

Die Evaluierung nennt - nicht zuletzt vor dem Hintergrund der internationalen Entwicklungen – folgende großen Herausforderungen für die weitere Klimaschutzpolitik:

- Massive Verbesserungen in der Endenergieeffizienz (hierbei vor allem auch die Senkung des Stromverbrauchs sowohl der Haushalte als auch der Betriebe);
- Reduktion der nach wie vor steigenden Verkehrsemissionen sowohl durch stadtplanerische als auch durch technische Maßnahmen.

Dies ermöglicht erst einen deutlichen Anstieg des Anteils erneuerbarer Energieträger an der gesamten Endenergie.

3 DIE FORTSCHREIBUNG DES KLIMASCHUTZPROGRAMMS BIS 2020

Aufgrund der Erfahrungen in der bisherigen KliP-Umsetzung, der Ergebnisse der KliP-Evaluierung und auf der Basis der alljährlich vom Umweltbundesamt publizierten Treibhausgasbilanz wurde in interdisziplinären Arbeitsgruppen eine Fortschreibung des Wiener Klimaschutzprogramms bis zum Jahr 2020 („KliP II“) ausgearbeitet und am 18. Dezember 2009 vom Wiener Gemeinderat beschlossen.

3.1 Bewertung der Emissionseinsparungen und volkswirtschaftlichen Effekte

Um die für die Wiener Klimaschutzpolitik wichtigsten Maßnahmenbündel der nächsten Jahre zu identifizieren, wurden im Rahmen einer Studie der Österreichischen Energieagentur[3] die neuen

[2] „Evaluierung der Umsetzung des Klimaschutzprogramms (KliP) der Stadt Wien“, Österreichische Energieagentur, 2009
[3] „Bewertung der volkswirtschaftlichen Effekte sowie der möglichen CO2-Einsparungen durch die Umsetzung des KliP II“, Österreichische Energieagentur, Jänner 2008

Maßnahmenprogramme bzw. Maßnahmen des KliP II im Hinblick auf ihr CO2-Reduktionspotezial und ihre volkswirtschaftliche Effekte bewertet.

Konkret wurden folgende Aspekte in die Bewertung miteinbezogen:

- CO2-Einsparung
- Kosten der Stadt Wien
- Investitionskosten
- Wertschöpfung
- Beschäftigungseffekte über die gesamte Laufzeit.

Darüber hinaus wurde das NOx-Vermeidungspotential mitberücksichtigt, da diese Emissionen derzeit eine besondere Problematik darstellen.

Als so genannte „TOP Runner", welche in der weiteren KliP II-Umsetzung priorisiert werden sollen, wurden folgende vier Maßnahmenbündel identifiziert:

- Thermisch-energetische Wohnhaussanierung
- Fernwärmeausbau und Effizienzsteigerung bei der Fernwärme
- Weitere Forcierung des Umweltverbundes (Öffentlicher Verkehr, Radverkehr, Fußgänger/-innen-Verkehr)
- Hohe energietechnische Standards beim Neubau von Wohngebäuden

Wie zu erwarten war, weisen die beiden Maßnahmen „Thermisch-energetische Wohnhaussanierung" und „Effizienzsteigerung und Fernwärmeausbau" die höchsten Effekte auf, sowohl was das Einsparungspotenzial von CO2-Emissionen, als auch die volkswirtschaftlichen Effekte betrifft.

Beim Netzausbau der U-Bahn zeigte sich klar, dass diese Maßnahme nur in Kombination mit anderen Verkehrsmaßnahmen sinnvoll ist, da der alleinige Ausbau der U-Bahn ohne weitere verkehrliche Verbindungen in die Fläche nur wenig CO2-Einsparungseffekte bewirkt.

Für Wien wird weiterhin ein Ansteigen der Bevölkerungszahl prognostiziert. Dadurch wird sich auch unabhängig von gesteigerten Komfortansprüchen der Bevölkerung der Bedarf an Wohnraum in den Jahren bis 2020 erhöhen. In diesem Zusammenhang ist insbesondere die Umsetzung von hohen energietechnischen Standards beim Neubau von Wohngebäuden wichtig. Da es durch die Neuerrichtung von Wohngebäuden und deren folgenden Nutzung naturgemäß zu einem weiteren Anstieg von CO2-Emissionen kommt, sind die Auswirkungen der Neubauten auf das Klima im Vergleich zu „konventionell" errichteten Wohngebäuden so gering wie möglich zu halten.

3.2 Konkrete Zielsetzungen

Minus 21% Treibhausgasemissionen pro Kopf im Jahr 2020 im Vergleich zu 1990 – das ist das Klimaschutzziel der Stadt Wien, das mit dem Klimaschutzprogramm der Stadt Wien, Fortschreibung 2010–2020 erreicht werden soll.

1,4 Mio. Jahrestonnen an Treibhausgasemissionen sollen durch die Umsetzung der geplanten Maßnahmen werden im Zeitraum zwischen 2009 und 2020 vermieden werden. Oder anders ausgedrückt: Betrugen die von Wien beeinflussbaren Treibhausgasemissionen im Jahr 1990 noch rund 3,7 Tonnen pro Kopf, so werden es im Jahr 2020 aufgrund des Wiener Klimaschutzprogramms nur noch rund 2,9 Tonnen sein; d. h. im Jahr 2020 wird jede Wienerin, jeder Wiener durchschnittlich rund 790 kg weniger Treibhausgase verursachen als noch 30 Jahre davor.

Die im KliP II formulierten Maßnahmen zielen ab auf jene Bereiche, die auch tatsächlich im Wiener Einflussbereich liegen und durch Aktivitäten der Stadt bzw. des Landes Wien verändert werden können. Das sind: der Kleinverbrauch, die Industrie, der Abfallbereich und die Landwirtschaft zur Gänze; beim Verkehr trifft es die Emissionen im Wiener Straßennetz und in der Energieversorgung die Emissionen der Anlagen, die nicht dem Instrument des Emissionshandels unterliegen.

Die konkreten Zielsetzungen sind:

- Erhöhung des Fernwärme-Anteils auf 50 %: Dieses Ziel soll durch kontinuierliche Ausbauplanung durch Wien Energie Fernwärme, durch den Ausbau der Netze sowie durch Effizienzsteigerungen und den Einsatz erneuerbarer Energieträger erreicht werden.
- Weitere Forcierung der thermischen Gebäudesanierung: Im Bereich der Gebäudesanierung liegt hohes Potenzial vor allem auch im Bereich des Wiener Förderprogramms Thewosan. Es sollen jedoch nicht nur die Förderbestimmungen angepasst werden, sondern auch in den ordnungsrechtlichen Vorschriften (z. B. Bauordnung) die Grenzwerte für Neubau und Sanierung weiter verschärft werden.
- Ausbau des öffentlichen Verkehrs, Forcierung des Umweltverbundes unter Einbeziehung von öffentlichem Verkehr, Radverkehr und Fußgängerverkehr, Reduzierung des Pkw-Verkehrs: Neben der laufenden Forcierung des öffentlichen Verkehrs wird von spezieller Bedeutung in Zukunft die besondere Berücksichtigung des Radverkehrs sein. Auch die weitere Attraktivierung des Fußgängerverkehrs wird einen wichtigen Beitrag zur Reduktion der Treibhausgasemissionen leisten. In diesem Zusammenhang ist außerdem zu erwarten, dass aufgrund der technischen Weiterentwicklung der Kraftfahrzeuge und weiterer flankierender Maßnahmen die Treibhausgasemissionen aus dem Wiener Pkw-Verkehr deutlich werden.
- Mehr als Verdopplung der durch erneuerbare Energieträger bereitgestellten Menge an Endenergie gegenüber 1990: Die verschiedenen Möglichkeiten der Stadt Wien bzw. ihrer Betriebe sollen ausgeschöpft werden, die verschiedenen Formen von erneuerbaren Energieträgern wie etwa Biomasse, Wind und Photovoltaik sowohl im Stadtgebiet, aber auch außerhalb Wiens zu nutzen.
- Erstellung eines Versorgungssicherheitsplans für Energie: Aus Sicht des Klimaschutzes muss in diesem Plan – auch unter Berücksichtigung der absehbaren Folgen der Klimaänderung - den Themenbereichen „Energieeffizienz“ und „Erneuerbare“ breiter Raum gewidmet werden. Dabei sind konkrete Maßnahmen zur Senkung des Energiebedarfs durch Erhöhung der Endenergieeffizienz und auch zur Steigerung der Nutzung von erneuerbarer Energie, von elementarer Bedeutung.

3.3 Konkrete Maßnahmen

Das KliP II umfasst 37 Maßnahmenprogramme mit insgesamt 385 Einzel-Maßnahmen in den fünf Handlungsfeldern:

- Energieaufbringung
- Energieverwendung
- Mobilität und Stadtstruktur
- Beschaffung, Abfallwirtschaft, Land- und Forstwirtschaft, Naturschutz
- Öffentlichkeitsarbeit

sowie Überlegungen zu Wiener Anpassungsmaßnahmen an den globalen Klimawandel.

Handlungsfeld A „Energieaufbringung“

In diesem Handlungsfeld liegt der Fokus auf jenen aufbringungs- bzw. erzeugungsseitigen Vorhaben zur Reduktion von CO2-Emissionen im Bereich der (Fern-)Wärme-, (Fern)Kälte- und Stromerzeugung, welche Wien unmittelbar beeinflussen kann. Auch finden sich im Handlungsfeld Energieaufbringung Maßnahmen zur Verschiebung des Energieträgermix bei den Endverbraucherinnen und -verbraucher.

Handlungsfeld B „Energieverwendung“

Der Schwerpunkt in diesem Handlungsfeld liegt auf der möglichst effizienten Energieverwendung durch die Endverbraucher. Besonderes Augenmerk liegt dabei auf den gebäudebezogenen Aspekten. Diese umfassen sämtliche Bereiche der Energieverwendung, die zum Bau und Betrieb eines Gebäudes gehören. Daneben enthält das Handlungsfeld noch Maßnahmen für die öffentliche Beleuchtung, für nicht straßengebundene Maschinen mit Verbrennungsmotoren und für Elektrogeräte.

Handlungsfeld C „Mobilität und Stadtstruktur“

Ziel des Handlungsfelds „Mobilität und Stadtstruktur“ ist es, direkt und indirekt Treibhausgasemissionen aus dem Verkehrsbereich zu reduzieren. Ansätze für Maßnahmen finden sich deshalb zum einen bei der Förderung umweltfreundlicher Verkehrsarten wie Radverkehr, Fußgängerverkehr oder öffentlicher Verkehr.

Zum anderen wird diese angebotsorientierte Strategie ergänzt durch Restriktionen bei der Nutzung jener Verkehrsmittel, die im Gegensatz zu den zuvor aufgezählten umwelt- und klimaschädigende Wirkungen haben (hier vor allem der motorisierte Individualverkehr).

Die Kombination der Verkehrsmittel untereinander soll erhöht und grundsätzlich für jeden Weg jenes Verkehrsmittel verwendet werden, welches sich für den jeweiligen Verkehrszweck auch am besten eignet.

Handlungsfeld D „Beschaffung, Abfallwirtschaft, Land- und Forstwirtschaft, Naturschutz“

Die Beschaffung durch die öffentliche Hand und die Abfallwirtschaft sind neben Energie und Verkehr wichtige Themenbereiche für den Klimaschutz. Demgemäß zielen die Maßnahmenprogramme dieses Handlungsfeldes darauf ab, jene Treibhausgasemissionen zu reduzieren, die durch Beschaffungsvorgänge der Stadt Wien sowie durch die Wiener Abfallwirtschaft hervorgerufen werden. Zusätzlich sind in diesem Handlungsfeld aber auch Maßnahmen im Bereich der Land- und Forstwirtschaft und des Naturschutzes angesiedelt.

Handlungsfeld E „Öffentlichkeitsarbeit“

In diesem Handlungsfeld sind sämtliche Vorgaben der Öffentlichkeitsarbeit zum gesamten Klimaschutzprogramm verankert. Die Maßnahmenprogramme dieses Handlungsfeldes setzen vorrangig auf Information und Bewusstseinsbildung bei der Wiener Bevölkerung sowie bei weiteren für die Umsetzung relevanten Akteuren, um so klimafreundliches Verhalten hervorzurufen.

Anpassung an den globalen Klimawandel

Abschließend enthält das KliP II noch Überlegungen zu Wiener Anpassungsmaßnahmen an den globalen Klimawandel. Die erforderlichen Maßnahmen werden in den nächsten Jahren ausgearbeitet werden.

4 KLIMASCHUTZ ALS BEITRAG ZU MEHR LEBENSQUALITÄT IN WIEN

Bezüglich Lebensqualität, Umwelt- und Klimaschutz nimmt Wien europa- und weltweit in Städterankings Spitzenpositionen ein. Neben dem 1. Platz in der weltweiten Lebensqualität-Studie von Mercer unterstreicht der 1. Platz im European Green City Index einmal mehr, dass Wien am richtigen Weg ist.

Klimaschutz ist ein wichtiger Innovationsmotor für den Wirtschaftstandort Wien und sichert Arbeitsplätze: Energieeffizienz bei der Fernwärme, Zukunftsprojekte wie die Fernkälte, thermisch-energetisch sanierte Wohnhäuser mit hoher Behaglichkeit und geringem Heizenergieverbrauch, moderne Wohngebäude mit hohem energietechnischem Standard, energiesparende U-Bahnen – um hier nur einige Beispiele zu nennen. Durch klimarelevante Maßnahmen konnten im Jahr 2008 in Wien laut Evaluierung der Österreichischen Energieagentur[4] rund 56.600 Arbeitsplätze gesichert werden.

Klimaschutz steht für umweltfreundliche Mobilität: Durch eine anspruchsvolle Stadtplanung kann die Anzahl der Wege und der zurückgelegten Wegelängen reduziert werden. Wenn immer mehr Wienerinnen und Wiener immer öfter mit dem Rad fahren, zu Fuß gehen oder ihre Wege mit den Öffentlichen Verkehrsmitteln zurück legen, tun sie nicht nur der Umwelt, sondern auch ihrer eigenen Gesundheit Gutes.

Klimaschutz steigert die Lebensqualität im bebauten Stadtgebiet: Der Nahversorger ums Eck und auch privat nutzbare attraktive Grün- und Freiräume sind Schlüsselfaktoren, um die Zufriedenheit der Bewohnerinnen und Bewohner in ihrem Wohnumfeld zu steigern und der Abwanderung ins grüne Umland entgegenwirken zu können.

Das Klimaschutzprogramm der Stadt Wien trägt dazu bei, dass Wien eine der lebenswertesten Städte der Welt bleibt. Das diesjährige CORP-Motto „STÄDTE FÜR ALLE: Lebenswert, gesund, prosperierend!“ ist in Wien also keine unrealistische Phantasie sondern eine vielversprechende Visison oder teilweise sogar schon gelebte Realität.

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Das Wissen Wiens – innovative urbane Technologien und Strategien als Garant der Wiener Lebensqualität

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1 KURZFASSUNG

„Wien ist anders“. Schon lange ist dieser Slogan im In- und Ausland bekannt und anerkannt. In Wahrheit aber ist vieles an Wien genau so, wie es die Menschen überall von ihrer Stadt erwarten:

Wien ist lebenswert, Wien ist sicher, Wien ist sauber, Wien ist grün.

Der Unterschied zu anderen Städten ist die Art und Weise, wie diese Qualitäten geschaffen und gesichert werden: Die Stadtverwaltung, ihre Betriebe und Unternehmen verstehen sich als umfassende öffentliche Dienstleister; ihr Wissen, Wirken und Zusammenwirken ist das Kapital einer modernen Stadt.

Die Dienstleistungen der Daseinsvorsorge haben in Wien seit vielen Jahrzehnten einen Stellenwert wie in kaum einer anderen vergleichbaren Großstadt. Ein dichtes öffentliches Nahverkehrsnetz, die gesicherte und hochqualitative Versorgung mit Trinkwasser und eine vorbildlich organisierte Abwasser- und Müllbeseitigung sind in Wien Selbstverständlichkeit und tragen wesentlich zur Attraktivität der Stadt bei.

Als Dienstleistungsorganisation der Stadt Wien bietet TINA VIENNA einen Einblick in das Wiener Wissen zum Thema Stadt- und Umwelttechnologien an. Wir zeigen erprobte und bewährte Strategien und Technologien der Stadt, ihrer Dienststellen und Unternehmen, die einen wesentlichen Beitrag zur Lebensqualität in Wien leisten.

2 DA SEIN FÜR DIE MENSCHEN IN DER STADT

2.1 Hohe Lebensqualität beruht auf einer starken und verlässlichen Daseinsvorsorge

Die bewährte kommunale Daseinsvorsorge in Wien ist ein Garant für eine hohe Lebensqualität und ein wichtiger Standortvorteil Wiens im globalen Wettbewerb.

Dies zeigt auch die jährlich vom internationalen Beratungsunternehmen Mercer durchgeführte Studie zur Bewertung der Lebensqualität in 215 Metropolen weltweit. Hier nimmt Wien aktuell den ersten Platz ein.

Darauf sind wir stolz und das bedeutet auch Verantwortung gegenüber der Bevölkerung.

Denn gerade in Zeiten von Wirtschafts- und Finanzkrise darf die öffentliche Hand nicht die Hände in den Schoß legen.

Wien hält trotz sehr schwieriger ökonomischer Rahmenbedingungen und rückläufiger Einnahmen an einem Budgetkurs fest, bei dem die Investitionen in die Menschen im Mittelpunkt stehen. Denn die Krise ist erst vorüber, wenn auch am Arbeitsmarkt eine Trendumkehr zu erkennen ist. Wien folgt daher der einhelligen Empfehlung aller namhaften Wirtschaftsforscherinnen und Wirtschaftsforscher und hält am Wiener Weg der antizyklischen Finanz- und Wirtschaftspolitik fest. Dabei sieht sich die Stadt vor allem als Konjunktur- und Beschäftigungsmotor für mehr Nachfrage und die Zukunftsprojekte Wiens.

Das hohe Daseinsvorsorgeniveau in Wien braucht ständige Investitionen. Die Ausgaben für die Daseinsvorsorge im engeren Sinn – in den Bereichen Wasser, Kanal und Abfall – erreichten im Jahr 2009 einen neuen Spitzenwert: Mit rund 545 Mio. € werden 20 Mio. € mehr bereitgestellt als 2008, das ist ein Plus von 3,8%. Damit kann insbesondere das hohe Service- und Umweltschutzniveau Wiens garantiert werden.

3 NEW PUBLIC MANAGEMENT

2002 wurde der auf den Grundsätzen des New Public Management basierende Wiener Weg der Verwaltungsmodernisierung durch die Einführung der Globalbudgetierung entscheidend vorangetrieben. Die Stadt Wien wurde für ganz Österreich zur Vorreiterin im Bereich des modernen Budgetmanagements.

Die Wiener Stadtverwaltung besteht nicht nur aus den Mitarbeitern und Mitarbeiterinnen in den verschiedenen Magistratsabteilungen sondern umfasst auch zahlreiche Fachleute in den Betrieben und Unternehmungen der Stadt. Ihnen ist es zu verdanken, dass Wien zu den am besten verwalteten Kommunen der Welt gehört. Eine Vielzahl von miteinander vernetzten strategischen Programmen sichert, dass im

vielfältigen und komplexen alltäglichen Handeln alles in eine gemeinsame Richtung geht: Lebensqualität und Nachhaltigkeit. Damit auch künftige Generationen mindestens die gleichen Optionen und Chancen für sozialen Zusammenhalt, wirtschaftliche Leistungsfähigkeit und Umweltqualität vorfinden, braucht es gemeinsame Orientierung.

3.1 Die Stadt ist eine geschätzte Dienstleisterin

Die Wienerinnen und WIener schätzen ihre Stadtverwaltung: eine regelmäßig durchgeführte Großstudie bei ca. 9.000 Stadtbewohnern ergab 2007 in den Bereichen Gesamtzufriedenheit, Bürgernähe und Umsetzung der Verwaltungsmodernisierung zu 70% die Noten „sehr gut“ bzw. „gut“ (Studie „Leben in Wien“). Dahinter steht eine starke Verwaltung, die ihre Verantwortung für öffentliche Aufgaben konsequent wahrnimmt.

In Wien werden die meisten Infrastrukturleistungen direkt oder indirekt von der Stadt gesteuert und finanziert. Gerade bei der Finanzierung geht die Stadt neue Wege: sie hat sich durch eine „Kaskade der Flexibilisierung“ Handlungsmöglichkeiten erhalten, geschaffen und erweitert. Neben Leistungen aus dem zentralen Stadtbudget agiert die Stadt als Eigentümerin von kommunalen Betrieben und Hauptaktionärin von städtischen Unternehmungen. So verbindet sie Kontrolle und Wettbewerb.

3.2 Die Verwaltung denkt quer

Eine moderne Stadt braucht nicht nur Spezialistinnen und Spezialisten, die fachliche Aufgaben in höchster Qualität bewältigen. Es geht auch um einen Blick über den Tellerrand des eigenen Themas, um gemeinsame Herausforderungen zu bewältigen. In Wien haben sich unterschiedliche Herangehensweisen bewährt, um „Querschnittsmaterien“ in den Blick zu nehmen: Klimaschutz wird etwa als „virtuelle Organisation“ vorangetrieben: Mehr als 300 Mitarbeiter aus rund 150 Fachabteilungen und Institutionen der Wiener Stadtverwaltung, den städtischen Betrieben und externen Organisationen sind im Rahmen des Klimaschutzprogrammes „KliP Wien“ vernetzt und leisten dezentral ihren Beitrag zur Reduktion der CO2-Emissionen, vernetzt von einer schlanken Koordinationsstelle. Das schlägt sich etwa in der Beschaffung nieder: das Programm „ÖkoKauf Wien“ sorgt für die Anschaffung von phosphat- und formaldehydfreien Produkten sowie die Vermeidung von PVC, aggressiven Reinigungsmitteln oder Tropenhölzern.

Auch Gender Mainstreaming setzt die Stadt vernetzt um: ein im Dialog aller Stellen erstellter Gleichstellungsaktionsplan (GAP) sichert die Umsetzung in allen Bereichen und Ebenen. Auch für das Thema Barrierefreiheit gibt es in der Stadtverwaltung eine eigene Kompetenzstelle, die das Wissen in diesem Themenbereich bündelt.

3.3 Neue Allianzen machen fit für die Zukunft der Stadt

Eine starke Stadtverwaltung braucht tragfähige Partnerschaften. Der Magistrat und die Unternehmen der Stadt kooperieren in vielfältiger Weise mit der Wiener Wirtschaft. Die Stadt gehört etwa als Auftraggeberin zu den wichtigen Motoren der städtischen Ökonomie. Aber auch über gezielte finanzielle Förderungen, etwa für Wohnbau, Wirtschaft und Wissenschaft und über Angebote der Wissensvermittlung und Qualifizierung ist die Stadt aktive Partnerin für Unternehmen und wissenschaftliche Einrichtungen.

Eine Erfolgsgeschichte ist auch der vielfach ausgezeichnete „ÖkoBusinessPlan Wien“, ein Programm der Stadt Wien, das Wiener Unternehmen bei der Umsetzung von umweltrelevanten Maßnahmen im Betrieb unterstützt und dazu beiträgt, ihre Betriebskosten zu senken.

Andere strategische Programme wie der Stadtentwicklungsplan 2005, der Masterplan Verkehr 2003 oder die urbane Luftinitiative und das städtische Energieeffizienzprogramm wurden unter Einbindung unterschiedlicher Interessensgruppen und NGOs erstellt. Hier heißt Partnerschaft Dialog in der Entwicklung, um bei der Umsetzung auf Unterstützung zählen zu können.

3.4 Eine Stadt der klugen Köpfe

Wien erkennt, wie auch andere Kommunen, dass neue Technologien weitreichende Folgen für das Zusammenleben haben werden. Für den Magistrat ist es daher essentiell, immer am laufenden Stand der Technik, der Forschung und der wissenschaftlichen Erkenntnisse zu sein. Im Rahmen einer Strategie zur Forschung, Technologie und Innovation (FTI Strategie) fördert die Stadt Vorhaben, die sowohl zur Stärkung des Wirtschaftsstandortes beitragen als auch einen gesellschaftlichen Nutzen für die Wienerinnnen und

WIener nach sich ziehen. Denn Wien ist mit tiefgreifenden Veränderungen in gesellschaftlicher und wirtschaftlicher Hinsicht konfrontiert. Demografischer Wandel, Globalisierung oder neue Kommunikationstechnologien motivieren die Stadt, Neues zu entwickeln.

In internen interdisziplinären Pilotprojekten, wie etwa das durch die Bertelsmann Stiftung ausgezeichnete Projekt „SALTO - eigenverantwortlich älter werden im Stadtteil", entsteht Wissen, das die Verwaltung fit für die Zukunft macht. Die Vergabe vielfältiger Forschungsaufträge gerade im Bereich der Umwelttechnologien sind ein weiterer wichtiger Baustein, um Wien noch mehr zu einer leistungsfähigen Wissens- und Wissenschaftsstadt zu machen.

4 SICHERHEIT UND HOHE QUALITÄT

Wenn Besucher nach Wien kommen, sind sie oft erstaunt, dass es in Wien keine Stadtteile gibt, die sie nachts aus Sicherheitsgründen meiden sollten. Im Gegenteil, die Stadt gilt als objektiv und subjektiv sicher. In vergleichenden Forschungen der fünf europäischen Städte Amsterdam, Budapest, Hamburg, Krakau und Wien erreicht Wien Spitzenwerte: nur eine kleine Minderheit empfindet ihre Wohnumgebung als „(eher oder sehr) unsicher" und weit mehr als die Hälfte der Befragten gibt an, sich sicher zu fühlen. Auf die Frage: „Für wie wahrscheinlich halten Sie es, in nächster Zeit in Ihrem Wohnviertel belästigt, geschlagen, bestohlen oder überfallen zu werden?" antworten in Wien 72% mit „sehr unwahrscheinlich", in den andern vier Städten pendelt dieser Wert zwischen 27% und 58%. „Sicherheit" als objektive Qualität und als subjektiv empfundener Aspekt urbaner Lebensqualität braucht Handeln der Kommune auf mehreren Ebenen.

4.1 Öffentliche Räume ohne Angst

Angsträume sind Zonen, die subjektiv als besonders unsicher empfunden werden. Sie schränken damit die Bewegungsfreiheit von Personen mit erhöhtem Sicherheitsbedürfnis - wie Frauen, Kinder, ältere Menschen oder Menschen mit Behinderungen - ein. Ein sensibler Umgang mit dem öffentlichen Raum kann das verhindern: Klare Orientierung und Übersichtlichkeit stehen dabei im Vordergrund. Im Leitbild für den öffentlichen Raum „Freiraum-Stadtraum Wien" gibt sich die Stadt klare Richtlinien für die Vorsorge, Gestaltung und das Management urbaner Freiräume. Wenn es um Kontrolle geht, dann liegt der Schwerpunkt auf sozialer Kontrolle, die aus der Identifikation der Stadtbenutzerinnen und Stadtbenutzer mit „ihrem" Raum entstehen kann. Beteiligung bei Umgestaltungen schafften die Voraussetzung für das Aushandeln von Interessen. Gleichermaßen wichtig ist die in Wien besonders aktive Integrationspolitik, da Kriminalitätsangst mitunter stark auf „die Anderen" projiziert wird.

4.2 „Stadt fair teilen"

Wenn es um Unsicherheit im öffentlichen Raum geht, sind Frauen besonders betroffen: 2006 wurden in Wien 56% aller Wege zu Fuß von Frauen zurückgelegt. Der Großteil sind Versorgungs- oder Begleitwege. Eine für alle gut benutzbare Stadt ist auch eine sichere Stadt. Angesichts dieser Tatsache wurde eine Grundlage zur geschlechtssensiblen Entscheidungsfindung für Projekte und Vorhaben im öffentlichen Raum erarbeitet. Unter dem Titel „Stadt fair teilen" wurde im sechsten Wiener Gemeindebezirk ein Pilotprojekt durchgeführt, in dem ein geschlechtssensibler Blick auf alle Maßnahmen „Gender Mainstreaming" erst möglich macht. Ziel ist es etwa, die Qualitäten des Fußwegenetzes dort zu erhöhen, wo mit Schulen, Altersheimen, Spitälern oder Amtshäusern besonders wichtige Einrichtungen des täglichen Bedarfs liegen. Vor allem zwei Maßnahmen ermöglichen schwächeren Verkehrsteilnehmern ein gutes und stressfreies Vorankommen: die Mindestbreite der Gehsteige von zwei Metern und angemessene Ampelschaltungen.

4.3 Sehen und gesehen werden

Einer der auffälligsten Gründe, warum Menschen in Wien auch in der Nacht entspannt unterwegs sind, ist das Licht. Der „Masterplan Licht" beinhaltet Strategien zu den Themen Sicherheit im Verkehr, Schutz vor Übergriffen, Gender Mainstreaming, Umweltschutz, Stadtgestaltung und Ästhetik, Lichttechnik und technologie, Wirtschaftlichkeit und Energieverbrauch. Denn mehr Licht und damit mehr Sicherheit kosten nicht mehr und tragen sogar zum Klimaschutz bei. Mit den neuesten LED–Leuchten ist es möglich, die Anzahl der Leuchten in Wien zu erhöhen und trotzdem den gesamten Energieverbrauch für Lichtstrom zu senken.

4.4 Mit neuen Technologien sicher ans Ziel

Ein wichtiger Maßstab für die Lebensqualität einer Stadt ist die Verkehrssicherheit: je verlässlicher, flüssiger und unfallfreier, desto besser und sicherer. Wien hat dabei mit dem Vorrang des öffentlichen Verkehrs einen großen Vorteil: in U-Bahn, Straßenbahn und Bus kommen alle bequem und sicher ans Ziel. Aber auch für den motorisierten Individualverkehr gilt: durch Steuerung und Optimierung lassen sich Unfälle vermeiden. In Wien steuert ein einziger zentraler Rechner alle Verkehrsampeln. Dank neuer Technologie passen sich alle Signalanlagen den Verkehrsströmen an.

4.5 Umweltschonender städtischer Verkehr

In Wien werden 35 Prozent der Wege mit den öffentlichen Verkehrsmitteln zurückgelegt – ein internationaler Spitzenwert (EU-Durchschnitt: 28 Prozent). Weitere 31 Prozent der Wege werden zu Fuß oder mit dem Fahrrad bewältigt. Nicht umsonst strebt Wien an, „Stadt der kurzen Wege“ zu sein. Schließlich sind alle Distanzen problemlos mit dem Fahrrad, zu Fuß oder dem flächendeckend ausgebauten Nahverkehrssystem zu bewältigen. Bis 2025 soll der Anteil des umweltfreundlichen Verkehrs am Gesamtverkehr weiter gesteigert werden. Ambitioniertes Ziel der Stadt: den Anteil des motorisierten Individualverkehrs durch massiven Ausbau des öffentlichen Verkehrsnetzes sowie Attraktivierung des Alternativangebots von derzeit noch 34 Prozent auf 25 Prozent zu senken.

4.6 Informationsservices erleichtern den Alltag

Zu wissen, wann tatsächlich welches Verkehrsmittel aktuell zur Verfügung steht, macht die Entscheidung für ein möglichst rasches Vorankommen in der Stadt leichter. Davon haben die einzelnen Stadtbenutzerinnen und Stadtbenutzer etwas, aber es hilft auch der Stadt insgesamt, effektive und nachhaltige Mobilität zu fördern. Mit dem „Rechnergesteuerten Betriebs-Leitsystem (RBL)“ schlagen die Wiener Linien gleich zwei Fliegen mit einer Klappe. Zum einen steigert das RBL die Effizienz des Betriebes der Wiener Linien, da Unregelmäßigkeiten rasch erkannt werden und zum anderen bietet die Fahrgastinformation an den Haltestellen und über das kostenlose mobile Service „qando“ ein verbessertes Service für die Kundinnen und Kunden. Denn zufriedene Kunden fahren lieber und öfter mit U-Bahn, Straßenbahn oder Bus. Weiters vereint das Onlineservice AnachB.at alle relevanten Informationen über Verbindungen, Fahrpläne, Staus, Verzögerungen oder ideale Fahrradrouten zu einem leistungsfähigen Informations- und Entscheidungstool.

4.7 Ausgezeichneter Klimaschutz

Begonnen hat alles 1999, als die Wiener Stadtregierung mit einem eigenen Klimaschutzprogramm (KliP) ein klares Bekenntnis zur Erreichung der Klimaschutzziele abgab. Die eigens dafür eingerichtete Koordinationsstelle zieht in der Zwischenzeit erfolgreich Bilanz: Alle angepeilten Ziele wurden vorzeitig erreicht. Mit der Umsetzung von 36 Maßnahmenpaketen aus dem KliP konnte zwischen 2000 und 2006 der CO2-Emissionsausstoß in Wien um 2,6 Mio. Tonnen reduziert werden. Durch das Nachfolgeprogramm KliP II sollen zwischen 2010 und 2020 1,4 Mio. Jahrestonnen an Treibhausgasemissionen eingespart werden.

Parallel dazu hat die Stadt sukzessive ihr öffentliches Verkehrs- und Radwegenetz ausgebaut und im städtischen Wohnbau vor allem auf energieeffizientes Bauen und Sanieren sowie alternative Energieformen gesetzt. Die Anstrengungen finden international Anerkennung: Vom Klima-Bündnis Europa erhielt Wien den „Climate-Star 2009“ für das umfassendste Klimaschutzprogramm unter 444 Gemeinden aus 11 Ländern.

4.8 Nachhaltiges Abwassermanagement und Gewässerschutz

Als eine der ersten europäischen Städte hat Wien die Bedeutung eines nachhaltigen und integrierten Abwassermanagements erkannt. Dabei geht es um den gesamten Wasserkreislauf in der Stadt: möglichst verlustfrei wird Quellwasser aus den nahe gelegenen Ausläufern der Alpen nach Wien transportiert und in der Stadt effizient verteilt. Ein ausgeklügeltes System aus Speichern und Messstellen garantiert dabei einerseits höchste Versorgungssicherheit und andererseits beste Wasserqualität.

Das Abwasser wird im Kanalsystem gesammelt und „bewirtschaftet“, also mittels modernster digitaler Kanalnetzsteuerung immer optimal verteilt. Auch Projekte zur Versickerung von Regenwasser als Entlastung der Kanäle fügen sich in dieses ökologische Gesamtkonzept.

Schließlich landen die Abwässer in der Hauptkläranlage der Stadt Wien, in der – bei trockener Witterung – etwa 600.000 m³ täglich gereinigt werden. Sie gehört damit zu den größten Umweltschutzprojekten Europas.

Internationale Beachtung fand auch die erfolgreiche Sanierung und Revitalisierung natürlicher Gewässer wie der Alten Donau oder des Wienflusses. So ist etwa aus der ehemals trüben und unansehnlichen Alten Donau wieder ein hochwertiges innerstädtisches Naherholungszentrum geworden, gekennzeichnet durch klares, sauberes Wasser.

4.9 Digitale Informationen vom Naturschutzgebiet bis zum Kanal

Wer ein Bauprojekt plant, braucht vielfältige Informationen: Wo darf was wie gebaut werden? Wie ist die Lärmsituation? Wo genau in Wien ist welche Pflanze geschützt? Wie verläuft der Kanal? Die Stadt liefert dazu relevante und vernetzte Informationen. Ein digitaler, laufend aktualisierter Stadtplan mit größtmöglicher Tiefenschärfe, das ist die Mehrzweckkarte (MZK) Wien. Sie macht die Topographie der Stadt bis in die dritte Dimension per Mausklick verfügbar – für Stadt- und Verkehrsplaner, Architekten oder Bauträger. 25 Jahre Vermessungs- und Entwicklungsarbeit stecken hinter dem Projekt.

Das „Umweltgut“ – der Umweltstadtplan auf wien.at – ist für Bewohner und Besucher der Stadt interessant: er macht Umweltschutzinformationen für alle zugänglich. Interessierte erhalten Informationen darüber, wo welche Naturelemente geschützt sind und welche Auswirkungen das etwa auf Bauvorhaben hat.

Das digitale Kanalinformationssystems von Wien Kanal dient anderen Städten als Vorbild: mit der integrierten Kanalnetzdatenbank (KANIS) steht eine aktuelle und umfassende Grundlage zur Verfügung, um Instandhaltungs-, Reinigungs- und Planungsarbeiten stets mit größter Effizienz zu erledigen. Zusätzlich helfen digitale Datenauswertungen dabei, den Kanalbetrieb laufend zu optimieren. Kundinnen und Kunden können sich alle wichtigen Informationen bequem aus dem Internet holen.

5 SCHLUSSFOLGERUNG

Es ist wichtig sich mit veränderten äußeren Rahmenbedingungen auseinanderzusetzen und entsprechende Antworten zu entwickeln und zu finden.

Die kollektive Angst ist ein allgegenwärtiges Zeitgeistphänomen. Die Finanz- und Wirtschaftskrise, die ersparte Rücklagen ebenso angreift wie die Sicherheit von Arbeitsplatz und Pension, wird von Einzelpersonen als Bedrohungsszenario wahrgenommen; die Menschen fühlen sich ausgeliefert und in der Entwicklung von Zukunftsperspektiven blockiert. Der aktive Umgang mit Veränderungen bietet hier einen Weg, aus der Blockade herauszukommen und dies muss von den Kommunalverwaltungen aktiv vorgelebt und unterstützt werden.

Mit der Erbringung der Daseinsvorsorge-Leistungen durch die öffentliche Hand bzw. ihre Unternehmen wird beste Qualität und Versorgungssicherheit für alle Menschen gesichert.

Wiener Lebens- und Umweltqualität werden weltweit gerühmt. Dahinter stehen innovative Lösungen im Infrastrukturbereich, viele davon entwickelt von Dienststellen der Stadt oder von in Wien ansässigen Unternehmen. Strategische, technische und organisatorische Modelle, die ebenso wegweisend wie praxiserprobt sind.

TINA VIENNA ist die Dienstleistungsorganisation und Drehscheibe für innovative Stadt- und Umwelttechnologien, entwickelt und umgesetzt von den Dienststellen und Unternehmen der Stadt Wien. Wir erfassen das Wiener Know-how in diesem Bereich, vermitteln dieses international und unterstützen in- und ausländische Gebietskörperschaften dabei, das Wiener Wissen im Bereich der urbanen Technologien und Strategien für Ihre Bedürfnisse zu nutzen.

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Design Considerations and Sustainable Low Cost Housing Provision for the Urban Poor in Addis Ababa, Ethiopia

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1 ABSTRACT

Design considerations remain significant in low cost housing projects in both developed and developing countries; which are currently faced by challenges of shelter provision for everyone including the urban poor; due to unprecedented increase in rates of urban migration and urbanization. Ethiopia, particularly Addis Ababa city has not been spared. The city administration launched grand low cost housing projects through the Integrated Housing Development Programme (IHDP) in 2006. This study sought to unveil the significance of design considerations in low cost housing provision thorough the IHDP and the extent to which the Addis Ababa Administration had considered this relevant. The research made use of detailed case analysis of condominium housing on 103 sites of Addis Ababa City using primary and secondary data sources such as questionnaires, interviews, the Delphi technique and document analysis. Qualitative and quantitative data were produced. This research revealed that although the city administration has made great strides in low cost housing provision, there were omissions in the implementation of housing designs considerations with regards technical issues, people's culture, the needs and interests of the urban poor. As such the research recommends that the city administration should strengthen participation of beneficiaries in projects that affect them directly; and that building codes and policies in housing be enforced and monitored for sustainable housing provisioning; and prosperity of the poor living in cities.

1.1 INTRODUCTION AND BACKGROUND TO THE STUDY

Design considerations remain significant in low cost housing projects in both developed and developing countries. Both regions are currently being faced by challenges of shelter provision for everyone including the urban poor. This situation is being execerbated by unprecedented increase in rates of urban migration and urbanization being experience the world over. Ethiopia, particularly Addis Ababa city has not been spared. Addis Ababa is a city where mixity is evidenced by modern building erected side by side delapidated slum settelments (IHDP 2008).

The Addis Ababa city administration launched grand low cost condominium housing projects through the Integrated Housing Development Programme (IHDP) in 2006 to minimize housing backlog, slums, and to provide decent shelter to middle and low income groups. The Addis Ababa city government designed condominium housing project as a response to acute housing shortage in the city due to unaffordability problems and the ever increasing gap between the demand and supply of housing in the city. Currently 33,000 condominium housing units have been constructed and transferred to beneficiaries in Addis Ababa city alone (MWUD, 2008). The condominum housing can be defined as a form of ownership arrangement for housing tenure in which several households occupy one property so that each dweller owns a housing unit; and has equity in common areas(Hecht, 1999).

1.2 AIM OF THE STUDY

The aim of this study is to unveil the significance of design considerations in low cost housing provision thorough the IHDP and the extent to which the Addis Ababa Administration had considered design consideration in low cost housing provision relevant.

1.2.1 Research objectives

- To establish the compatibility of the condominium housing project with people's social, economic and cultural needs
- To highlight the significance of design considerations in housing projects

1.2.2 Research methodology

The research made use of detailed case analysis of condominium housing on 103 sites of Addis Ababa City using primary and secondary data sources such as questionnaires, interviews, the Delphi technique and document analysis. Qualitative and quantitative data were produced.

1.2.3 Desuign considerations

Design considerations in project palnning remain a significant tool for project planners in reducing costs and increasing sustainability of the project. Housing projects design considerations increase the economic viability of the project, improve quality of life for residents and enhance the vitality of communities (Wachter; Global Report on Human Settlement 2005). Housing in this reagrd is not only the physical structure but it made up of a combination of different facilities and infrastructure that helps for physical well being of groups and individuals and extends to accessibility security and neighborhood setting in broadest sense.Asd such, for housing projects to be sustainable they need to be consistent with policy procedures, needs, preferences and demand pattern of the beneficiaries; hence it is very important to determine what project beneficiaries regard as standards housing. In most cases however it is often difficult to define what can be labeled standard because people or communities hold different perceptions and interests with regards standards. The public interest is the prism through which we should always look as we make our decisions... a standard has no fixed meaning (Schultze 2008).

1.2.4 Condominium Housing in Ethiopian Context

The idae of condominum housing is a new pheneomenon in Ethiopia. It is just as old as the IHDP. It emerged as a strategic response to rapid urban population growth, high prevalence of urban poverty, and urban unemployment in major Ethiopian cities; because only 30% of the urban house stock was regarded to be in fair conditon; and the housing shoertage is being estimated to be between 900 000 and 1 000 000 (MWUD, 2006, IHDP 2008). The condominum housing project thus aims at meeting the elements of Millenium Goal 7 on Environmenetal Sustainability, target 11 which seeks to achieve a significant “improvement in the lives of at least 100 million slum dwellers“ In Addis Abaa city more than 70% of the polation lives in slums and the houses are made predominanlty from mud and straw (IHDP 2008). Below is a table that shows the distribution of condominm houses in Addis Ababa City, Ethiopia

Sub city	Total number of site s	Housing typology					No of apartment block	No of housing units	No of common blocks
		Studio	One bed room	Two bed room	Three bed room	Commercial			
Arada	19	535	744	858	116	42	67	2253	24
Addis Katema	9	435	435	504	65	111	40	1550	18
Lideta	9	473	598	538	42	25	51	1676	18
Kirkos	14	367	590	994	183	131	61	1965	26
Yeka	12	162	500	1786	387	237	97	3050	37
Gulele	7	339	415	638	10	62	58	1464	18
Kolfe	10	1343	1353	4298	830	790	231	8619	86
Nifassil k	10	564	1372	2280	548	489	158	5286	39
Bole	9	544	690	2264	258	478	115	4234	44
Akaki	5	234	284	625	135	24	39	1302	15
Total	103	4996	6981	14485	2574	2389	917	31399	325

Fig. 2 Diustribution of condominum houses in Addis Ababa city(Seyoum, et.al 2006)

The condomium houses in Ethiopia are manily G+ 5 structures. Each block contains between 125 and 130 housing units. The house typologies range from studio, one bedroom, two bedroom and three bedroom units; which have the dimensions shown in the table below.

House typology	Area in (m^2)
Studio	$21m^2$
1-Bedroom	$30m^2$
2-Bedroom	$40m^2$
3-Bedroom	$60m^2$

Fig. 1 Size of condominum house typology (Source:- Amhara regional housing strategy (prepared by Marta Davids, 2006).

The function of housing these housing units vary from household to house depending on their social, cultural and economic values.

2 DISCUSSION OF FINDINGS

This research revealed that although the city administration has made great strides in low cost housing provision, there were omissions in the implementation of housing designs considerations with regards technical issues, people's culture, the needs and interests of the urban poor. When design considerations are observed; it leads to adequate shelter. Adequate shelter means more than just having a roof above one's head. It has varied dimensions such as having adequate space, adequate privacy, physical accessibility, adequate security, structural durability, security of tenure,basic infrastructure, accessible location with regards work and basic facilities (Global Report on Human Settlements 2005)

2.1 Site selection

According to the housing development project office of Addis Ababa Ethiopia; 173.8 hectares of land was spared and prepared for 34,280 condominium units in the city. This includes land for the erection of the condominum houses, land for common space, land for for local kitchens, land for common loundry and land for septic tanks and drainage laying space. The research esatablished that there was no critera used for site selection. Land belongs to the government, as such the governemnt provides land for condomiunm housing projects in order to cut construction costs.Building sites were randomly selected for the project on open spaces in inner city and some on the peripherals of the city. Households that benefited from cndominum houses in the inner city had an advantage of living and working in the inner city without tranport costs; and access services services. Those households who benefited from condomium projects outside the city centre are now incuring costs of transport to acquire services to and from the city centre.

2.2 Social networks

Ethiopia is a traditional society where social networks play a very significant role in the people's day to day lives and activities. The condomium housing project has ushered new ways of living and new networks for many of the benficiaries. The relalltionships of households in the condominumm houses is fragmented compasred to open neighbourhoods. Beneficiaries often need to make new friends with their new neighbours and they often miss social ties created earlier when they were still living in their old locations.

2.3 Communal kitchens

The condominum housing project has provided house design through use of professionalsuch as planners, engineers, achitechts(Woundimagegnehu 2009). The house designs were meant to benefit the low income earners of the Ethiopian society. However it has to be taken into considraetion that affordable designs need not only consider to the cost of construction; but also cultural activities of the households. Many low in come households who benefited from the condominium housing units previously owned a local kitchen; but the designed condominum houses can only offer a common local kitchen for use by several households and the design of these kitchens is narrow and lack a chimney. Siooem condominum site did not have these communal kitchens at all and yet a kitchen is one of basic housing facilities that is reagrded as very viatl as the living room. In most cases the beneficiaries of the condomium house are tyhe urban poor who often lack

finamces to buy eletronic utilites such as cookers. Observations revealed that condominium sites in Gerji-2, Adewa Park, and Bole Ring road have no common kitchen facilities. Poor households are forced to use charcoal and kerosene bringing additional items on their tight budgets.

2.4 Mainatance and finishing

According to the Addis Ababa Housing Development Project Office, mainatanance and inside finishing of the houses should be done by the beneficiaries. Most beneficiaries had been experienceing malfunctioning of of water pipes, electric cables sewage line, dsoor and windows on various sites. Reserach shows that on average households need to invest at least 5865 Birr for mainatnance and finishing purposes. This is a lot of money for the urban poor who often earn at least 100bir per month.

2.5 Water and sanitation

The model of the condominum house project provides all site with darinage and sewr pipes. Howver due to the ever increasuing population in Addis Ababa in serach of better opportunites and services the the drainage and sewer pipes are frequently busting and blocked because they are failing to cope with incraesing presure. Designers did not consider the size of the pipes in anticipation of the proportion of the number of condomium housing units built with an average of.5-8 persons per household (Wubshet 2008).

2.6 Spaces and culture

The condomium housing project design needed to consider provision of different service facilities within the various neighbourhoods, such as, animal slaughtering room, coffee grinding room, spice drying areas, coffee ceremony spaces, children's play ground, green field, car park. Beneficiaries of the studio and one bedroom houses lack enough space for comfortable living given the fact that on average each household is made up of 5-8 persons. The person-per-room density is rather too big acoording to international standards which stipulate that one person must have at least 7m2. This implies overcrowding in the condominim houses. If more than two people share the some room, the room is over crowded, and not comfortable to live (United Nation Human Settlements). The design considerations for condominium housing project are failing the urban poor who have large families.

3 CONCLUSION AND RECOMENDATIONS

From the findings, the condominium housing project of Addis Ababa has been an advantage to many local poor households. However the project has displayed problems with regards design consideration after beneficiaries occupy the new houses in terms of weak social interactions, housing conditions and insufficient traditional utilities such as kitchens. loss of As such the research recommends that the city administration should strengthen participation of beneficiaries in projects that affect them directly; and that building codes and policies in housing be enforced and monitored for sustainable housing provisioning; and prosperity of the poor living in cities. How the Condominium is not effective in constructing quality and comfortable houses to beneficiaries and other is the better economic status of the beneficiaries who have capacity to invest huge amount of money benefits more from the program.

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Die Nutzung der Wiener Lebensqualitätsforschung als Instrument einer an den Bedürfnissen der Bevölkerung orientierten Stadtentwicklung

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1 ABSTRACT

Lebensqualitätsforschung kann im Sinn einer evidenzbasierten Politikgestaltung als Instrument zur Identifikation von Bedürfnissen der Bevölkerung und zur Evaluierung der Effektivität von Maßnahmen der Stadt¬entwicklung genutzt werden. Im Zuge der „Sozialwissenschaftlichen Grundlagen¬for¬schung für Wien“ (2008) wurden 8.700 Wienerinnen und Wiener zu den verschiedensten Dimensionen ihrer Lebens¬qualität befragt. Die Ergebnisse der Studie bestätigen die steigende Lebens¬zufriedenheit in Wien, zeigen die Effekte von gesetzten Maßnahmen und ermöglichen die Identifikation zukünftiger Heraus¬forderungen an die Stadtentwicklung.

2 SOZIALWISSENSCHAFTLICHE GRUNDLAGENFORSCHUNG FÜR WIEN

2.1 Lebensqualitätsforschung als Instrument mit Steuerungsrelevanz

Die Stadt Wien hat die Förderung bzw. die Verbesserung der Lebensqualität der Wienerinnen und Wiener als eines der wichtigsten Ziele in ihr politisches Handeln integriert. Um die Lebensqualität zu sichern oder aus¬zubauen, ist eine genaue Analyse der Effektivität sowohl von bislang gesetzten als auch von geplanten Maß¬nahmen notwendig. Die Wiener Lebensqualitätsforschung kann als Instrument einer evidenzbasierten Politik¬gestaltung auf¬gefasst werden, da sie eine grundlegende Datenbasis für die Entwicklung handlungs¬orientierter Empfehlungen bereit¬stellt, die Wirkungen bestehender kommunalpolitischer Maßnahmen auf eine Reihe von Lebensbereichen abschätzbar macht und deren Interdependenzen erkennen lässt. Die „Sozial¬wissen¬schaftliche Grundlagen¬forschung für Wien“ (SOWI) reiht sich in die mittlerweile langjährige Tradition der Wiener Lebensqualitäts¬forschung ein, kann sie doch als Nachfolgestudie der Großerhebungen „Leben in Wien“ (1995) und „Leben- und Lebensqualität in Wien“ (2003) betrachtet werden. Es ist daher mittlerweile möglich, für eine Vielzahl von Indikatoren Zeitreihen zu bilden und Zufriedenheitswerte (z.B. mit der Ver¬kehrsanbindung des Wohn¬gebiets) oder Handlungsmuster (z.B. Verkehrsmittelwahl) mit den gesetzten ver-kehrsplanerischen Maß¬nahmen in Verbindung zu bringen.

Der Vorteil einer solchen Großbefragung liegt – neben der großen Fallzahl, die auch kleinräumige Analysen gestattet – in der thematischen Breite des Fragen¬katalogs. Dieser beinhaltet sowohl Fragen zur Bindung an die Stadt und zur Zufriedenheit mit den unter¬schiedlichsten Lebensbereichen sowie städtischen Angeboten (z.B. Wohn- und Wohnumfeldsituation, Verkehrs- bzw. Mobilitätsangebote, Freizeitangebote, Gesundheits¬zustand, soziale und familiäre Ein¬bettung, Umweltqualitäten, berufliche und finanziellen Situation, Weiter¬bildungs¬aktivitäten, Kultur- und Sport¬aktivitäten, soziale Infrastrukturen, etc.) als auch Fragen zur Identifikation von Ver¬besserungs¬wünschen im Wohnumfeld und zu individuellen Verhaltensweisen (z.B. Verkehrs¬mittelwahl bei ver¬schiedenen Arten von Wegen). Ein wesentlicher innovativer Aspekt der SOWI war die Er¬weiterung des Fragenkatalogs um das Thema der politischen Partizipation, im Zuge dessen sowohl die Zu¬frieden¬heit mit dem Funktionieren der Demokratie und den politischen Parteien als auch das Niveau der politischen Beteiligung und das Interesse an diversen Beteiligungs¬möglich¬keiten abgefragt wurde. Durch die hohe Fallzahl und die inhaltliche Breite lassen sich nicht nur einzelne thematische Felder in einem hohen Detail¬grad analysieren, sondern auch Zusammenhänge zwischen den ver¬schiedenen kommunalpolitischen Handlungs- bzw. Politikfeldern aufzeigen.

2.2 Lebensqualitätsforschung als mehrdimensionales Indikatorenbündel

Da sich Lebensqualität nicht einfach und direkt messen lässt, muss man den sehr allgemeinen Oberbegriff in eine Reihe von klar definierten Teildimensionen zerlegen und in weiterer Folge adäquate und messbare Größen d.h. Indikatoren suchen. Diese Einzelindikatoren können nach erfolgter Messung für Aussagen über Teil¬bereiche der Lebensqualität (z.B. Zufriedenheit mit dem Erwerbsleben) verwendet werden. Als

‚composite indicator' eingesetzt, zielt das Gesamtkonstrukt der Lebensqualität darauf ab, neben dem Ist-Zu¬stand auch die Veränderungen der Lebensqualität zu dokumentieren. In diesem integrativen Ansatz von Lebens¬qualität werden sowohl subjektive als auch objektive Dimensionen berücksichtigt. Lebensqualität wird man erst dann als gut bezeichnen, wenn nicht nur die objektiven Bedingungen angemessen sind, sondern wenn diese von den Betroffenen auch entsprechend wahrgenommen werden. Umgekehrt sind in ge¬wissem Sinne schlechte objektive Lebensbedigungen nicht notwendigerweise negativ einzuschätzen, wenn die Referenzperson sie nicht als problematisch wahrnimmt oder andere Aspekte als wichtiger einstuft. Die Konzeption von Lebensqualität als ‚composite indicator' berücksichtigt daher sowohl die Wechsel¬beziehungen zwischen den verschiedenen gesellschaftlichen Teilsystemen (z.B. Recht, Bildung, Arbeit,...) als auch die individuellen Lebenslagen. Lebensqualitätsforschung, welche die Lebensqualität im eben explizierten Sinne als ein soziales Konstrukt versteht, benötigt ein Indikatorenset, das Aufschluss über objektive und subjektive Aspekte der Lebens¬situation einzelner Bevölkerungsgruppen (Outputindikatoren) gibt, die kommunalpolitischen Instrumente und Maßnahmen (Inputindikatoren) erfasst, sowie ökonomische, soziale und kulturelle Rahmen¬bedingungen (Kontextindikatoren) berücksichtigt.

3 METHODISCHE VORGEHENSWEISE

Das Projekt der Sozialwissenschaftlichen Grundlagenforschung wurde im Zuge einer For¬schungs-kooperation zwischen der Stadt Wien und der Universität Wien mit Unterstützung eines projekt-begleitenden Beirates umgesetzt. Die empirische Erhebung erfolgte im Zeitraum zwischen Mai bis Dezember 2008 in Form von telefonischen CATI-Inter¬views. Im Rahmen der Basiserhebung umfasste die Stichprobe 8.400 Wienerinnen und Wiener ab 15 Jahren. Weitere 300 aus der Türkei und aus den Ländern des ehemaligen Jugoslawien zugewanderte Wienerinnen und Wiener wurden in Form von Face-to-Face Interviews von zweisprachigen Interviewern in ihrer jeweiligen Mutter¬sprache befragt. Das Frageprogramm enthielt inkl. Statistik rund 130 Fragestellungen. Die durchschnittliche Befragungszeit belief sich auf rund 40 bis 45 Minuten. Angesichts des großen Umfangs des Fragebogens wurde ein Teil der Fragen gesplittet, d.h. bei jeweils der Hälfte der Gesamtstichprobe erhoben. Um auch aussagekräftige Daten für die kleineren Wiener Wohnbezirke zu erhalten, erfolgte das Sampling nach Bezirken disproportional. Diese Disproportionalität wurde im Zuge der Auswertung wieder aufgehoben. Die Stich¬probe wurde personenbezogen gewichtet, wobei der Wohnbezirk, das Alter, das Geschlecht und das Bildungs¬niveau als Gewichtungskriterien heranzogen wurde. Aufgrund der hohen Fallzahl von 8.700 Inter¬views erlaubt der Datensatz sowohl repräsentative Aussagen hinsichtlich der unterschiedlichsten sozioökonomischen Hintergrundvariablen der Befragten (z.B. Geschlecht, Alter, Bildung, Stellung im Beruf, Migrationshintergrund,...) als auch kleinräumige Auswertung auf Ebene der Wiener Gemeindebezirke oder der im Zuge des Projekts neu definierten Gebietstypologie.

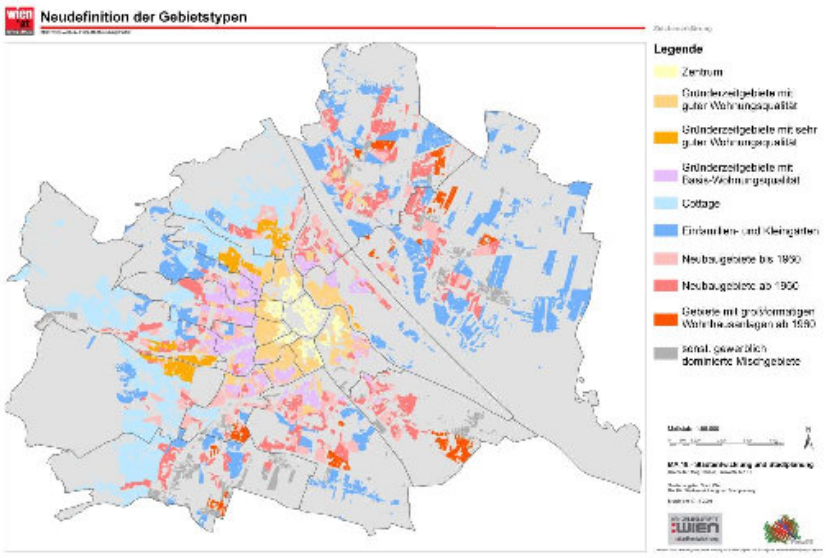

Abb. 1: Gebietstypengliederung für räumliche Auswertungen

Eine „Übersetzung“ der Ergebnisse der SOWI für die Bedürfnisse der Stadt¬ent¬wicklung erfordert, dass die Zu¬friedenheits¬werte und Wünsche der Wiener Be¬völkerung vor dem Hinter¬grund der tat¬sächlichen städte¬baulichen Situation in der un¬mittelbaren Wohn¬um¬gebung analysiert werden. Eine Fokussierung auf die in sich oft städtebaulich und sozio-strukturell heterogenen Wiener Bezirke greift dies¬bezüglich zu kurz. Um die Verbindung von Befragungs¬daten zur Wohnum¬feld¬situation her¬stellen zu können, wurde das schon bei den vorangehenden Lebensqualitätsstudien verwendete Konzept der "Gebietstypen" weiter entwickelt. Bei der Neudefinition der Definition der Gebietstypen wurden als Gliederungs¬merkmale allein bauliche Dimensionen (überwiegendes Baualter, Ausstattung der Wohnungen, Wohnungs¬größe, bauliche Dichte, Anteil der Wohnungen in Gebäuden mit ein oder zwei Wohnungen am gesamten Wohnungsbestand) an¬gewandt. Die Abgrenzung der Gebiets¬typen erfolgte auf Basis der rund 1.400 Wiener Zählgebiete. Aus den durch¬geführten Clusteranalysen ergab sich die Anzahl an sinn¬voll abgrenzbaren Gebietstypen: vier Gebietstypen im Gründerzeitgebiet, drei Typen von Neubau¬gebieten, zwei Typen mit hohem Anteil an Grünflächen und ein Gebietstyp mit betrieblichen Misch¬nutzungen.

4 AUSGEWÄHLTE ERGEBNISSE DER STUDIE

4.1 Hohe Bindung an die Stadt durch hohe Lebenszufriedenheit

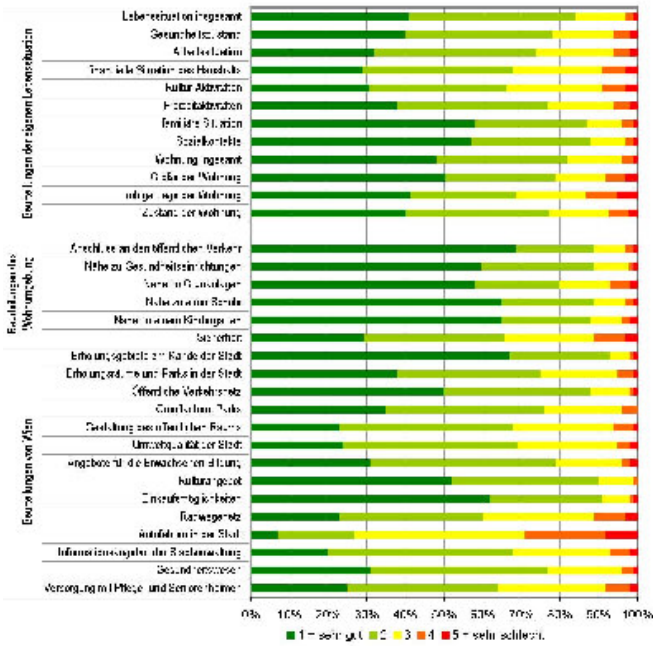

Abb. 2: Ausgewählte Zufriedenheitswerte

Von den 8.700 Befragten waren 38% gebürtige Wienerinnen oder Wiener, wobei rund 70% der nicht in Wien geborenen Befragten aus den Bundesländern nach Wien zugezogen sind. Trotz des hohen Anteils an nicht in Wien ge¬borenen Personen besteht eine starke Bindung an die Stadt. 68% der Be-fragten leben „sehr gerne“ in Wien, weitere 28% bekundeten, „gerne“ in Wien zu leben, und nur 4% der Befragten leben „nicht so gerne“ in Wien. Im Vergleich zu den Vor¬gängerstudien zeigt sich eine steigende Zu¬frieden¬heit mit dem Wohngebiet und mit Wien im all¬gemeinen. Von den rund 30% der Haus¬halte, in denen zu¬mindest ein Haushaltsmitglied in den nächsten 5 Jahren einen Wohnungswechsel plant, wollen nur 8% in eine Wiener Umlandgemeinde und 10% weiter weg ziehen.

Abb. 2 stellt eine Reihe von Zufrieden¬heits¬werten dar, die verschiedenste Aspekte der in¬dividuellen Lebens¬situation, der Bewertung des Wohn¬gebiets und der Beurteilung von Wien be¬treffen. Auf Basis einer fünfstufigen Skala (analog dem Schul¬noten¬system) zeigten sich 84% der Befragten mit ihrer Lebens¬situation „sehr zufrieden“ oder „zufrieden“ und nur 3% der Befragten un¬zufrieden. Höhere Zu-frieden¬heits¬werte ergaben sich in den Dimensionen „familiäre Situation“ und „soziale Kontakte“. Über 80% der Befragten sind mit ihrer Wohnung „sehr zufrieden“ oder „zu¬frieden“. Bei einem Großteil der angeführten Frage¬stellungen bewegt sich der Anteil der Unzu¬friedenen unter 10%. Zumeist bekunden

auch mehr Befragte, dass sich die Situation in den letzten Jahren verbessert hat als dass sie sich verschlechtert hat.

Eine Analyse der Daten hinsichtlich der verschiedensten Hintergrunddimensionen der Befragten (Alter, Ge¬schlecht, Bildungsniveau, Migrationshintergrund) ergibt allerdings beträchtliche Unterschiede in den Zu¬friedenheitsniveaus, die hier nur angedeutet werden können. Beispielsweise zeigen die Daten, dass sich die Zufriedenheitsniveaus nahezu aller thematischer Bereiche im Vergleich zwischen der ersten Generation von Migranten/-innen (Geburtsort im Ausland) und der zweiten Generation (in Österreich geboren und zumindest ein Eltern¬teil im Ausland geboren) stark erhöhen. Die im Vergleich höhere Lebens¬zufriedenheit der 2. Generation gibt daher einen starken empirischen Hinweis auf die Integrationserfolge der Wiener/-innen mit Migrationshintergrund im Generationenvergleich.

4.2 Kleinräumige Analyse der Wohnsituation und der Wohnumfeldbedingungen

Ein wichtiger Bestandteil der alltäglichen Lebenssituation ist die eigene Wohnung und das unmittelbare Wohn¬umfeld. Die Qualität seiner Gestaltung, die Lage im Stadtgebiet, die Art der Bebauung und der Wohn¬ungs¬struktur der näheren Wohnumgebung sowie die Versorgungsstandards hinsichtlich verschiedenster für den laufenden Lebens¬vollzug wichtiger Einrichtungen bilden ein Gesamtmilieu, das er¬heblichen Einfluss auf die Bewältigung der verschiedensten alltäglichen Lebensvollzüge und auf die Heraus¬bildung bestimmter Lebens¬gewohnheiten und Verhaltensweisen hat. Das Wohnumfeld ist somit auch bestimmend für die Zu¬friedenheit der Bewohner¬innen und Bewohner mit den verschiedenen Lebens¬bereichen. Die Aus¬wertungen der Fragen, welche Maßnahmen für die Verbesserung der Lebens¬qualität oder welche Frei¬zeit¬einrichtungen im Wohngebiet notwendig wären, bieten empirisch gesicherte Ansatz¬punkte für die Initiierung von Aktivitäten im Wohngebiet und das Erkennen von Entwicklungs¬potentialen.

Die Bewohner der gründerzeitlich geprägten Gebietstypen sehen vor allem in der Ver¬kehrsberuhigung (Ausbau des Radverkehrs, Errichtung von Wohnstraßen, Tempo 30 Zonen, Wohn-Sammel¬garagen), in der Grünraumversorgung (z.B. Innenhofbegrünung) sowie in den wohn¬umgebungsbezogenen Infrastrukturen (Freitzeiteinrichtungen, Freiflächen für Jugendliche, Kinder¬spielplätze) Potentiale zur Verbesserung ihrer Lebensqualität. Bewohner von großformatigen Wohn¬haus¬anlagen und von durch eine lockerere Bebauungsstruktur geprägten Gebieten (Einfamilienhäuser und Klein¬gärten bzw., Cottage) sehen in über¬durchschnittlichem Maß in der Verbesserung des ÖV-Anschlusses eine Möglichkeit zur Verbesserung der Lebensqualität. Unterdurchschnittliche Zufriedenheiten mit sozialen Infra¬strukturen in der Wohn¬umgebung ergeben sich nur in den Gebietstypen Einfamilienhäuser und Kleingärten bzw. Cottage.

Die Abbildungen 3 und 4 veranschaulichen die Möglichkeit zur kleinräumigen Analyse von wohn¬umgebungs¬bezogenen Daten der SOWI anhand der Frage, ob die Errichtung von Grünflächen in der Wohn¬um¬gebung zu einer Verbesserung der Lebensqualität beitragen würde. Neben dem Durchschnitt für Wien werden in den beiden Abbildungen die Vertrauensbereiche (95% Konfidenzintervalle) für die Ergebnisse auf Ebene der Bezirke und der Gebietstypen dargestellt. Ein überdurchschnittlicher Bedarf an zusätzlicher Grün¬raum¬ver¬sorgung kann, wie skizziert, in den Innenbezirken, in den Bezirken entlang des Westgürtels, bzw. im Gebietstyp Zentrum sowie in den gründerzeitlichen Gebieten mit Basis-Wohnungsqualität und guter Wohn¬ungs¬qualität festgestellt werden.

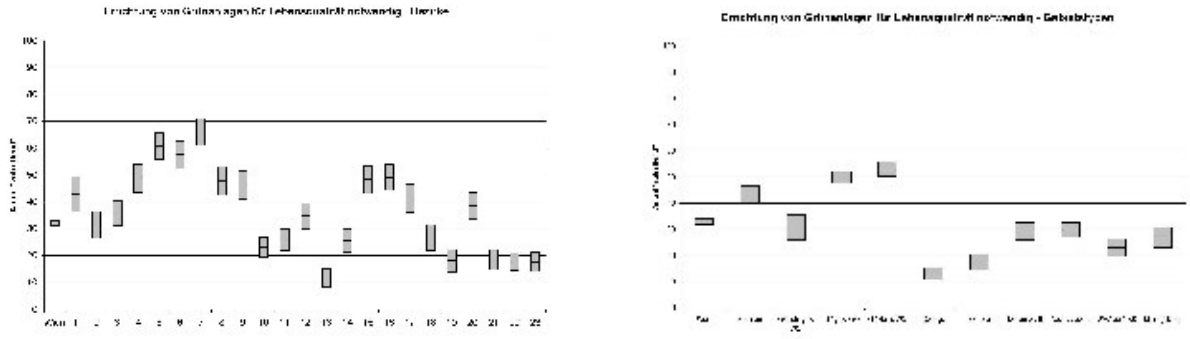

Abb. 3 und 4: Errichtung von Grünanlagen für Steigerung der Lebensqualität notwendig – nach Bezirken und Gebietstypen

4.3 Auswirkungen vergangener Maßnahmen

Das Datenmaterial der SOWI und deren Vorgängererhebungen erlaubt die Identifikation von Auswirkungen von gesetzten Maßnahmen der Stadt Wien auf Verhaltensweisen und Zu-friedenheitswerte der Wiener und innen. Be¬sonders anschauliche Ergebnisse zeigen sich vor allem im Bereich Mobilität und in den kleinräumigen Analysen der Verkehrsmittelwahl nach Wegezwecken und der Zu¬friedenheit mit dem Angebot an öffentlichen Verkehrsmitteln. Die Verlängerungen der U3 im Jahr 1998 in den 11. Bezirk und im Jahr 2000 in den 16. Bezirk führten beispielsweise dazu, dass bei den in den genannten Bezirken wohnenden bzw. in Arbeit oder Ausbildung stehenden Personen zwischen 1995 und 2003 die Anzahl der mit dem Pkw zurück¬gelegten Arbeits- und Aus¬bildungswege sinkt, während sie beim Durchschnitt der Wiener Bevölkerung im gleichen Zeitraum noch ansteigt. Die im Jahr 2006 fertig gestellte Verlängerung der U1 im 22. Bezirk hatte zur Folge, dass bei den im genannten Bezirken wohnenden bzw. in Arbeit oder Ausbildung stehenden Per¬sonen zwischen 2003 und 2008 die Anzahl der mit dem Pkw zurückgelegten Arbeits- und Ausbildungs¬wege etwas stärker sinkt als beim Durchschnitt der Bevölkerung Wiens. Analoges gilt für die Verlängerung der U6 in den 21. Bezirk im Jahr 1996. In diesem Fall tritt der entsprechende Effekt mit einer zeitlichen Ver¬zögerung erst zwischen 2003 und 2008 ein. Weiters lassen sich positive Zusammenhänge zwischen der räumlichen Ausdehnung der Park¬raumbewirtschaftung in Wien und der Entwicklung der Zufriedenheit mit der Park¬platz¬situation in der Wohn¬umgebung aufzeigen.

5 PARTIZIPATION AN DER STADTENTWICKLUNG

Das Antwortverhalten zum Thema politische Partizipation bestätigt die Erfolge der partizipativen Stadtentwicklung und weist auf beträchtliche Aktivierungspotentiale in der Wiener Bevölkerung sowie auf eine beachtliche Stärke der Zivil¬¬gesellschaft hin. Rund 44% der Befragten sind der Meinung, dass durch Bürgerbeteiligung und Partizipation im Rahmen der Stadtentwicklung „eine echte Gelegenheit zur Mitentscheidung“ gegeben ist. 8% der Wienerinnen haben nach eigenen Angaben schon einmal von einem Angebot der Stadt Wien zur Beteiligung Gebrauch gemacht, 11% haben sich bereits in einer Bürgerinitiative engagieren und 30% der Be¬völkerung haben schon einmal in einem gemeinnützigen Verein bzw. einer NGO mitgewirkt. Die Potentiale der Bewohnerbeteiligung liegen allerdings noch um ein vielfaches höher als die bisherigen Be¬teiligungen: 35% der Wiener/-innen können sich vorstellen, bei einem Angebot der Stadt Wien zu Partizipation teilzunehmen, knapp die Hälfte an einer Bürgerinitiative.

6 WEITERFÜHRENDE ANALYSEMÖGLICHKEITEN

Im Sinne der oben skizzierten Ansätze zur Messung der Lebensqualität als ‚composite indicator’ wurden im Zuge der Datenanalyse auch multivariate Methoden (z.B. Clusteranalysen, Faktorenanalysen) angewendet, um einerseits der Mehrdimensionalität der Lebensqualität gerecht zu werden und andererseits durch dimensions¬reduzierende Verfahren die Zusammenhänge zwischen den verschiedenen Aspekten der Lebens¬qualität identifizieren zu können. Beispielsweise zeigte die Bildung eines auf Basis von 26 items berechneten „Lebens¬qualitätsindex“, dass vor allem die Existenz von beruflichem und familärem Stress einen hohen Ein¬fluss auf die Lebensqualität hat. Im Zuge von weiterführenden Sonderauswertungen werden die Erhebungs¬daten auch mit baulichen Daten (z.B. Standorte von Kinderbetreuungseinrichtungen) in Bezug gesetzt, um die Relevanz der räumlichen Nähe bzw. der fußläufigen Erreichbarkeit für das Niveau der Zu¬frieden¬heit mit dem jeweiligen Betreuungs¬typ messbar zu machen.

7 ZUSAMMENFASSUNG

Wien nimmt in Bezug auf die hohe Lebensqualität europaweit eine Sonderstellung ein. Dies kommt nicht nur in den jährlich durchgeführten internationalen Rankings zum Ausdruck, sondern spiegelt sich auch in der Meinung der Wiener Bevölkerung wider. Die Sozialwissenschaftliche Grundlagenforschung für Wien (2008) bestätigt die hohe und weiterhin steigende Lebensqualität in der Stadt Wien und erlaubt Aussagen über das Zufriedenheitsniveau der Bevölkerung sowohl hinsichtlich der sozioökomischen Situation als auch der Wohn¬gebiete der Befragten. Vor dem Hintergrund der zunehmenden Diversität europäischer Stadt¬gesellschaften schafft eine umfassende Lebensqualitätsforschung die notwendige Datenbasis für eine evidenz¬basierte Stadtplanung mit dem Ziel, die Lebensqualität der Bewohner/-innen zu fördern und die Stadt weiter¬hin lebenswert zu gestalten. Mit ihrer Hilfe können sowohl bereits gesetzte Stadtent¬wicklungs¬maß¬nahmen hinsichtlich ihrer Effektivität beurteilt als auch die Bedürfnisse der

Bewohner identiziert werden, um die Entwicklung neuer Interventionen auf eine breite empirische Basis zu stellen.

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Die Regionalen in Nordrhein-Westfalen: Impulse für den Strukturwandel. Beispielhafte Erneuerungsstrategie der Regionale 2010 im Rheinland

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1 THEMA

Die REGIONALEN sind eine Besonderheit, die es in dieser Form nur in Nordrhein-Westfalen gibt. Formal und Amtsdeutsch ist die REGIONALE ein Angebot des Landes Nordrhein-Westfalen an Teilräume des Landes, sich für einen Zeitraum zwischen 5 und 7 Jahren auf eine, im weitesten Sinne, strukturpolitisch ausgerichtete Projektstrategie zu verständigen und diese, kommunale Grenzen überwindend, gemeinsam umzusetzen. Damit sind die REGIONALEN eine spezifische Form regionaler Strukturpolitik des Landes. Die Wesensmerkmale der REGIONALEN, eine kooperative, projektorientierte Regionalentwicklung, die Profilierung regionaler Besonderheiten und die Umsetzung und Präsentation beispielhafter Lösungen für den städtebaulichen, räumlichen und wirtschaftlichen Strukturwandel.

In der Tradition knüpfen die Regionalen eng an die Prinzipien der Internationalen Bauausstellung (IBA) Emscher Park an. Seit 1997 haben die Regionen des Landes die Möglichkeit, sich auf der Basis eines gemeinsam erarbeiteten Rahmenkonzeptes für die Durchführung einer REGIONALE zu bewerben. Die Landesregierung hat die Handlungsfelder der REGIONALE bewusst breit angelegt: Städtebau – Landschaft – Wirtschaft – Kultur – Bildung und Wissen.

Die Regionen sollen selbst entscheiden, welche Schwerpunkte sie setzen. Gegenstand der REGIONALE ist die gemeinschaftliche Vorbereitung, Realisierung und Präsentation von Projekten, Ereignissen und Initiativen, die in der Region in einem konzeptionellen Zusammenhang entwickelt werden, um das regionale Profil zu schärfen. Enthält eine Region den Zuschlag, so werden die vorgeschlagenen Maßnahmen aus den bestehenden Förderprogrammen des Landes prioritär gefördert.

Im Endjahr der REGIONALE werden alle umgesetzten Projekte der Öffentlichkeit präsentiert. Während in der ersten Generation der REGIONALE, 2000 in Ostwestfalen, 2002 im Raum Düsseldorf (EUROGA) und 2004 „Links und rechts der Ems“ die Entwicklung von Kulturlandschaften, nicht zuletzt unter touristischen Gesichtspunkten stand, lässt sich bei der zweiten Generation REGIONALEN, 2006 im Bergischen Städtedreieck, 2008 im trinationalen Raum Aachen und 2010 im Großraum Köln-Bonn eine Akzentverschiebung zu breiter angelegten REGIONALEN Entwicklungsstrategien erkennen. Insbesondere die rheinische REGIONALE 2010 ist im Hinblick auf ihre Wirkung (Planungskultur, regionale Identität und Strukturwirksamkeit) hervorzuheben. Sie liefert damit wichtige Anstöße für die REGIONALEN der Zukunft: 2013 in Südwestfalen und 2016 im westlichen Münsterland.

2 FAZIT

- Allein schon die Bewerbung zur Ausrichtung einer REGIONALE schärft den Blick für regionale Belange. Der Wettstreit der Regionen untereinander hat bereits in der Bewerbungsphase regionale Prozesse beflügelt. Denn die Regionen wurden durch das Instrument REGIONALE ermuntert, sich über die Schlüssigkeit der regionalen Abgrenzung, über die Stärken und Schwächen der Region, über profilierte, maßgeschneiderte Entwicklungsprogramme, über Leitthemen und ausstrahlungsfähige Projekte, über die Prozessgestaltung sowie über die Organisation und auch die Finanzierung intensiv auseinanderzusetzen und zu verständigen.
- Die bereits vorhandenen Schätze und Besonderheiten in den jeweiligen Regionen wurden durch die REGIONALE in ein anderes Licht und damit auch neu im Bewusstsein der Bevölkerung gerückt. Allein die Vielzahl baukulturell herausragender Schloss- und Burganlagen, das reichhaltige gartenkulturelle Erbe in Ostwestfalen, im Rheinland wie im Münsterland und die vielen besonderen, bislang verborgenen Orte wie Steinbrüche und Abbaugebiete haben eine Renaissance und Neuinterpretation erfahren.
- Mit der REGIONALE 2010 wurde erstmals die Bildungslandschaft und wissenschaftliche Leistungsfähigkeit in der Region ins Blickfeld gerückt.

- Im Präsentationsjahr haben die ausgestellten Projekte und die durchgeführten Ereignisse und Veranstaltungen die Menschen aus der Region und darüber hinaus angezogen.
- Die nachhaltigste Verbesserung durch die REGIONALEN liegt vermutlich in der Stärkung der Kooperationsstrukturen in den jeweiligen Regionen. Die intensive gemeinsame Arbeit, das Ringen um ein gemeinsames Profil und kollektiv getragene Qualitätsansprüche haben nicht nur im Druck des Erfolges die Akteure in der Region zusammengeschweißt. Insbesondere wurde das Wissen über die kommunalen Nachbarn, deren Stärken und Schwächen und deren Belange und Interessen deutlich gesteigert und damit auch ein interkommunales Verständnis für Entwicklungsziele gestärkt. Denn selbstverständlich gibt es auch in den Regionen, die die REGIONALEN geschlossen haben, interkommunale Abstimmungen, die vorher gar nicht oder nur formalisiert möglich waren. Mit keiner anderen regionalen Strukturförderung wurde die Kooperation zwischen den Gemeinden in der Region so beflügelt wie mit dem Instrument der REGIONALEN.

Das Festhalten an Prinzipien, die sich als Garanten für das Einlösen von Qualitätsansprüchen erweisen, hat sich in allen REGIONALEN bewährt. Dazu gehören vor allem das Wettbewerbsprinzip, die zeitliche Befristung und die Pflicht zur Präsentation.

Qualität entsteht nur in Ausnahmefällen von allein. In der Regel ist sie Ergebnis eines intensiven Diskurses, des Wettstreits von Ideen. Die Möglichkeit, aus Alternativen die beste auswählen zu können, charakterisiert das Wettbewerbsprinzip. Auch die Präsentationspflicht erweist sich als gutes Vehikel, Qualitäten und Innovationen zu fördern. Jede Region will sich von ihrer „besten Seite“ zeigen. Und die zeitliche Befristung fördert die für Innovationsprozesse so wichtige Außeralltäglichkeit.

Auch wenn das Zusammenspiel mit den etablierten Behörden nicht immer konfliktfrei verläuft, hat sich die Einrichtung einer zentralen Steuerungseinheit für die REGIONALEN bewährt: Sie erleichtern den Ausbruch aus der Verwaltungsroutine und erlauben die Konzentration auf die Projektarbeit.

Die bisherigen REGIONALEN bestätigen die Hoffnung, dass innovative Stadt- und Regionalentwicklung auch in Zeiten knapper Kassen möglich ist. Gerade dann ist die REGIONALE die richtige Strategie: Sie erfordert mehr Kooperation, mehr Gemeinsamkeit und die Verständigung auf wirklich bedeutsame und außergewöhnliche Projekte zur Profilierung der Region. Jedes Projekt muss sich in seiner Wirksamkeit (Nachhaltigkeit und Qualität, Authentizität und Unverwechselbarkeit) gegenüber der Region erklären können.

Die REGIONALEN sind eine Chance für alle.

Für die privaten und öffentlichen Akteure in den Regionen, also für Bürger, Unternehmen, Politik und Verwaltung, aber auch für die Ministerien in der Landesregierung. Sie können lernen, ressortübergreifend gemeinsam und gezielt zu handeln.

Natürlich ist die Reichweite auch der ambitioniertesten REGIONALE begrenzt, doch sie kann ein wichtiger Hoffnungsträger und Impulsgeber für die Wandlungsprozesse und die kluge Modernisierung einer Region sein.

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„Einfach-Mehrfach“, ein partizipativ angelegtes Erfolgsmodell der Stadt Wien

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1 „EINFACH – MEHRFACH“, EIN STRATEGISCHE PROJEKT DER STADT WIEN

Wien ist eine urbane Stadt. Auch in den Neubaugebieten am Stadtrand können Bewegungs- und Freiräume für spezifische Nutzer/-innengruppen rar sein. Das spüren vor allem Kinder und Jugendliche.

Wienerwald, Lobau, Prater und Donauinsel haben als Erholungsräume große Bedeutung, sind aber für viele Stadtbewohner-/innen zu weit entfernt von Wohn- und Arbeitsstandorten, um in tägliche Wege und Freizeitprogramme einplanbar zu sein. Die traditionelle Grün- und Freiraumplanung muss mit knappen Mitteln auskommen und hat lange Vorlaufzeiten bei der Umsetzung. Der Vereinssport erreicht auch nur Teile der Bewegungsbegeisterten. Neue Trends und Moden im Freizeitbereich schaffen unerwartete Nachfragen, die die knappe Raumsituation bei konkurrierenden Ansprüchen zusätzlich belasten.

1998 wurde das strategische Projekt „einfach-mehrfach“ nicht als Ersatz oder Konkurrenz, sondern als Ergänzung zur großen Linie der Freiraumpolitik installiert und arbeitet seither mit 2 Hauptschwerpunkten: Mehrfachnutzung und Zwischennutzung. Dabei berät und unterstützt die Projektkoordination für Mehrfachnutzung konkrete Initiativen in ganz Wien.

Der Wiener Weg: „neue Angebote zu setzen“ als Strategie, anstatt vor allem Ver- und Gebote zu erlassen, hat schon gute Erfolge gezeigt und ist Teil der auch international sehr positiv gesehenen Lebensqualität dieser Stadt. Auch in Zeiten knapper Ressourcen auf Prävention zu bauen ist Investition in die Zukunft und lohnt sich.

2 MEHRFACH- UND ZWISCHENNUTZUNGEN ALS PRINZIP UND ALS LOKALE KONFLIKTLÖSUNGSSTRATEGIE

Anlass für das Aktivwerden der Projektkoordination für Mehrfachnutzung sind oft Konflikte in oder um Wohnhausanlagen, aber auch im öffentlichen Raum. Manchmal erscheint das „Ausweichen“ als konfliktmindernde Strategie durchaus sinnvoll, da sie einen Teil des Stresses nimmt und neue Rahmenbedingungen schafft. Jugendliche haben meist die Erfahrung von Verboten und reagieren deshalb oft sehr positiv auf zusätzliche Angebote, wie die neue Spiel- und Sportzone am Gaudenzdorfer Gürtel. Beleuchtete, auch abends heftig und begeistert bespielte Trendsportflächen sind der Hit für viele. Dieser früher ausschließlich als Verkehrsrestfläche gesehene öffentliche Raum hat eine völlige Neudefinition erfahren und ist jetzt innerstädtische Bühne, vor allem für die Jugend, auch oder gerade weil so viele Autos vorbeifahren, gemäß dem Motto „Bewegung findet Stadt“ (www.park.wien.at).

Foto: MA 18

3 PARTIZIPATION

Partizipation ist in Wien ein wichtiges Anliegen, die Anforderungen für Mehrfach- und Zwischennutzung werden fast immer von den Betroffenen selbst formuliert bzw. durch Lobbyisten/-innen aus der Jugendarbeit verstärkt. Das „Verhandeln lernen“ ist für Jugendliche eine wichtige Erfahrung und dient der Kompetenzerweiterung, durchaus auch in einem beruflichen Kontext.

Jugendliche sind Experten/-innen ihrer Lebenswelten und haben einen Blick für neue Möglichkeiten, so wurde beispielsweise der „Spielraum undergound“ unter der neuen Nordbrückenabfahrt, hinter der SCN (shopping city Nord) mit Ihnen gemeinsam entwickelt.

4 KOOPERATIONSPARTNER/-INNEN

Vermittlung findet Stadt ist das Motto der Projektkoordination für Mehrfachnutzung, die nicht Planung im üblichen Sinne betreibt sondern sich als Strukturförderungsinstrument begreift . Für die Umsetzung sind neben Grundeigentümer/-innen städtische Dienststellen und die Bezirke die wichtigsten Partner www.einfach-mehrfach.wien.at .

Neue Herausforderungen sind vor allem eine verstärkte Nachfrage nach indoor-facilities als Ergänzung der öffentlichen (outdoor) Grün- und Freiflächen ebenso wie auch die vielen Standortanfragen für Jugendkultur-, Event- und Trendsport-locations.

5 SCHULHÖFE UND BÄDER – POTENZIALE DES STÄDTISCHEN GRUNDBESITZES

Ziel von „Mehrfachnutzung“ war und ist es, vor allem die Potenziale der stadteigenen Flächen für weitere Interessenten/-innen zu öffnen . Die Schulhöfe und Schulsportanlagen nachmittags, Samstag , Sonntag und in den Ferien für die Wohnumgebung nutzbar zu machen und als zentrale Siedlungs-Infrastruktur für alle bereitzustellen wird mittlerweile an vielen Standorten praktiziert. Beispiele dafür sind:

Ein zweites Tor macht es möglich: Schule und Park in der Pezzlgasse im 17. Bezirk nutzen den einzigen Ballkäfig abwechselnd.

Im 13. Bezirk gibt es viele private Gärten, aber wenig offene Treffpunkte für Kinder, deshalb wird der Volksschulhof Auhofstraße am Nachmittag geöffnet.

5.1 Generalsanierungen sind ein guter Anlass, auch die Freiflächen neu zu überdenken

Der Dr.-Josef-Resch-Platz im 17. Bezirk bot lange Zeit eine nicht sehr attraktive Grünfläche, auf der sogar „Fußball spielen verboten“ war. Jetzt ist der Park mit einer neuen Sportoberfläche (Planung M. Kirchner) ausgestaltet, die tagsüber für Schulsport und Nachmittagsbetreuung zur Verfügung steht und spätnachmittags, an Wochenenden und in den Ferien offener Freizeitort für alle Anrainer/-innen ist.

Auf Initiative einer LA 21 Gruppe im 3. Bezirk entstand durch Zusammenlegung und Umbau vom ehemaligen Klopsteinpark und Straße eine neue attraktive Freifläche für Alle, der 2009 eröffnete Joe Zawinul Park, der nach der Schulsanierung noch ergänzt wird um die Öffnung des Schulhofes.

Den radikalsten Umbau leistete sich der 22. Bezirk, wo ein seit Jahren unbrauchbarer Schulsportplatz im Zuge der Sanierung zum „Actin-Park“, der völlig offenen zentralen Freizeitinfrastruktur einer großen 70er-Jahre-Siedlung, Hirschstetten, umfunktioniert wurde (Konzept Kohlbauer, Planung Auböck/Karasz), wobei das Jugendzentrum vor Ort extrem wichtig in seiner Mediationsfunktion ist (www.hirschstetten.org).

13., Schulhof Auhofstraße Platz
Foto: MA 18

22., Actinpark
Foto: MA 18

3., Joe Zawinul Park
Foto: MA 18

17., Dr. Josef Resch
Foto: MA 18

5.2 Auch die Wiener Bäder (MA 44) tragen das Prinzip Mehrfachnutzung stark mit

Im 23. Bezirk wurden neben dem Höpflerbad bewusst eine von außen erreichbare und ganzjährig zur Verfügung stehende Freifläche angekauft und geschlechtsensibel ausgestaltet.

So wurde z. B. 2005 im 16. Bezirk am Hofferplatz das Kinderfreibad generalsaniert und der für ganzjährige Aktivitäten nutzbare Mehrzweckraum mit Zugang zum benachbarten Park eröffnet.

6 INDOOR-ANGEBOTE

Um der Parkbetreuung, dem animativen Programm in allen Wiener Bezirken, den ganzjährigen Betrieb zu ermöglichen, wird versucht so oft wie möglich den outdoor-Bewegungs-und Spielflächen eine indoor-Ergänzung zur Seite zu stellen. Für diese spricht nicht nur die Witterungsunabhängigkeit, sondern auch die Möglichkeit, Dinge auszuprobieren, die unter allgemeiner Beobachtung draußen im Park schwer möglich sind.

Burschen z. B. kochen wie Jamie Oliver und Mädchen können Tanzen üben: im „Wohnzimmer“ unter der generalsanierten Schule im 5. Bezirk, Diehlgasse (www.parkbetreuung-margareten.at).

Die Wannenbäder im 1. Stock des alten „Tröpferlbades“ im 5. Bezirk braucht heute niemand mehr, eine Treppe in den Park verbindet nunmehr Mehrzweckraum und Grünfläche im Einsiedlerpark.

Selbst verwaltete Treffpunkte ohne Konsumzwang wurden in Aspern und Essling im 22. Bezirk (http://june.essling.at; efjuca@jungeboxaspern.at) gemeinsam mit den Jugendlichen ebenso errichtet wie die interessante Architektur „parklife“ beim Abenteuerspielplatz Rennbahnweg, entworfen und gebaut von Studierende der TU Wien mit Architekt Fattinger, finanziert von 22.Bezirk, MA 13 und KÖR-Kunst im öffentlichen Raum (www.aktivspielplatz.at; www.design-build.at),

Spiel und Sport sind ein Teil der Ausdrucksmöglichkeiten einer jungen und modernen Stadt, kulturelle Aktivitäten einen andere, wobei die Welten oft nicht so weit auseinanderliegen wie das Beispiel der Skaterhalle „skatearea23“ im 23.Bezirk zeigt (www.skatearea23.at).

5., „Wohnzimmer“
Foto: ifep

22., Junge Box Aspern
Foto: Verein EFJUCA

22., „parklife“
Foto: Architekt Fattinger

23., Graffiti in der „skatearea23“
Foto: Roman Hackl

7 MÄDCHEN

Im Rahmen des „einfach-mehrfach“-Konzeptes lassen sich auch gut die speziellen Ansprüche verschiedener Nutzer/-innengruppen unterbringen, wie das Beispiel der „Mädchengärten“ zeigen soll.

Junge Mädchen ziehen sich ab zwölf Jahren aus dem öffentlichen Raum eher zurück, zeigen neuere Untersuchungen. Besonders in den „rauen“ Gegenden ist dies einerseits verständlich, andererseits auch von Eltern immer wieder erwünscht. Dort, wo Parkbetreuung, aufsuchende/mobile Jugendarbeit oder streetwork Kontakt mit Mädchengruppen hält, wird oft der Wunsch nach sicheren Rückzugsorten formuliert.

Im 11. Bezirk wird der von einem Musiklokal (Szene Wien) nicht gebrauchte Garten seit Jahren als „Mädchengarten“ genutzt und kann auch gemietet werden. Dieses Angebot ermöglicht Mädchen ganz neue Erfahrungen: das ungenierte Rumtoben und Wasserspritzen, der Bau von Hütten, echtes Gärtnern, private Feste,.... (www.parkbetreuung.at)

8 ZWISCHENNUTZUNGEN – TEMPORÄRE ORTE

Zwischennutzungen oder temporäre Bespielungen von Flächen finden überwiegend auf Grundflächen, die sich nicht im Grundbesitz der Stadt befinden, unter dem Motto „Baulücken können mehr als nur Autoabstellplätze sein …“, statt.

So wurde 1997: der temporäre „Bauspielplatz“ am Leberberg im 11. Bezirk ein großer Erfolg, ebenso wie 2002 die Aktion „Sommer in Hernals, Beachvolleyball in der Baulücke“ (auf Initiative der Gebietsbetreuung Hernals – Währing).

11.,Mädchengarten in Simmering (Foto: MA18)

11., Bauspielplatz am Leberberg (Foto: Foto: kiddy & Co)

22., Spielwiese in der Silenegasse (Foto: MA 18)

Das Wohnbaugrundstück in der Silenegasse im 22. Bezirk ist vorübergehend eine Spielwiese für Jung und Alt. Bewusst wurden die vorhandenen Bäume erhalten. (Wildes) Fußballspielen wird zwar durch diese Unterteilung nicht gerade begünstigt und dafür aber besonders von den Mädchen geschätzt.

9 KULTURELLE ZWISCHENNUTZUNGEN IM SINNE VON „URBAN CATALYSTS“

Nicht alles wird für die Ewigkeit gebaut oder gebraucht, „(kulturelle) Zwischennutzungen“ ermöglichen oft sehr interessante Einblicke in sich transformierende Gebäude oder Gelände.

So bespielte die Künstler/-innengruppe MIK (www.mik22.at) den ehemaligen Genochmarkt im 22.Bezirk 2 Saisonen lang und die Wiener Festwochen 2009 verlegten mit großem Erfolg eine Produktion in die alte Gasmesserhalle des ehemaligen alten Gaswerkes Leopoldau im 21. Bezirk.

Im Gegensatz zum Trend der Events und kurzfristigen Clubaktivitäten mit schnell wechselnden Standorten ist das Fluc (Architekt Stattmann) im 2. Bezirk ein Beispiel für die Weiterentwicklung eines Ortes. Gestartet als Privatinitiative in Räumlichkeiten des alten Bahnhofs Wien Nord konnte die Stadt (MA 29) durch Bereitstellen einer heute nicht mehr gebrauchten Fußgängerunterführung das „Überleben“ einer neuen „Kulturinstitution“ (Motto: „ Musik hören und Kultur machen“) am Praterstern sichern und ausbauen helfen (www.fluc.at).

Das Aufspüren von Möglichkeiten und Vernetzen von Akteuren/-innen aus ganz unterschiedlichen „urbanen Welten“ ist ein Ziel der Projektkoordination für Mehrfachnutzung. Die Nachfrage nach neuen Orten für kulturelle, soziale, auch sportliche Aktivitäten ist enorm, die Experimente 1 : 1 sind sehr spannend und beschreiten neue Wege bei Planungsmethodik und Projekt– bzw. Stadtentwicklungsstrategien.

22., Kultur am ehemaligen Genochmarkt (Foto: MA18)

21., Festwochenaufführung im alten Gaswer (Foto: Paul Weihs, rewalk)

2., Musiklokal fluc (Foto: fluc)

10 PERSPEKTIVEN SCHAFFEN GEGEN (JUGEND)-ARBEITSLOSIGKEIT/BERUFS-ORIENTIERUNG

Space!lab ist ein niederschwelliges arbeitsmarktpolitisches Angebot für ausgrenzungsgefährdete Jugendliche, die einen erhöhten Bedarf an begleiteter Unterstützung zur aktiven Lebensgestaltung und beruflicher Perspektivenentwicklung haben. Durchgeführt wird das Projekt in einer Kooperation von Verein Wiener Jugendzentren, Volkshilfe Beschäftigung und WUK (www.space-lab.at).

Foto: space!lab

Die Vorstudie dazu wurde von der Projektkoordination für Mehrfachnutzung mitinitiiert und von der EU finanziell gefördert.

11 ZUSAMMENFASSUNG

„Nichts zeigt den Wandel des Anforderungsbildes an den Planer oder die Planerin prägnanter als das Projekt „einfach-mehrfach“. Nicht Erfassen, Analysieren, Entscheiden und Durchsetzen stehen im Vordergrund,

sondern Zuhören, Aufspüren, Vermitteln, Motivieren und Ressourcen auftreiben. Im Ergebnis entstehen tolle Projekte, die auf idealtypische Weise die Betroffenen in den Planungsprozess integrieren, wobei es nicht nur um das Prinzip der Beteiligung, sondern durchaus auch um neue Planungsmethoden und -strategien geht.“ (DI Thomas Madreiter, MA 18, Beiträge zur Stadtentwicklung, 2006)

Vermittlung findet Stadt !

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Environmental Justice in Berlin: GIS-based method determining an aggregated index for urban planning

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1 ABSTRACT

In the early nineties, a wide discussion about Environmental Justice has started among German health scientists, sociologists, and other academics. In this context, several studies focussing on the disproportional burden of discrete environmental hazards on different socio-economic groups were carried out.

The present paper reviews a method to index several Environmental Justice factors within planning areas of Berlin. In order to examine the current status, the spatial distribution of thermal comfort, green spaces and emissions of PM10 and NOx has been determined, using a GIS-based analysis. These results were then related to data on the social status. The various outcomes show a complex relation between social status and exposure to environmental quality, but reveal a tendency of disproportional distribution, prejudicing groups of lower social status.

In order to develop a planning area based measure of Environmental Justice, the analysed factors were aggregated into a single environmental impact factor and combined with the associated social status. Finally, possibilities of integrating this factor into urban planning in Berlin were identified.

2 INTRODUCTION

The distribution of environmental impacts among the population has been assessed since the 1980s in the United States under the headword of „Environmental Justice“ (EJ). EJ has been defined as ‘‘a concept that promotes the equitable treatment of people of all races, incomes and cultures with respect to environmental laws, regulations, policies and decisions’’ (Todd & Zografos, 2005, p. 484). EJ is a general term to assess distributive justice, procedural justice, policy justice and other aspects in a normative way.

Several case studies showed a relationship between a lower social status and the distribution of environmental hazards like air pollutants, noise, toxic sites, and access to environmental amenities like green spaces.

The relation of environmental quality, health impacts and socio-economic situation is also discussed in Germany. German public health research established coherence between a low social status and a living environment with polluted air, noise and a lack of green space in Bavaria (Bolte and Fromme 2008). One of the first studies which analyses EJ regarding it's spatial distinction was conducted by Köckler et al. (2008) in Kassel, showing relation between households with migration background and/or low-income households and the exposure to noise and particulate matter. Köckler et al. (2008) surveyed data on sociodemographic factors, risk perception, handling strategies, state of health, environmental related behavior and access to green spaces in a standardized household survey.

Social and spatial differences in Germany are less distinctive and environmental hazards are generally lesser than in the US (Maschewsky 2004). As the distribution of environmental burdens is much more managed by spatial planning, an uneven distribution of environmental burdens seems to be less supposable. Maschewsky also points out that race-based indicators employed in several studies in the United States might be less appropriate to the European situation, assuming that EJ is determined rather by the socio-economic situation.

In Germany EJ has not been integrated in planning processes yet. Developing an EJ-Index for the urban area of Berlin, we want to contribute to the raising discussion on EJ. This paper presents only excerpts of the study. The distribution of thermal comfort and availability of green spaces, and the development of the indices will be described more detailed.

3 CASE STUDY BERLIN

Berlin has approximately 3.4 million inhabitants (density: 3849 inhabitants per km²) and is thus the city with the second largest number of inhabitants in Europe (Department for Statistics Berlin-Brandenburg 2009).

Berlin is mainly characterized by its heterogeneity concerning social as well as environmental aspects. In 2008, 9.4% of the inhabitants of Berlin were unemployed and 13.8% received transfer payments. 37.4% of all children under 15 years depend on transfer payments, which is a very high value in comparison to other German cities. 42.8% of all children and teenagers under 18 years are living in families with migration background.

The case study is the first EJ-study of multiple impacts for the metropolitan region of Berlin, Germany. It applies the concept of EJ in its distributional dimension and tests the hypothesis that areas inhabited by population with low social status are disproportionately burdened by environmental hazards. The study was conducted on the scale of the whole city and allows therefore comparisons between areas with different social status.

3.1 Data

The study was conducted at planning area level, which is the most detailed geographical unit on which data is available. Altogether Berlin has 447 planning areas with 7500 inhabitants on average (10 to 31.268) and an area ranging from 0.14km² to 23.70km².

Environmental indicators covered in this study are thermal comfort, availability of green spaces and air quality (PM10 and NOx). This represents a mixture of environmental hazards and qualities.

To represent the socio-economic situation, we used the so-called Status-Index which is determined in the Berlin Senate Department's annual urban monitoring program, and which reflects the socio-economic status of each planning area. The Status-Index integrates data on unemployment, receipt of livelihood benefits and the origin of people separated by age-groups. Planning areas are categorized in deciles and allocated to four levels, whereas 20% have a social status of 1, 60% of 2, and status groups 3 and 4 having 10% respectively.

The chosen environmental indicators are relevant in the urban context and can be influenced by the Senate Department's policies. We utilized data which is regularly collected and already used by the Department for Urban Development.

3.2 Methods

The data on thermal comfort (PMV) and on the availability of green spaces was obtained on block level and was aggregated to the planning area level. To evaluate the relation between environmental factors and social status, estimated values based on cross tables were calculated.

We developed two indices, the multiple Environmental Burden Index and the EJ-Index.

The environmental indicators include both burdens and amenities, which are divided as follows:

- Environmental burdens: all categories of both NOx and PM10, categories II, III and IV of availability of green spaces, categories III and IV of thermal comfort
- Environmental amenities: category I of availability of green spaces, categories I & II of thermal comfort

The environmental indicators which are listed as burdens above, were cumulated in the multiple Environmental Burden Index in the following way: As soon as one of the environmental indicators had a value of IV, the whole planning area was estimated with IV. Once one of the indicators had a value of III, the whole planning area was evaluated with III. The same procedure was done with the values II and I. Assuming that one environmental factor can´t be compensated by another, the assessment of a planning area is based on the worst value of one environmental factor within this area. The information whether there are no, one or two amenities in each planning area was displayed in the map, but not included in the calculation of the index.

On base of the aggregated environmental burdens and the social status, an index was constructed to classify the situation of environmental justice for each planning area. This EJ-Index shows four grades of EJ:

Advantaged (I), moderately disadvantaged (II), disadvantaged (III) and highly disadvantaged (IV) (see Fig. 1). Status-groups 3 and 4 were treated equally, because they contain only 20% of all planning areas.

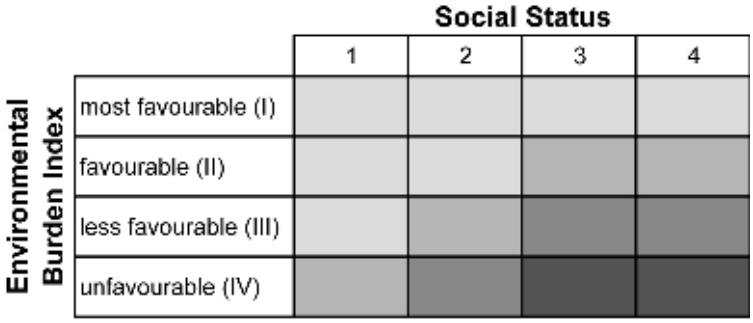

Fig. 1: Categorization of EJ-Index

3.3 Results

The output of our analysis offers information on the spatial distribution of environmental factors and their relation to the social status. The social status groups conform to the given categorization of the Status-Index as describes before. A total of 87 (20%) planning areas have high social status (1), 260 (60%) a middle social status (2), 43 (10%) a low social status (3) and 44 (10%) a very low status (4).

Planning areas with a social status of 3 and 4 are primarily located north and south around the inner circle of Berlin. Due to the urban context, the spatial distribution of all examined environmental factors shows an agglomeration of burdened planning areas in the city centre. The outskirts are characterized by less burdened planning areas and environmental amenities. Exceptions to this are some suburban, more densified centres in the eastern part of Berlin. The examination of conditions of thermal comfort on planning area level reveals that only 7% (32) of all planning areas hold most favourable (I), another 24% (102) favourable (II) thermal comfort. A significant 56% (241) show less favourable (III) and 14% (59) unfavourable thermal conditions (IV). The disproportional distribution of planning areas with favourable thermal conditions among the different status groups is obvious. Of planning areas with high social status (1), only 9 % (10) have less favourable or unfavourable (III / IV) thermal comfort, whereas 98 % (43) of planning areas with low social status offer these conditions.

		Social Status				
		1	2	3	4	∑
Thermal comfort	most favourable (I)	25 / *6*	7 / *19*	0 / *3*	0 / *3*	32
	favourable (II)	52 / *20*	47 / *61*	2 / *10*	1 / *10*	102
	less favourable (III)	8 / *48*	164 / *144*	36 / *24*	33 / *24*	241
	unfavourable (IV)	2 / *12*	42 / *35*	5 / *6*	10 / *6*	59
	∑	87	260	43	44	434

Fig. 2: Thermal comfort

The evaluation of green space access adduced that 39% (165) of all planning areas show a sufficient availability (I) of green spaces. 19% (81) are supplied insufficiently (II), 19% (81) are supplied highly insufficiently (III) and 24% (101) are assigned to be not served (IV) at all. The distribution among the social status groups is similar to the thermal comfort distribution. As an example 90% (76) of planning areas with a high social status offer a sufficient availability of green space, whereas only 9 % (4) of planning areas with a low social status (IV) have a sufficient availability of green space.

Greenspace availability	Social Status 1	2	3	4	∑
sufficient (I)	76 / *32*	78 / *99*	7 / *17*	4 / *17*	165
insufficient (II)	4 / *16*	67 / *49*	5 / *8*	5 / *8*	81
highly insufficient (III)	2 / *16*	55 / *49*	14 / *8*	10 / *8*	81
not served (IV)	2 / *20*	58 / *61*	17 / *10*	24 / *10*	101
∑	84	258	43	43	428

Fig. 3: Availability of green spaces

To evaluate the relation between environmental factors and social status, estimated values based on the provided cross tables were calculated.

The most remarkable outcome is the great difference between counted and estimated values of status group 1. As an example, 76 planning areas with a high social status (1) offer a sufficient availability of green spaces. Based on the assumption, that there is no relation between this environmental factor and social status, only 32 would be expected. The significance of the difference between the existing and estimated distribution was proved on base of a chi-square-test at a 5% significance level. All differences were valid.

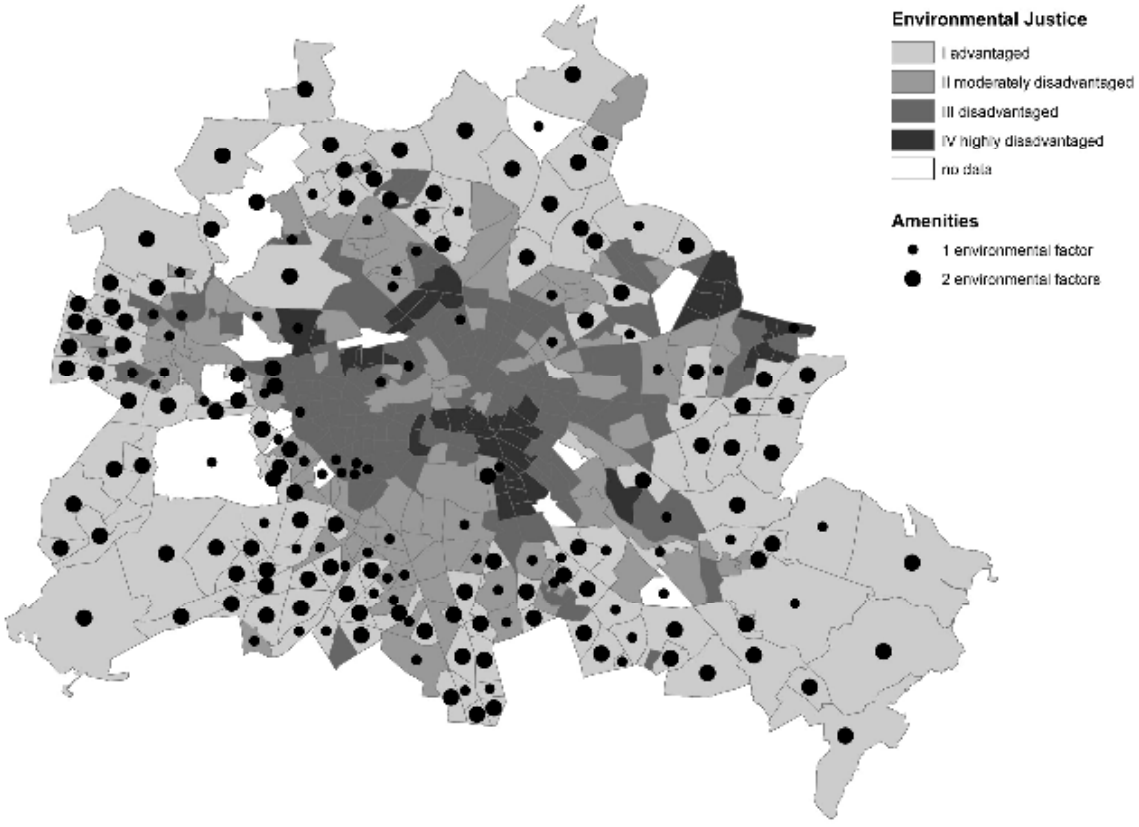

Fig. 4: EJ-Index and environmental amenities

Based on the EJ-Index, 31 % (133) of all planning areas are advantaged (I), 25 % (110) moderately disadvantaged (II), 33 % (142) disadvantaged (III) and 11 % (49) highly disadvantaged (IV). The EJ-Index reveals a concentration of highly disadvantaged (IV) planning areas around the inner city and in the east outskirts. Overall, 15.6% of the total population live in planning areas rated IV, which cover 4.3% of the total area of Berlin. 42 % (191) of all planning areas offer at least one environmental impact, which was categorized as an amenity before (see Fig. 4). These areas which possess also environmental amenities are primarily located in the outskirts. There are very few exceptions of planning areas (3 areas), which were rated IV on the EJ-Index, but offer also one environmental amenity.

4 CONCLUSION

A disproportional distribution of environmental burdens on planning areas with different socio-economic status was found in the metropolitan area of Berlin. The Environmental Burden Index shows a decreasing gradient of environmental quality from suburbs to the inner city, with the exception of scattered densified areas in the suburbs. The EJ-Index provides an overview on areas which are both social and environmental hotspots. The developed indices are supposed to stimulate a discussion about the possibilities of aggregating different environmental burdens and relating them to data on social status. The described method is easy to understand and to handle. It can be adjusted to other situations by including different environmental impact factors or modified by weighting the indicators (e.g. according to their health impact).

The most remarkable result of this study is the great difference between counted and estimated values of status group 1. Therefore disproportional distribution of environmental quality does not necessarily imply higher environmental burden on lower social groups, but a lower environmental burden on groups with higher social status.

This study is also a first step towards an integration of environmental justice issues into urban policies and planning processes. Cities are good test-beds for possibilities to integrate EJ in urban planning due to their administrative structures, social diversity, and the intensity of environmental impacts.

Urban development is strongly influenced and partly determined by urban planning policies. The Strategic Environmental Assessment (SEA) is one European instrument which shall ensure the integration of environmental issues in urban planning. Beside environmental resources the German SEA is required to integrate an assessment of impacts on human beings including human health and on the population in general (German Federal Building Code (BauGB) §1). Walker et al. (2005) and Köckler (2006) emphasize that humans and human health in SEAs should be addressed not only quantitatively but also qualitatively. In contrast to the current practice a qualitative assessment would consider social aspects of human population, which can influence the vulnerability towards environmental impacts. Therefore the SEA in urban planning processes could be a gateway for integrating EJ in decision-making. For urban planning the developed EJ-Index offers an approach to strengthen interrelation and information exchange between the departments of environmental protection, health, and social policies.

Nevertheless the assessment of EJ and the achievability of an equal distribution of environmental burdens might have it's limitations. Usually the exposure to environmental impacts is assessed, but not the real impact on health. It’s generally difficult to determine if the environmental quality entails the social structure or if it’s the other way around. Even if a disproportional distribution is stated, it’s difficult to change.

The idea of environmental justice helps to create awareness on the topic of environmental inequality, which is happening in Europe in an academic debate in the last years. Whether it is helpful to obtain a better distribution of environmental qualities as well, has to be tried out in practice.

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Ermittlung von Energiekennzahlen für Haushalte und Stadtstrukturtypen in Ho Chi Minh City

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1 ABSTRACT

Der vorliegende Beitrag beschreibt ein Konzept für die Ermittlung von Energiekennzahlen für Haushalte und Stadtstrukturtypen in Ho Chi Minh City (HCMC). Die Arbeit stellt eine Teilaufgabe des Arbeitspaketes „Urban Energy" des BMBF-Projektes „Megacity Research Project TP. Ho Chi Minh" dar und soll grundlegende Kenngrößen zum Aufbau eines Modells liefern, um die räumliche Verteilung des Energieverbrauchs der Haushalte in HCMC zu simulieren. Die angestrebten Energiekennzahlen sollen durch Auswertung vorhandener Literatur, Energiedaten, Erhebungen und Berechnungen ermittelt werden. In diesem Beitrag können lediglich die Grundzüge des Konzeptes erläutert werden.

2 EINFÜHRUNG

Jedes Jahr verbraucht Ho Chi Minh City (HCMC) etwa ein Viertel des gesamten Energiekonsums von Vietnam. Das Thema Energie und Energieverbrauch einer hochdynamischen Megastadt wie HCMC ist besonders interessant im Hinblick auf eine nachhaltige Entwicklung und vor dem Hintergrund der immer knapper werdenden fossilen Rohstoffe. Das stetige Bevölkerungs- und Wirtschaftswachstum sowie die boomende Bautätigkeit und die verstärkte Industrialisierung in HCMC stellen eine enorme Herausforderung an die Energieversorgung und die Energiesicherheit. Die neuen marktwirtschaftlichen Bedingungen und die Einführung neuer Technologien (moderne billige Klimaanlagen) führen aufgrund der zu erwartenden Massenanschaffung zu einer weiteren Steigerung des Stromverbrauches in den Haushalten und eventuell zu einem akuten Engpass bei der Stromversorgung in den nächsten Jahren. Aufgrund der Knappheit fossiler Energieträger und der schon heute spürbaren Engpässe auf den Weltenergiemärkten muss eine nachhaltige Energiepolitik die Entwicklung energieeffizienter Strukturen unterstützen und umsetzen.

U. a. vor diesem Hintergrund hat das Bundesministerium für Bildung und Forschung (BMBF) im Juli 2008 innerhalb seines Förderprogrammes „Future Megacities – Energy- and Climate-Efficient Structures in Urban Growth Centres" das von der BTU Cottbus koordinierte Projekt „Megacity City Research TP. Ho Chi Minh" mit einer Laufzeit von fünf Jahren bewilligt. An diesem Projekt ist das Leibniz-Institut für ökologische Raumentwicklung (IÖR) durch die Bearbeitung von zwei Arbeitspaketen (Urban Flooding und Urban Energy) beteiligt. Ziel des Arbeitspakets (WP) Urban Energy ist es, gemeinsam mit den vietnamesischen Partnern die räumliche Verteilung des Energieverbrauchs im Wohnsektor von Ho Chi Minh City (HCMC) zu ermitteln und eine Analyse der Energieerzeugung und des Energieträger-Mix von HCMC durchzuführen. Ausgehend von diesen Erkenntnissen sowie den darauf aufbauenden Szenarien werden Grundlagen bereitgestellt, um Handlungsempfehlungen zur Reduzierung des Energieverbrauchs im Wohnsektor abzuleiten und mögliche Raumplanungsmaßnahmen und Strategien für energie- und klimaeffiziente Stadtstrukturen in HCMC zu begründen.

Eine grundlegende Arbeit für das WP Urban Energy ist die Entwicklung eines Simulationsmodells zur Analyse der räumlichen Verteilung des Energieverbrauchs von Haushalten in HCMC. Der Modellierungsansatz beruht auf einer Systemanalyse für das urbane Energiesystem sowie auf Gebäude- und Stadtstrukturtypen von HCMC. Zuerst gilt es, möglichst viele relevante Informationen und Fakten über das Energiesystem von HCMC zu sammeln, zu ordnen und zu einer Gesamtschau zusammenzutragen. Des Weiteren liegt ein Schwerpunkt der Arbeit darin, Energiekennzahlen für ausgewählte Repräsentanten der entwickelten Gebäudetypen und Stadtstrukturtypen von HCMC zu ermitteln bzw. abzuschätzen.

Unter einer Energiekennzahl für Wohngebäude in HCMC wird der durchschnittliche Energieverbrauch in kWh pro m² Wohnfläche verstanden, der für die Wohnfunktion des Gebäudes (bei durchschnittlicher Benutzung und durchschnittlichen Wetterverhältnissen) in einem Jahr verbraucht wird (vgl. Mügge und Weninger 1998). Die Höhe des Energieverbrauchs ist abhängig von Verhaltensweisen, wie z.B. zu niedrigen Innentemperaturen bei der Kühlung und unsachgemäßer Lüftung von Wohnräumen.

3 ERMITTLUNG DER ENERGIEKENNZAHLEN FÜR HAUSHALTE IN HO CHI MINH CITY

Fundamentale sozio-ökonomische Rahmendaten, z. B., Bevölkerung und Anzahl der Haushalte auf Stadtteil- und Gemeindeebene wurden recherchiert bzw. ermittelt. Bevölkerungsdaten für die Stadtteile (Distrikte) von HCMC wurden den statistischen Jahrbüchern der Stadt des Jahres 2007 und 2008 entnommen. Die vorhandenen Datensätze umfassen die Jahre 2000 und 2004 bis 2008 (siehe Abb. 1). Ebenso konnten aus diesen Quellen Daten zum Bruttoinlandsprodukt und Klima von HCMC erfasst werden. Das IÖR-Team recherchierte des Weiteren Daten zum gesamten Stromverbrauch in HCMC in den Jahren 2000 bis 2003 und 2008 bis 2009 und Daten zu den CO2 Emissionen in HCMC (General Statistics Office 2008, HCMC Statistical Office 2008, Nguyen The Bao & Bui Tuyen 2005).

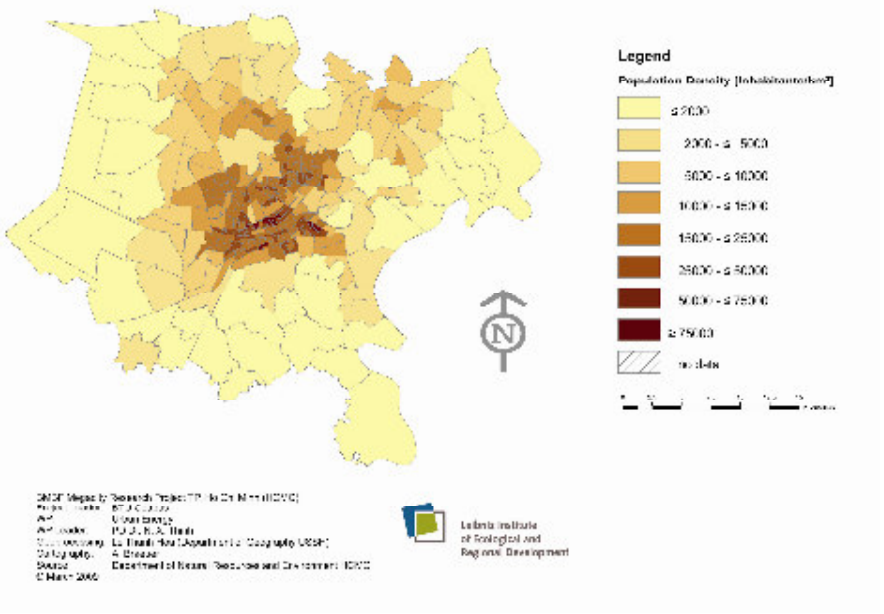

Abb. 1: Bevölkerungsdichte von Phuongs (Kommunen, Wards) der urbanen Distrikte von HCMC

Der Energieverbrauch der verschiedenen Haushalte variiert sehr stark in Abhängigkeit von den Lebensstandards der Bewohner. Je höher der Lebensstandard eines Haushalts ist, desto mehr Energie wird verbraucht. Dies resultiert aus der höheren Anzahl von Haushaltsgeräten und Klimaanlagen dieser Haushalte. Ein wichtiger Indikator für den Lebensstandard eines Haushalts ist der Gebäudetyp, in dem dieser Haushalt zu finden ist. Während sich Haushalte mit hohem Wohlstand häufig in Villen oder Apartmenthäusern befinden, sind Haushalte mit mittlerem Einkommen vorrangig in Shophäusern untergebracht. Haushalte mit sehr niedrigen Einkommen leben häufig in traditionellen Shophäusern oder kleinen Gassenhäusern (siehe Abb. 2). Es bestehen also große Unterschiede in der Gebäudegröße, die von kleinen Einfamilienhäusern bis zu großen Wohnblocks mit mehreren hundert Wohnungen reicht, und in der Bausubstanz sowie im Wärmeschutz und Baualter. Üblicherweise wird nicht der Energieverbrauch eines gesamten Gebäudes erfasst, sondern der der einzelnen Haushalte.

In der Regel bestimmt das Einkommen den Lebensstil und den Energieverbrauch eines Haushalts. Nach Le Hoang Viet (2010) ist das Einkommen in HCMC ein wichtigerer Indikator für den Energieverbrauch als der Gebäudetyp. Dies resultiert daher, dass aufgrund von Umsiedlungsmaßnahmen Haushalte mit sehr unterschiedlichen Einkommen in gleichen Gebäudetypen vorzufinden sind. Dennoch ist auch ein grober Zusammenhang zwischen Gebäudetypen und Energieverbrauch von Haushalten zu erwarten.

Abb. 2: 4 verschiedene Gebäudetypen in HCMC (von links oben nach rechts unten: traditionelle Shophäuser, Standard-Shophäuser und Sozialwohnungen sowie Appartements in hoher Dichte; Fotos: A. Bräuer und K. Scharte, 2010)

Ein wichtiger Meilenstein zur Systemanalyse ist die Beschaffung und die erste Auswertung von Daten des Stromverbrauchs der Haushalte von HCMC zu den 12 Monaten im Jahr 2008. Grundlegende räumliche Analysen des Stromverbrauchs der Haushalte der verschiedenen Kommunen (Gemeinden) und Distrikte HCMCs, sowie die Ermittlung aktueller Daten über die Anzahl der Haushalte HCMCs können anhand dieses Energiedatensatzes durchgeführt werden.

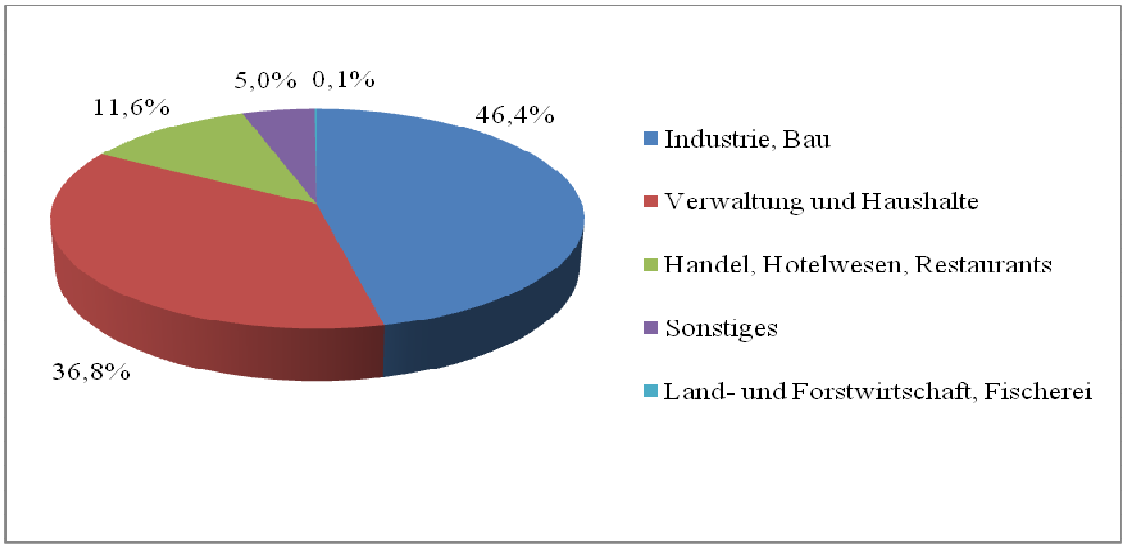

Abb. 3: Stromverbrauch in HCMC für das Jahr 2008 nach Sektoren nach Angaben von Institute of Energy Hanoi 2010

Abbildung 3 zeigt die Anteile des Stromverbrauchs der verschiedenen Sektoren in HCMC für das Jahr 2008. Die wichtigsten Verbrauchssektoren sind Industrie/Bau mit 46,4 % und Verwaltung/Haushalte mit 36,8 % des gesamten Stromverbrauchs in HCMC. Diese Werte belegen die Relevanz der Untersuchung des Energieverbrauchs im Wohnsektor für HCMC. Anhand von etwa 1,5 Mio. Datensätzen der Strom-Verbraucher in HCMC, getrennt ausgewiesen für die einzelnen Monate des Jahres 2008 mit Angaben über Distrikt, Ward und Straßennamen, können Stromverbrauchskennwerte für Haushalte und Raumeinheiten

abgeleitet werden (siehe Abb. 4). Diese Kennwerte sollen durch Erhebungen und Befragungen abgeglichen werden.

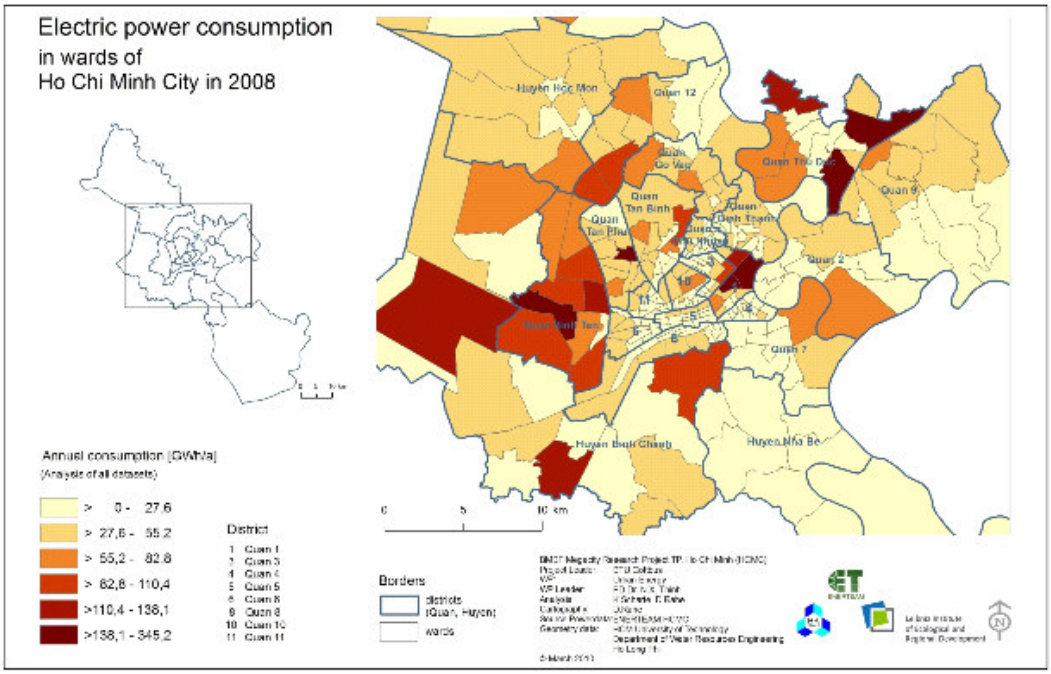

Abb. 4: Die räumliche Verteilung des Jahresstromverbrauchs auf der Ward-Ebene im Zentralteil von HCMC

Auf Basis von Informationen zu den Unterschieden des Energieverbrauchs in den einzelnen Gebäudetypen werden Abschätzungen zu den Anteilen der einzelnen Bedarfsfaktoren am Energieverbrauch vorgenommen. Hierfür wird der gesamte Energieverbrauch eines Haushaltes in verschiedene Kategorien aufgeteilt. Diese umfassen die Warmwasserbereitung, Raumkühlung, Beleuchtung, das Kochen und die Nutzung sonstiger Elektrogeräte eines Haushalts. Zu jeder dieser Kategorien erfolgt durch Abschätzung der Anzahl vorhandener Geräte und deren Nutzung eine detaillierte Aufschlüsselung der Faktoren des Energieverbrauchs der verschiedenen Haushalte. Auf diese Weise hat das IÖR-Team eine Energiebilanz für verschiedene Gebäudetypen von HCMC unter Annahme von bestimmten Voraussetzungen erstellt. Diese Energiekennzahlen für Gebäudetypen werden anhand der Daten einer Befragung (z. B. Waibel 2009) und des oben genannten Datensatzes validiert.

4 ABSCHÄTZUNG DES FLÄCHENSPEZIFISCHEN ENERGIEVERBRAUCHS VON STADTSTRUKTURTYPEN IN HO CHI MINH CITY

Als Basis für die Verräumlichung des Energieverbrauchs von Haushalten dient der Stadtstrukturtypenansatz. Entsprechend den verfügbaren Flächennutzungsdaten von HCMC hat der Lehrstuhl Umweltplanung der BTU Cottbus (2010) das Gebiet von HCMC in mehr als 80 Stadtstrukturtypen (SST) unterteilt, von denen 25 SST die Siedlungen mit mehrheitlichem Anteil von Wohngebäuden beschreiben. Diese SST unterscheiden sich neben anderen Kriterien vor allem nach der Art der Gebäude und der Bebauungsstruktur. Die Differenzierung der Art der Gebäude ergibt sich durch 16 Gebäudetypen. Sie lassen sich in die drei Teilbereiche Schophäuser, Villen und Appartements in hoher Dichte gliedern. Die Stadt wurde in insgesamt 16.598 Polygone aufgeteilt und jedes Polygon wird einem SST zugeordnet. Ungefähr 6.250 Polygone befinden sich im Zentrum der Stadt.

Für die Modellierung des Energieverbrauchs von Haushalten sind vor allem die Polygone wichtig, die den SST des Sektors der Wohngebäude zugeordnet sind. Für jeden der 25 SST dieses Bereichs wird ein durchschnittlicher spezifischer Energieverbrauch der Haushalte ermittelt und auf alle Polygone dieses SST übertragen.

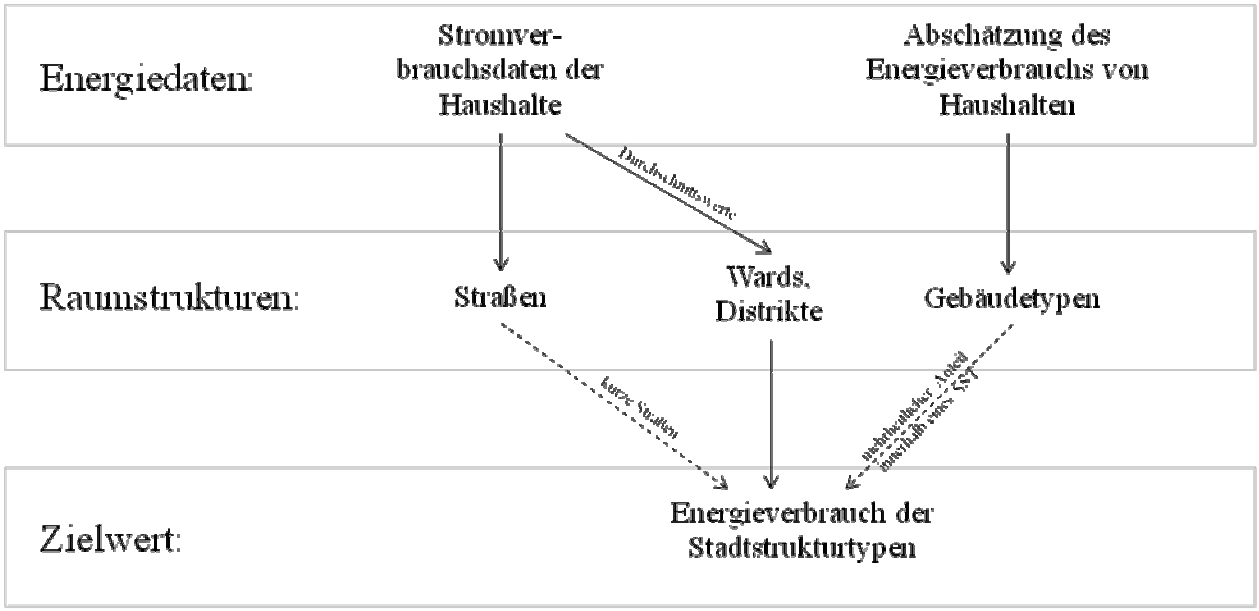

Abb. 5: Algorithmus zur Ermittlung des flächenspezifischen Energieverbrauchs für die Stadtstrukturtypen (SST) in HCMC

Abbildung 5 stellt den Algorithmus zur Ermittlung der Kennwerte des flächenspezifischen Energieverbrauchs für die Stadtstrukturtypen in HCMC vor. Mithilfe der GIS-Analyse werden kurze Straßen identifiziert, die vollständig in Polygonen von Strukturtypen liegen. Des Weiteren werden die überwiegenden Gebäudetypen der einzelnen Strukturtypen herausgearbeitet. Diese Informationen und weitere Überlegungen helfen, den Energieverbrauch von ausgewählten Repräsentanten der Stadtstrukturtypen abzuschätzen.

5 AUSBLICK

Demnächst erfolgt eine tiefer gehende Analyse der oben genannten Stromverbrauchsdaten für das Jahr 2008. Diese Analyse und Erhebungsergebnisse (z. B. Waibel 2009) sowie weitere Informationen (z. B. über Stromtarife) sollen helfen, die Energieverbrauchskennwerte für verschiedene Haushaltstypen hinreichend genau zu ermitteln. Etwa 10 bis 15 Polygone jedes Stadtstrukturtyps werden als Repräsentanten ausgewählt, um deren flächenspezifischen Energieverbrauch zu ermitteln. Danach werden entweder der Modalwert bei schiefer Verteilung oder der Mittelwert bei annähernd normaler Verteilung als flächenspezifische Energiekennzahlen für die Stadtstrukturtypen verwendet.

6 DANKSAGUNG

Dieses Forschungsprojekt wird vom Bundesministerium für Bildung und Forschung (BMBF) gefördert. Weiterhin bedanken wir uns für die wertvollen Unterstützungen von dem Lehrstuhl Umweltplanung der BTU Cottbus und Le Hoang Viet (ENERTEAM HCMC).

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FlexiCount: Eine flexible Personenzählmatte für den mobilen Indoor und Outdoor Einsatz

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1 KURZFASSUNG

Umfangreiche qualitativ hochwertige Realdaten über das Personenaufkommen werden in der Raum- und Verkehrsplanung zur Optimierung von Infrastrukturen benötigt. Das Projekt FlexiCount schafft notwendige Grundlagen für eine modulare und energieautarke Personenzählmatte. Damit werden mittelfristig die Anforderungen des Markts an eine flexible Datenerhebung mit hoher Qualität und geringen Installations- und Wartungskosten erfüllt.

2 EINLEITUNG

Verkehrszählungen im motorisierten Verkehr sind mittlerweile fester Bestandteil von Verkehrs- und Raumplanungsmodellen und bilden eine unerlässliche Datengrundlage, zum Beispiel für die Optimierung der Straßeninfrastruktur. Aufgrund der unzureichenden Genauigkeit bei hohem Verkehrsaufkommen wurden manuelle Verkehrszählungen in den letzten Jahren von Zählungen mithilfe technischer Systeme abgelöst. Für die Zählung von PKWs und LKWs werden demnach Dauerzählstellen mittels so genannter Induktions¬schleifen bzw. mobile Zähleinrichtungen mittels Laser und Videotechnik verwendet.

Im Bereich des nicht-motorisierten Verkehrs wird das Personenaufkommen von Infrastrukturbetreibern von Bahnhöfen, Flughäfen oder Einkaufsstraßen erfasst. Die hierbei erhobenen Daten bilden eine essentielle Datengrundlage zur Optimierung von Fahrplänen, für das Ressourcenmanagement, für bauliche Planungen und für die Optimierung von Verkehrsleitsystemen und somit indirekt zur Attraktivitätssteigerung des nicht-motorisierten Verkehrs. Im Vergleich zu Zählungen im motorisierten Individualverkehr werden hier die Anforderungen an die Personenzählung weder von automatisierten noch von händischen Lösungen in der erforderlichen Qualität abgedeckt.

2.1 Motivation

Für die Ermittlung des Personenaufkommens wird derzeit häufig auf händische Zählungen zurückgegriffen. Diese sind jedoch insbesondere bei hohem Personenaufkommen – aufgrund des eingeschränkten menschlichen Wahrnehmungsvermögens – sehr ungenau. Weiters kann so nur mit erheblichem Aufwand und Kosten eine signifikante Datenmenge erhoben werden, wodurch ein großer Bedarf an automatisierten Lösungen existiert. Für die automatisierte Personenzählung gibt es eine Vielzahl unterschiedlicher Technologien und Produkte. Trotzdem kommen diese nur selten zum Einsatz. Ein wesentlicher Grund hierfür ist, dass keines der angebotenen Systeme alle gestellten Anforderungen erfüllt:

- Kosten: Viele Zählsysteme (bspw. mit Lasertechnologie) verursachen hohe Investitionskosten, benötigen mitunter teure Software zur Auswertung, und bereiten einen erheblichen Installationsaufwand (z.B. Strom- und Datenanbindung) vor Ort.
- Flexibilität: Vorgegebene Installationshöhen (meist ein kleiner Bereich) bestimmen bei vielen Verfahren die mögliche Zählbreite, welche oft zu schmal ausfällt. Desweiteren werden in der Regel separate Installationen für die Stromversorgung und die Datenanbindung benötigt.
- Qualität: In Stoßzeiten kommt es in Ballungsbereichen zu einem hohen Personenaufkommen. In derartigen Fällen leidet bei allen Systemen die Genauigkeit der Zählung; Auswirkungen von hohen Personendichten auf den Messfehler sind in der Regel nicht bekannt, wodurch die Qualität der Erhebung nicht abschätzbar ist.
- Umgebungsbedingungen: Einige Sensorsysteme haben Probleme mit schnellen Temperaturschwankungen und/oder variierenden Lichtbedingungen – typ. Bedingungen eines Eingangsbereichs – und liefern in derartigen Situationen oftmals falsche Daten. Ebenso sind nur wenige Lösungen für einen Einsatz im Außenbereich geeignet.

- Mobilität: Für die temporäre Erhebung des Personenaufkommens für wenige Tage bis Wochen (z.B. Optimierung einer Fußgängerampel) ist ein autonomes und energieautarkes System gefordert. Derzeit eignen sich die angebotenen Systeme (z.B.: aktiver Infrarotzähler) nur für die Zählung von einzelnen Personen.

Eine Kombination mehrerer Sensordaten (Sensorfusion) zur Zählung trägt zu einer Linderung dieser Probleme bei; dies erhöht jedoch zumeist die Systemkomplexität und die Kosten, siehe [WH09].

Im Projekt FlexiCount werden die Grundlagen für eine neue Technologie erarbeitet werden, die die Anforderungen des Markts (insbesondere die umfangreichen Anforderungen der Anwender im Verkehrsbereich) berücksichtigt, um mittelfristig sowohl eine erhöhte Datenverfügbarkeit als auch Datenqualität beim automatisierten Erfassen des Personenaufkommens unter den zuvor angeführten Rahmenbedingungen zu erreichen.

3 AKTUELLER STAND DER TECHNIK

Ein aktuellen Überblick über Vor- und Nachteile sowie Evaluierungen verschiedener Zähltechnologien für Fußgänger wurde in einer Studie der University of California, Berkeley erstellt [B+07, G+08]. Die folgende Liste zeigt den Stand der Technik einiger, automatischer Personenzähltechnologien:

Aktiver Infrarotzähler:

- (+) Geringe Kosten, geringer Energieverbrauch, einfache Installation, portabel
- (-) Keine Differenzierung zwischen Fußgängern und anderen Objekten (z.B. Regentropfen), mehrere Fußgänger werden beim Queren des Zählstrahls als ein Objekt gezählt

Passiver Infrarotzähler (Wärmebild) [H06, LH08]:

- (+) Geringe Kosten, geringer Energieverbrauch, keine Beeinträchtigung durch nasses und nebeliges Wetter, keine datenschutzrechtlichen Bedenken (Vergleich zu video-basierten Lösungen)
- (-) Dichte Szenen limitieren die Zählgenauigkeit stark, Top-View Montage limitiert die Zählbreite, Temperatur kann die Zählgenauigkeit beeinflussen

Laserscanner [ZS05, HS05, F05]:

- (+) Zählgenauigkeit höher als bei alternativen Systemen (auch bei dichten Szenen), kann Fußgänger separieren, einfaches Setup, Abdeckung großer Bereiche
- (-) Teuer, Zählperformance durch verschiedene Witterungsbedingungen beeinträchtigt, große und schwere Bauweise

Maschinelles Sehen in Bilddaten [RB06, TS07]:

- (+) Abdeckung großer Bereiche, Potential zur genauen Zählung für Personengruppen unter verschiedenen Lichtbedingungen (stereo-based), Aufgezeichnete Videodaten können für Sammlung von Fußgängercharakteristika betrachtet werden, einfache Installation und einfaches Setup, Aufgezeichnete Videodaten können mehrmals manuell ausgewertet werden.
- (-) Die meisten kommerziell erhältlichen Produkte sind für den Innenbereich konzipiert, Die Zählung in dichten Menschenmengen ist noch nicht gelöst, die Performance wird durch unterschiedliche Umweltbedingungen beeinträchtigt, oft datenschutzrechtliche Bedenken

Akustischer Plattensensor (EcoCounter):

- (+) Outdoor-fähig, 10 Jahre energieautarker Betrieb, Installation nicht sichtbar
- (-) Nur für den unterirdischen Einsatz (Aufwendige Installation), je Plattensensor nur eine Person, bidirektionale Zählung nur durch Mehrfachverlegung, geringe Zählgenauigkeit

Trotz des Vorhandenseins zahlreicher automatischer Ansätze und Lösungen wird manchmal immer noch auf händische Zählungen mittels „tally counter“ gesetzt, siehe [D+07, G+08]. Vor- und Nachteile der händischen Zählung:

- (+) Kostengünstig für kleine Stichproben, Bei einfachen Szenen nahezu 100%ige Genauigkeit, Keine besondere Hardware erforderlich

- (-) Genauigkeit abhängig von der beobachtenden Person (75-92%), nur bei geringem Personenaufkommen einsetzbar, bidirektionale Zählung vermindert die Genauigkeit stark, nur zeitlich begrenzte Erfassung möglich (wenige Stunden)

Zahlreiche internationale Anstrengungen zur Verbesserung der bestehenden Technologien haben in den letzten Jahren nur marginale Erfolge in einzelnen Bereichen erzielt. Anstrengungen zur Erhöhung der Flexibilität hinsichtlich der Zählbreite und der Mobilität wurden nur selten unternommen. FlexiCount verfolgt daher die innovative Technologie einer flexiblen und mobilen Personenzählmatte, um mittelfristig die Anforderungen an Personenzählungen im Verkehrsbereich zu erfüllen.

Im Kontext Personenzählung mit Matten gibt es international zwei erwähnenswerte Projekte/Produkte. (i) An der Schweizer Hochschule für Technik in Rapperswill wird in einem Studierendenprojekt eine „Zählmatte für das Besuchermonitoring“ entwickelt. Diese Entwicklung basiert auf den Erfahrungen der „akustischen Platte“ der Firma ecocounter (http://www.eco-compteur.com) beim Einsatz im Schweizer Nationalpark. Diese Matten werden jedoch im Boden vergraben und sind vom System her weder mobil noch modular verwendbar. (ii) Die Firma Future Shape (http://www.future-shape.com) vertreibt das Produkt SensFloor. Dieser Belag, wenn unter einem herkömmlichen Bodenbelag verlegt, detektiert über Veränderungen des magnetischen Feldes ob eine Person auf dem Bodensegment steht oder nicht. Dieses System eignet sich jedoch nur sehr eingeschränkt zur Personenzählung; es ist auch in erster Linie für den Einsatz im Bereich „Ambient Assistive Living“ bspw. im Bereich von Altersheimen entwickelt worden.

4 FLEXIBLE UND MOBILE PERSONENZÄHLMATTE

Vor allem in Verkehrsinfrastrukturen des öffentlichen Verkehrs wird eine flexible und mobile Lösung zur temporären und qualitativ hochwertigen Erfassung des Personenaufkommens benötigt. Über einen Zeitraum von einigen Tagen bis wenige Wochen soll es auf einfache und kostengünstige Weise möglich sein, das Personenaufkommen abzuschätzen, ohne hohe Installations- und Wartungskosten in Kauf zu nehmen. Die Technologie soll flexibel hinsichtlich der Zählbreite und robust gegenüber äußeren Umgebungseinflüssen sein.

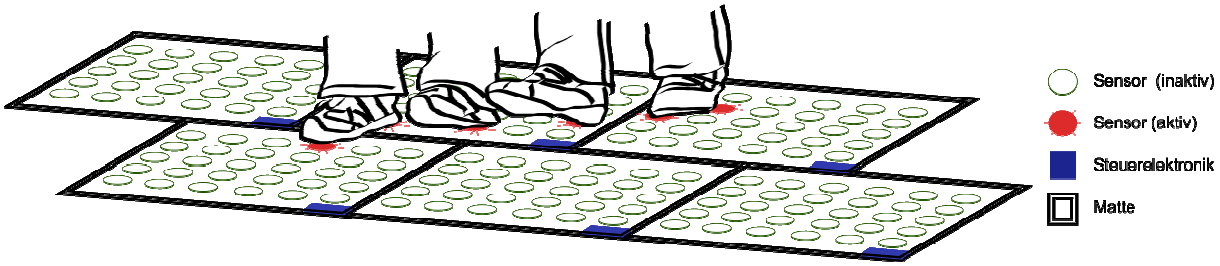

Abbildung 1: Mehrere FlexiCount Matten im Einsatz

Im Projekt FlexiCount wird eine Matte mit integrierter Sensorik entwickelt, die das Überqueren von Personen registriert und die erfassten Sensorwerte (z.B. ein Druckprofil) über ein drahtloses Sensornetzwerk an einen Auswerterechner überträgt. Mehrere dieser autarken Matten (vgl. Abbildung 1) sollen einfach – ähnlich einer Teppichfliese – nebeneinander verlegt werden können und bieten so die Möglichkeit einer flexiblen Adaptierung an unterschiedliche räumliche Gegebenheiten. Da die Matten autark ausgeführt sind bedürfen sie weder einer Verdrahtung untereinander noch irgendeiner separaten Installation.

Das mittelfristige Ziel von FlexiCount ist die Entwicklung einer Personenzählmatte mit folgenden Eigenschaften:

- Integrierte Sensoren zur Erfassung der Personenbewegung bei Übertritt der Zählmatte
- Hohe Mobilität (geringes Gewicht und einfacher Transport)
- Einfache Anpassung an die Zählbreite (mod. Aufbau mit bspw. 50x50cm Elementen)
- Zeitlich referenzierte bidirektionale Zählung
- Autarker Betrieb über mehrere Tage bzw. wenige Wochen (Ultra Low-Power Betrieb)
- Geringe Installations- und Wartungskosten (hinlegen, einschalten und zählen)
- Echtzeitdatenübertragung durch drahtlose Kommunikation

- Gute Zählgenauigkeit auch bei hohem Personenaufkommen (Abweichung bekannt)
- Für den Innen- und Außenbereich geeignet
- Berücksichtigung sicherheitsrelevanter Merkmale (Rutschfest, geringe Mattenhöhe, Abflachung an den Kanten, Leuchtmarkierung, …)

Im Projekt werden die Grundlagen für eine Machbarkeit eines solchen Systems erarbeitet und evaluiert. Dahingehend behandelt das Projekt detailliert Forschungsfragen zur Elektronik, zur Polymer-Integration und zum mathematischen Modell. Eine Minimalintegration der Technologie wird im Rahmen des Projekts prototypisch durchgeführt, um Trainings- und Validierungsdaten unter Realbedingungen zu erheben, und somit zu untersuchen, ob ein valides mathematisches Modell zur Personenzählung entwickelt werden kann.

5 FORSCHUNGSSCHWERPUNKTE FLEXICOUNT

Die Forschungsgebiete im Projekt FlexiCount zerfallen in die drei Gebiete Elektronik, Polymer-Integration und mathematische Modellierung.

5.1 Forschungsschwerpunkt Elektronik

Die einzelnen Forschungs- und Entwicklungsaufgaben im Bereich der Elektronik sind:

- (a) Auswahl und/oder (b) Entwicklung geeigneter Sensorik
- Ultra-Low Power Design ev. unter Einbeziehung von Energy Scavenging [R+03, G+05]
- Signalaufbereitung und –verarbeitung
- Realisierung eines „plug & play“-fähigen Wireless Networks
- Möglichkeit zur Kalibration der verbauten Messschaltung
- Miniaturisierter Aufbau der Elektronik für eine Integration in eine Matte
- Verwindungsfähiger, robuster Aufbau der Elektronik (Flexible Leiterplattentechnik)
- EMV robustes Design inkl. automatischer „Restart“-Funktionalität bei massiver Störung

Aus derzeitiger Sicht bergen insbesondere die Punkte (1b) und (2) ein hohes Innovations- und Forschungspotential; entsprechende Fortschritte in diesen Gebieten können auch langfristig in anderen Bereichen als „enabling Technology“ wirksam werden.

Im Punkt (1) wird dementsprechend untersucht, welche Sensoren (Druck, Kapazitiv, Induktiv, etc.) bzw. Kombinationen von Sensoren für die eindeutige Registrierung von Personen am geeignetsten sind, siehe bspw. [BP07, S+08]. Dies stellt insofern eine sehr herausfordernde Aufgabe dar, da die zu erfassenden Merkmale (großes, kleines Gewicht, unterschiedliche Schuhprofile, etc.) stark variieren und der Fehler der Detektion möglichst gering gehalten werden soll.

Im Punkt (2) soll untersucht werden, inwieweit aus Druck, Vibrationen und der Umgebungstemperatur Energie rückgeführt werden kann um die Elektronik (zumindest teilweise) zu versorgen, bzw. welche Möglichkeiten es gibt Akkus zu laden ohne dieselben aus der Matte entfernen zu müssen, siehe bspw. [PS05, RW03].

Die Punkte (3) bis (8) bergen darüber hinaus fordernde technische Aufgaben, die bewältigt werden müssen. Bspw. ist die Realisierung eines „plug & play“ fähigen, robusten drahtlosen Sensornetzwerks eine fordernde Aufgabe, da mitunter mit massiven Störungen aus der Umgebung zu rechnen ist.

5.2 Forschungsschwerpunkt Polymer-Integration

Die Herausforderung bei der Integration einer sensiblen Elektronik in einen Elastomer ist vorallem die geeignete Materialauswahl welche allen Anforderungen des Einsatzes gerecht werden muss, sowie die Integrationsmethodik.

Bei der Materialauswahl ist auf folgende zwei Punkte das Hauptaugenmerk zu legen:

- des Materials gegenüber Umwelteinflüssen wie breiten Temperaturbereichen, UV- und Ozoneinwirkung auf das Material im Außenbereich, Feuchtigkeit, …

- Design der Polymermatrix, um den Themen Druckverteilung, Lastabtragung, Einstellen definierter Steifigkeit (Kraft/Verformungszusammenhang) gerecht zu werden.
- Auswahl der Integrationsmethodik:
- Verfahren zur Integration der Sensorik in die Elastomermatrix, hierbei können mehrere Verarbeitungsmethoden angewandt bzw. weiterentwickelt werden. Die Palette reicht von Verkleben mittels Spezialklebern bis zur Sprühtechnologie bzw. dem Umschäumen des Sensors mittels flüssiger PUR-Komponenten (dimensionsabhängig).

Ziel ist es, die Elektronik in einen Spezial-Elastomer, welcher den spezifizierten Anforderungen Rechnung trägt, zu integrieren. Dabei ist die Steifigkeitsmatrix des Elastomerwerkstoffs so zu entwickeln, dass die Krafteinleitung, z.B hervorgerufen durch Personen unterschiedlichen Gewichts so an den Sensor übertragen bzw. verteilt wird, dass die Sensorik eindeutige Verformungen detektieren bzw. Signale generieren kann (Umwandlung Last/Kraft in eine für den Sensor verarbeitbare Verformung). Weiters gilt es, die Integration der Sensorik in den Spezial-Elastomer sicherzustellen, welche auf unterschiedliche Art und Weise (mehrere Fertigungstechnologien denkbar) erfolgen kann. Dabei ist auf die Rahmenbedingungen der Integration wie z.B. max. Temperatur, Druckverhältnisse während des Fügens bzw. der Verträglichkeit der unterschiedlichen Komponenten (Klebstoff, Sensorik) zu achten.

5.3 Forschungsschwerpunkt Mathematische-Modellierung

Bei der Personenzählung mit der mobilen modularen Personenzählmatte müssen zwei unterschiedliche Probleme gelöst werden:

- Eindeutige Extraktion der Anzahl der Fußabdrücke sowie der Gehrichtung aus den Sensordaten.
- Abschätzung wie viele Personen tatsächlich über die Matte gegangen sind und welche Genauigkeit für diese Abschätzung unter Einfluss von verschiedenen Personendichten und Umwelteinflüssen zu erwarten ist.

Bei einer Fußmatte mit hoher Sensordichte hat das erste Problem große Ähnlichkeit mit Objekterkennung und Verfolgung sowie Szenarienerkennung in Videos, da ein Fußabdruck auf der Sensormatte eine sich zeitlich verändernde Form ist (siehe [LL04] und [L+07]). Dabei unterscheiden sich Fußabdrücke in ihrer Form und Größe und müssen effizient von anderen Abdrücken wie Kinderwagen, Krücken, Hunden oder ähnlichem unterschieden werden können. Zusätzliche Probleme können sich aus den Eigenschaften der Matte ergeben, wenn z.B. bei hohen Dichten nahe beieinander liegende Fußabdrücke nicht mehr genügend separiert sind, um mit einfachen Methoden als mehrere Objekte erkannt zu werden. Das Problem entspricht also einer Erkennung sich zeitlich verändernder, dreidimensionaler Objekte, wobei die ersten zwei Komponenten die räumliche Ausdehnung der Abdrücke sind und die dritte die Intensität der einzelnen Sensorenmessungen. Mögliche Ansätze zum Lösen dieser Problematik sind bspw. die Verwendung neuronaler Netzwerke oder die Verwendung von Support Vector Machines [B07].

Im zweiten Teil der Modellierung geht es darum, unter verschiedenen Voraussetzungen möglichst genau die Anzahl der Personen zu ermitteln, die über die Fußmatte gehen. Dabei sind mehrere Herausforderungen zu berücksichtigen:

- Bei hohen Dichten wird es schwerer, Fußabdrücke zu erkennen.
- Verschiedene Witterungseinflüsse wie geringe Temperaturen und Nässe verändern die physikalischen Eigenschaften der Matte und können so zu Messfehlern und Ungenauigkeiten bei der Abdruckerkennung führen.
- Die Größe der Matte garantiert zwar, dass jeder Fußgänger mindestens einmal auf der Matte auftritt, allerdings kann es aufgrund unterschiedlicher Schrittlängen und Gehgeschwindigkeiten auch zu mehreren Fußabdrücken pro Person kommen.

Statistische Modelle für Zähldaten sollen als Grundlage für die Personenzählung herangezogen werden und mit nicht-parametrischen Ansätzen verglichen werden. Es existiert bereits eine breite Grundlage solcher Zählmodelle [W08], welche Möglichkeiten bieten die zu erwartenden, nichtlinearen Einflüsse zu modellieren [CT07]. Reale Zählungen bei verschiedensten Umweltbedingungen und Fußgängerdichten sollen zur Schätzung der Modelle und der Parameter der zugrundeliegenden Zufallsverteilungen herangezogen werden.

Wichtige Werte über die zu erwartenden Genauigkeiten solcher Modelle sowie der Einfluss und die Signifikanz verschiedener Einflussfaktoren auf die Genauigkeit der Ergebnisse können so gewonnen werden [J+06].

6 ZUSAMMENFASSUNG

FlexiCount adressiert die Grundlagen für eine modulare und energieautarke Sensormatte zur automatisierten Erfassung des Personenaufkommens. Um die gestellten Anforderungen des Markts an temporäre Personenzähl¬einrichtungen zu erfüllen, werden in einem interdisziplinären Ansatz forschungsintensive Fragen zur Elektronik, zur Polymer-Integration und zur mathematischen Modellierung behandelt. Eine Minimalintegration der Technologie wird im Rahmen des Projekts prototypisch durchgeführt, um Trainings- und Validierungsdaten unter Realbedingungen zu erheben.

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Graz Reininghaus: Vielfalt ermöglichen – für die Wiedergeburt des Urbanen

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1 EINLEITUNG

In Graz-Reininghaus bietet sich die einmalige Gelegenheit, im 21. Jhdt. wieder eine Stadt zu bauen: Million Quadratmeter nahezu unbebaute Fläche, die Kernstücke davon in der Hand eines Eigentümers, 1,8 km entfernt vom Grazer Stadtzentrum von Graz wartet darauf zu einer vitalen Stadt erweckt zu werden, die noch dazu den Anforderungen einer jungen urbanen Generation gerecht wird. Eine Chance, die wir uns nicht entgehen lassen sollten.

‚Stadt' war für die Menschen immer faszinierend und anziehend: Stadt versprach Sicherheit und Freiheit, man konnte in ihr Unbekanntes erleben. Variantenvorschlag: Genau diese Tradition haben wir für Graz-Reininghaus mit Begeisterung aufgenommen und mit viel Energie für zukünftige Generationen in neuer Form umgesetzt.

Drei Aspekte für den Prozess in Graz-Reininghaus möchte ich dabei herausgreifen:

- 1.Graz-Reininghaus 2020: Wie leben hier junge Familien? Welche Möglichkeiten haben Unternehmen? Welche Zusatznutzen entstehen dadurch für Investoren und Entwickler?
- 2.Die Reininghaus-Methode: Ein Begriff, den wir gewiss nicht lanciert haben. Die dahinter stehende Vorgehensweise halten wir aber für tauglich, die resiliente Stadt zu schaffen.
- 3.Fundamente: Selbstverständlich haben wir nicht im luftleeren Raum gearbeitet. Denn auch der Städtebau und die Forschung über ihn unterliegen einem Wissensstand und (Mega-)Trends in Folge gesellschaftlicher Entwicklungen.

Abb. 1: Graz-Reininghaus, Perspektive Grünachse, Abb. 2: Graz-Reininghaus, Perspektive Esplanade und Stadtteilpark

2006 wurde kleboth lindinger partners von Asset One, dem Haupteigentümer der Liegenschaften in Graz-Reininghaus, beauftragt, eine umfassende Konzeption für die Entwicklung des Areals zu erstellen. Dabei hatten wir alle Freiheiten, allerdings unter einer Bedingung: Uns wurde ein striktes Verbot auferlegt, den Zeichenstift in die Hand zu nehmen. Stattdessen sollten wir die Stadt als solche umfassend neu denken.

Ideale Rahmenbedingungen für ein spannendes Projekt.

Um aus Gedachtem und Denkbarem das Maximum für Graz-Reininghaus nutzbar zu machen, setzten wir einen komplexen und interdisziplinären Prozess auf, der auch den Anspruch hatte, belastbar zukunftsweisend zu sein: Hunderte Gespräche, Reisen, Zielvorgaben, Hypothesen, Varianten, Symposien und vor allem unbegrenztes Nachdenken und Diskussionen. Denn wir wollten nicht einen Plan realisieren, sondern Leben ermöglichen, das Leben in einer Stadt des 21. Jahrhunderts.

Wir übernahmen für diesen selten begangenen Weg die Rolle der städtebaulichen Intendanten. In einer zweiten Phase entwickelten wir dann das übergreifende Konzept und daraus das Stadtmodell Graz-Reininghaus. Dieses war Grundlage für die konkrete städtebauliche Planung.

2 GRAZ-REININGHAUS 2020.

Wie stellen wir uns vor, hier zu leben, zu arbeiten und zu investieren? Drei Bereiche, die nicht ausschließlich, aber doch wesentlich zur Stadt-Werdung beitragen.

Sprechen wir zuerst von den Familien, die hier leben werden. Das Leben in Graz-Reininghaus orientiert sich an den bisher unerfüllten Bedürfnissen und Sehnsüchten der zukünftigen Bewohner/-innen. Der Stadtteil öffnet Freiräume für die Lebensgestaltung aktiver, eigenverantwortlicher Bürger/-innen und fußt daher nicht mehr alleine auf Initiativen von Institutionen und Organisationen.

Neben dem bekannten Angebot des gewerblichen und kommunalen Wohnbaus gibt es daher kleinere und speziell zugeschnittene Bauflächen für ergänzende Angebote. Diese ermöglichen alternative, neuartige, Maß geschneiderte Wohn-, Arbeits- und Organisationsformen. Baugruppen, Stadthäuser und betreubare Wohneinheiten finden hier ebenso Platz wie Auto freies Wohnen, Generationenwohnen und unterschiedlichste Wohngemeinschaften. Die große Auswahl entspricht den vielfältigen Lebensvorstellungen einer zukünftigen Gesellschaft und stellt zudem ein buntes Stadtleben sicher.

Darüber hinaus wird der zwingende Zusammenhang aus Wohnen und Auto durchbrochen. Dementsprechend wird es keine den Wohnungen direkt zugeordnete Tiefgaragenplätze geben. 90 % der Abstellplätze werden in Sammelgaragen untergebracht, zugunsten von mehr Lebensraum für die Bewohner/-innen. Ergänzend dazu wird eine leistungsfähige Straßenbahnlinie durch das Gebiet geführt, großzügige und fein vernetzte Rad- und Fußwege entlang üppiger Alleen motivieren dazu, das Auto stehen zu lassen.

Der öffentliche Raum wird dadurch wieder zur Schnittstelle für alle Bürger, unabhängig davon, ob sie die Angebote im Stadtviertel annehmen oder welches Verkehrsmittel sie benutzen. Dies erhöht die Frequenz in den Straßen, die Zahl der Sozialkontakte und die Ereignisdichte.

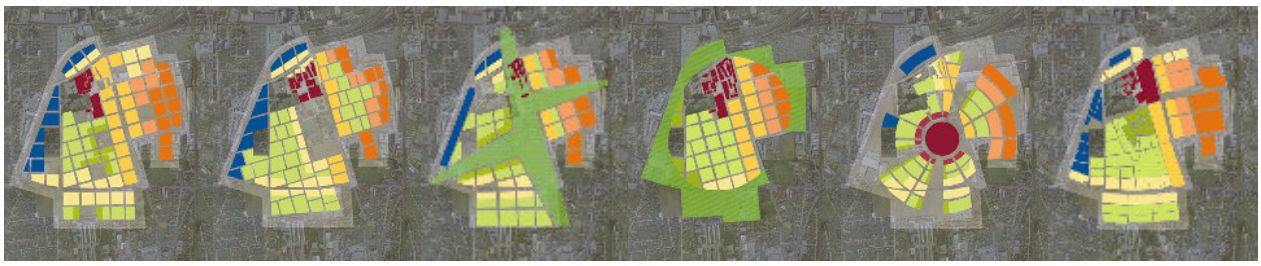

Abb. 3-8: 6 Stadtmodelle für Graz-Reininghaus: Quartiersplätze, Centralpark, Stadtinseln, Stadtlichtung, Landmark, Partchwork

Um den Erlebniswert der Straßen noch weiter zu steigern, bekommen auch die Erdgeschoßzonen einen Mix aus vielfältigen öffentlichen Einrichtungen. Die Sockelzonen der Gebäude bleiben über weite Teile frei von Wohnungen oder Büros. Hier finden sich neben Gemeinschafts- und Sozialräumen auch Geschäfte, Räume für Galerien, Cafés etc. So wird die Spirale der Attraktivitätssteigerung in Gang gesetzt: Die Sockelzonen bieten attraktive Angebote, dadurch werden die Straßenräume attraktiver und damit stärker frequentiert, dadurch werden die Angebote besser genutzt, etc. In Summe entsteht so das gewünschte vielfältige Stadtleben.

Graz-Reininghaus setzt auf Vielfalt bei Angebot und Atmosphäre. Da die Quartiere über mehrere Jahre bis Jahrzehnte von unterschiedlichen Entwicklern geplant und realisiert werden, ist nicht nur eine Vielzahl an Funktionen sichergestellt, es wird auch ein organisches Wachstum gewährleistet. Dadurch sind die Angebote entsprechend Zielgruppen konform. Angebote müssen nicht von langer Hand geplant werden, vielmehr wird der Nachfrage schrittweise nachgekommen: Was in einem Quartier noch fehlt, wird im nächsten ergänzend angeboten.

Diese von Beginn an angestrebte Durchmischung stellt ein selbstverständliches Nebeneinander von Wohnen, Arbeiten und Freizeit sicher. Die gesellschaftlichen Änderungen bringen immer mehr freie Arbeitseinteilung, Patchworkfamilien und den Wunsch nach vielfältigen Lebensformen mit sich. Eine Stadtteilplanung, die diesen Anforderungen gerecht wird, gewährleistet ein Mehr an Angeboten, eine soziale Durchmischung und ein Miteinander von verschiedenen Funktionen.

Ein besonderes gesellschaftliches Interface sind die vielfältigen Grün- und Freiräume, die für die Bedürfnisse jeder Zielgruppe individuelle Angebote bereithalten. Dazu zählen der Stadtteilpark und der Stadtplatz, Plätzchen und Gässchen, eine Auto freie Grünachse, die Quartiersparks und der Bezirksportplatz.

Kommen wir jetzt zur Wirtschaft in Graz-Reininghaus 2020. Zunächst zu jenem Teil, der hierher seinen Betriebsstandort verlegt. Durch die Vielzahl an bisher ungeahnten Möglichkeiten wird Graz-Reininghaus auch ein Stadtteil zum Unternehmen – hier wird aktiv sein möglich gemacht, Tun ist erwünscht. Hier werden betriebliche Existenzen aufgebaut. Ein Stadtteil als Jungunternehmen, das zum Unternehmen anspornt.

Auch aus der Entwicklung des Stadtteils ergeben sich Potenziale für die entsprechenden Unternehmen. Ein Stadtteil, der wächst, bietet Arbeit für hier tätige Architekten, Statiker, Planer, Raumausstatter, Einrichtungsstudios. Die Handwerker wollen verköstigt, die hier aufwachsenden Kinder unterhalten, die Wohnungen gestaltet und die Bewohner zum Verweilen in Gastgärten verführt werden. Ideale Voraussetzungen für junge Unternehmen mit unkonventionellen Ideen.

Die Besonderheit, dass hier ein ganzer Stadtteil neu errichtet wird, eröffnet zudem die Chance, eine eigene Community zu begründen. Das eröffnet im Speziellen neuen Geschäftsideen interessante Tätigkeitsbereiche. Zwei Beispiele: Selbstbewusste, engagierte Bürgeronnen und Bürger wünschen Alternativen zu öffentlichen Angeboten im Bereich von Betreuungs- und Bildungseinrichtungen; oder: der Wunsch nach Besitz eines Autos sinkt bei den jüngeren Generation, Besitz belastet und kostet. Eine tolle Chance für Car-Sharing-Angebote, Lieferservices, Mitfahrbörsen u.a.m.

Abb. 9: Podiumsdiskusion ‘Mobilität für Graz-Reininghaus’

Abb. 10: Diskussionsrunde während der Endpräsentation ‘Grün-und Freiraum in Graz-Reininghaus’

Abb. 11: Expertenintervie im Rahmen der ‘Stadtszenarien für Graz-Reininghaus’

Abb. 12: Symposium ‘Stadtszenarien zu Graz-Reininghaus’

Der Standort Graz-Reininghaus ist ideal für Dienstleistungs- und Gewerbetriebe, die städtisches Ambiente schätzen und auf Innenstadtnähe und hochwertige öffentliche Verkehrsmittel angewiesen sind. Gleichzeitig ist das räumliche Zusammenrücken und die Möglichkeit der zeitlichen Verschränkung von Arbeiten, Familie, Freizeit und Entspannung die Voraussetzung für hohe Lebensqualität.

Für Unternehmen jeder Größe, vom Ein-Mann-Unternehmen bis zur Konzernniederlassung sind in der Entwicklung der einzelnen Quartiere Lösungen in Miete und zum selbst Investieren für Anmietung und Ankauf vorgesehen. Trotz der guten Lage sind die Immobilienpreise anfangs noch moderat, das bietet die Möglichkeit, bei frühzeitigem Investment an der erwarteten Wertsteigerung zu partizipieren. Das Risiko ist dabei überschaubar, da klare Konzepte und Ideen vorliegen. Hier können auch junge Unternehmen noch ihren Standort im Eigentum erwerben und so langfristig Eigenkapital aufbauen.

Schließlich noch ein Blick auf die Investoren in Graz-Reininghaus 2020. Auch für sie beinhaltet das Konzept außergewöhnliche Möglichkeiten, die Stadtentwicklung in Graz-Reininghaus bietet Entwicklern und Investoren ein optimales Umfeld: Übernimmt ein Entwickler ein ganzes Quartier, kann er dieses von Grund auf nach seinen Vorstellungen gestalten, dessen Freiräume, Plätze und Baumassen. Er kann dem Quartier seinen eigenen Stempel aufdrücken.

Für Investoren mit Fokus auf einen kleineren Maßstab gibt es Grundstücke in unterschiedlicher Größe, Lage und Frequenz, mit individuellem Zuschnitt und Preis. Die gewünschte Nutzungsvielfalt ermöglicht ein weites Spektrum an denkbaren Nutzungen. Die Offenheit in den Vorschreibungen des Rahmenplans offeriert Chancen für phantasievolle Gestaltungen.

Das Stadtteilübergreifende Mobilitätskonzept stellt auch langfristig eine gute Erreichbarkeit und eine sinnvolle Umsetzung von Umweltzielen sicher. Im besten Sinne des Wortes: eine nachhaltige Entwicklung.

3 METHODE

Im zweiten Teil möchte ich auf die – sogenannte – Reininghaus-Methode und das ihr zu Grunde liegende Konzept der resilienten Stadt näher eingehen.

Eine neue Stadt kann nicht mit alten Methoden geplant werden. Das wäre nur das Wiederholen dessen, was absehbar nicht den zukünftigen Bedürfnissen entspricht. Denn auch mit bestem Wissen und Gewissen Geplantes kann weder die Energie der Nische noch die Kraft der Vielfalt ersetzen. Die Stadt muss beides sein: Robust und flexibel, konsequent und streng genauso wie freiheitsliebend und vielfältig. In dieser, wie wir es nennen, resilienten Stadt, wird auch die Urbanität, nach der wir uns sehnen, lebendig.

Resilienz muss zwei Anforderungen gerecht werden. Sie muss einerseits für Investoren und deren Anforderungen Freiheiten und Möglichkeiten bieten, damit Graz-Reininghaus im internationalen Standortwettbewerb attraktiv ist. Zu diesem Zweck lässt der vorgeschlagene Rahmenplan die Ausgestaltung von Details bewusst offen – nur so können geänderte Umstände, technologische Neuerungen oder aktuelle Erkenntnisse zum Zeitpunkt der Entwicklung eingebunden werden.

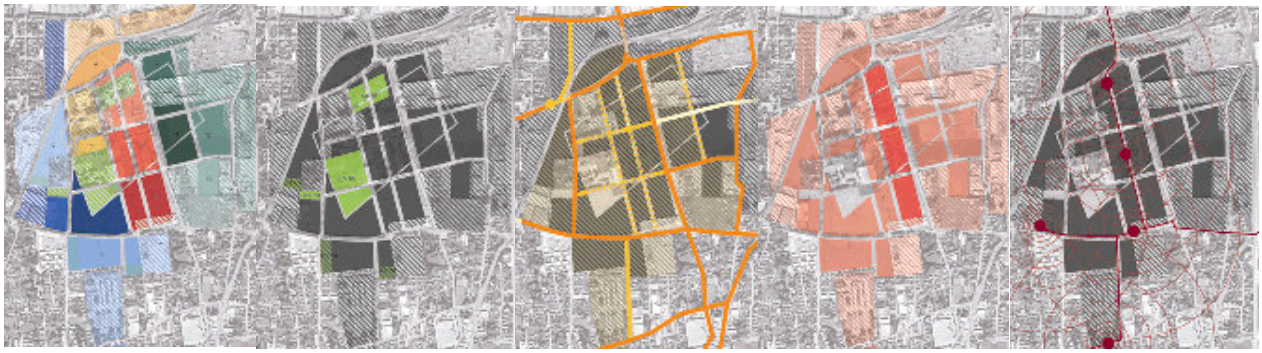

Abb. 13-17: Stadtmodell Graz-Reininghaus: 13 Stadtquartiere, öffentlicher Grünraum, Erschließung, Esplanade, ÖV-Erschließung

Zum Zweiten muss resiliente Planung so robust sein, dass das Funktionieren und der Zusammenhalt von Graz-Reininghaus unabhängig von den einzelnen Quartieren gewährleistet wird. Der Rahmenplan hat damit eine wichtige Vorsorgefunktion für eine kontinuierliche Entwicklung des Stadtteils, indem er langfristige Entwicklungsziele abbildet und als planerische Anforderungen festlegt. Insgesamt ist es demnach die Aufgabe des Rahmenplans, ‚Spielregeln' festzulegen, nicht aber die Spielzüge. Ganz nach dem Prinzip: Definiere so wenig wie möglich, aber so viel wie nötig.

Im Februar 2010 wurde dieser Rahmenplan für Graz-Reininghaus vom Grazer Gemeinderat verabschiedet. Dem gingen folgendeMeilensteine voraus:

- Zunächst steckten wir in 5 Standpunkten die prinzipiellen Zielvorgaben ab
- Dem folgten umfassende Recherchen zu Fragestellungen, die für das städtische Leben relevant sind, wie: Nutzungsvielfalt, Trends im Wohnbau, Ankernutzungen und Erweiterungsetappen. Alle Bereiche wurden in unterschiedlichsten Formaten thematisiert, analysiert und auf Graz-Reininghaus zugeschnitten
- Aus den aufbereiteten Themen haben wir wichtige Aspekte destilliert und in mehreren Szenarien dargestellt. Diese abstrahierten Stadtmodelle wurden in eingehender Diskussion mit dem Auftraggeber und der Stadt Graz zum Stadtmodell Graz-Reininghaus verdichtet.
- Daraus wurde ein Zielkatalog für die Stadtplanung erstellt, der Schritt für Schritt und unter Einbindung von zusätzlichen Experten schließlich zum Rahmenplan Graz-Reininghaus geführt hat.

4 FUNDAMENTE

Selbstverständlich haben wir nicht im luftleeren Raum gearbeitet. Denn die bekannten und anerkannten Grundregeln für die Stadtentwicklung bildeten ein Rückgrat für unser Tun: Nachhaltige Stadtentwicklung in der kompakten Stadt der kurzen Weg, Innerstädtische Nachverichtung, Wiedergewinnung der Innenstädte, Energieautarkie und Nullenergiestadtteil. Aber was macht die Besonderheit von Graz-Reininhaus aus?

Wir waren mit unserem Ohr näher an den Bedürfnissen der nachwachsenden Generationen. Dabei sind für Graz-Reininghaus zwei aktuelle Entwicklungen besonders relevant:

Unsere Gesellschaft wird sich in Zukunft viel stärker segregieren und deutlich weniger vorhersehbarer entwickeln. Ein gemeinsames gesellschaftliches Ziel ist im Moment nicht erkennbar. Es wird – sowohl zeitgleich als auch in rasch wechselnder Abfolge – viele verschiedene Lebensformen, stärker differenzierte Werte und zahlreiche unterschiedliche Zukunfts- und Lebensmodelle geben. Eine Stadt, die nur Lösungen für klar eingegrenzte Fragen bietet, wird dann nicht mehr funktionieren. Vielmehr müssen Städte in Zukunft variabel auf unterschiedlichste Bedürfnisse eingehen können.

Darüber hinaus entwickeln immer mehr Menschen ein tiefes Misstrauen gegenüber Institutionen, gesellschaftlichen Konstanten und scheinbaren Sicherheiten. Das öffnet Möglichkeiten für neue Wege, lässt aber auch bekannte Methoden und Steuerungsinstrumente unwirksam werden. Wenn es keine gesellschaftlich anerkannten Autoritäten gibt, fehlt auch die Legitimation für viele Entscheidungen.

Soll unter diesen Umständen Stadtentwicklung zu einem stabilen Kontinuum mit erkennbarer Richtung werden, brauchen Städte eine resiliente – eine robuste und gleichzeitig flexible – Basis.

5 ZUSAMMENFASSUNG

Städte waren immer mehr, als einfach nur ein Nebeneinander vieler Häuser. Was die Stadt attraktiv macht, ist die überraschende Vielfalt des Angebots und der Erlebnisse. Vielfalt als Mittel, nicht als Selbstzweck. Denn viele Grundfunktionen und Sowieso-Angebote hat jede Stadt. Entsprechend dem Pareto-Prinzip, demzufolge nur 20 % des Aufwands für die Gesamtleistung ausschlaggebend sind, macht aber genau der Zusatznutzen den erkennbaren Unterschied, den Mehrwert aus.

Der Kern des Konzepts für Graz-Reininghaus ist es, urbane Vielfalt zu ermöglichen. Das wird Graz-Reininghaus attraktiv machen. Attraktivität wird im Standortwettbewerb der Regionen zum entscheidenden Faktor. Hier ist das authentisch Urbane, in seiner jeweils passenden Form, unverzichtbar. Und was ist Urbanität? Urbanität ist das, was man nicht planen kann. Es ist ein Lebensgefühl, das sich durch die Summe von Ereignissen zu einem unverwechselbaren Erlebnis verdichtet. Urbanität ist Vielfalt.

Diese muss man zulassen.

6 SCHLUSSFOLGERUNG

Die Reininghaus-Methode ermöglicht es, spezifisches Know-How zu komplexen Themenbereichen zu sammeln, zu bewerten und zielgerichtet einzusetzen. Darüber hinaus sehen wir in einer Vorgangsweise, die klare Richtungen und Ziele vorgibt, gleichzeitig aber die detaillierten funktionalen und gestalterischen Lösungen für Teilbereiche gezielt für den Zeitpunkt der Realisierung offen lässt, ein optimales Instrument für Zeiten zunehmender Unvorhersehbarkeit.

Mit der Verabschiedung des Rahmenplans im Februar 2010 ist das Projekt für uns vorerst abgeschlossen. Wir beobachten jetzt mit Interesse, wie diese umfassende Grundlagenarbeit von der Stadt Graz in die reale Identität des Stadtteils und der gesamten Stadt übertragen wird.

Geist tötet Emotion, Planung verhindert Zulassen. Unserer Meinung nach hat das ausschließliche Denken in Masterplänen, Verordnungen und Raumordnungen in der Entwicklung der europäischen Städte ausgedient. Dafür wandeln sich Gesellschaft und Anforderungen viel zu rasch. Für die resiliente Stadt brauchen wir auch resiliente Planungsinstrumente – klare Vorgaben für flexible Realisierungen.

Green Buildings for sustainable cities

Bernd Stampfl

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1 ABSTRACT

75% of the world's energy is consumed in cities.

40% of the world's energy is consumed in buildings.

The most interesting potential for CO2-reduction in cities from an economical point of view lays in the modernization of the builing infrastructure.

Making existing and new buildings to Green Buildings is one of the most effectice levers to meet the challenges of CO2 reduction in cities.

Siemens as endorser of the Green Building program of the European Union has already implemented several projects for the program. The objective of the presentation is to give a short overview of the frame conditions, the existing labels and – most important – show success stories.

2 INTRODUCTION

Cities cover less than 1% of the earth's surface but are disproportionately responsible for causing climate change.

Currently, around 50% of the world's population live in cities. Until 2030, 60% of the world's population growth will occur in cities

Cities and urban areas consume some 75% of the world's energy and are responsible for up to 75% of greenhouse gas emissions.

Cities directly or indirectly account for 60% of world's water use

So a majority of the world's energy consumption either occurs in cities or as a direct result of the way that cities function (eg through transport of goods to points of consumption in cities).

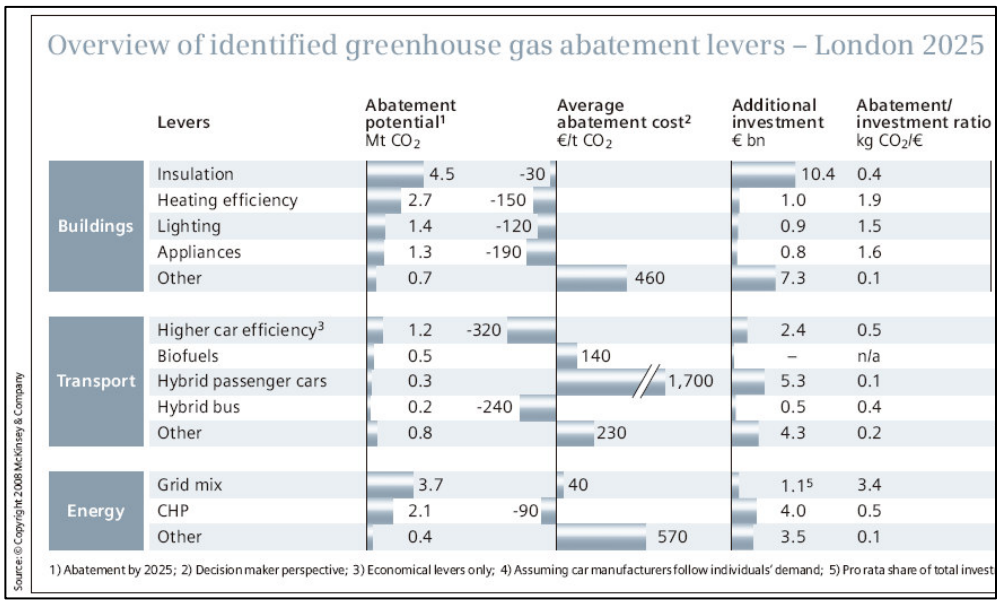
A study issued recently issued for the city of London showed the following facts:

More than half of the reduction potential lies within buildings. London could reduce a third of its green house gas emissions (10.6 Mt) until2025

Nearly 90% of this potential are based measures, that result in profitable lifecycle economics.

The installation of efficient lighting is the single most economic measure for buildings, resulting in 0.4 Mt of emission reductions, worth €270 per ton saved.

Commercial buildings may profit from a large set of measures, including the mornization of the infrastructure and optimization of building controls.



Energy saving measures in buildings could account for more than half of London's overall emissions reduction potential, cutting emissions by 10.6 Mt, or nearly one-third, by 2025.

Almost 90% of this carbon abatement potential is based on technological levers that will payback their initial investment through energy savings.

Businesses have a wide array of carbon-cutting options at their disposal, ranging from more efficient equipment to optimized building automation.

3 GREEN BUILDINGS AS SOLUTION FOR SUSTAINABLE CITIES

3.1 What is a Green Buidling?

A sustainable building, or green building is an outcome of a design which focuses on increasing the efficiency of resource use – energy, water, and materials – while reducing building impacts on human health and the environment during the building's lifecycle, through better siting, design, construction, operation, maintenance, and removal.

3.2 Which Green Building labels are known so far?

3.3 Best practice – Examples for Green Buildings

So far the Green Building Program of the European Union has 180 partners, which at least made one their buildings fulfilling the requirements of the program.

Siemens as one of the main endorsers encouraged several organizations to participate in the program. On the other side Siemens participates in the program as a partner by making its own buildings to Green Buildings.

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Gesunde Stadt? Eine interdisziplinäre Perspektive auf gesundheitliche Einflüsse in Essener Stadtteilen

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1 ABSTRACT

Unumstritten ist, dass das Konstrukt der Stadt als Lebensumfeld mit seinen komplexen Wechselwirkungen und dem Zusammenspiel von Einzelelementen die Gesundheit der in der Stadt und Stadtregion lebenden Menschen direkt und indirekt beeinflusst. Die Schaffung einer gesundheitserhaltenden gebauten Umwelt kann demnach zu gesundheitsförderlichen Bedingungen ebenso beitragen wie gesundheitsschädigende Bedingungen reduzieren. Darüber hinaus gilt es, das Augenmerk nicht allein auf die gebaute Umwelt zu richten, sondern auch auf den sozialen Raum und die Wahrnehmung der gebauten Umwelt durch die Bewohner. Bisher fehlt weitgehend eine integrierte und systematische Betrachtung des komplexen Gefüges der verschiedenen städtebaulichen, sozialräumlichen und umweltmedizinischen Aspekte der städtischen Umwelt und ihrer Folgen für die Gesundheit städtischer Bewohner.

Ziel dieser in 2009 gestarteten interdisziplinären Studie ist es, in vier ausgewählten Stadtteilen in Essen quantitative Ergebnisse über Erkrankungen oder Erkrankungsrisiken von Bewohnern in Zusammenhang zu setzen mit Faktoren ihrer gebauten und sozialen Umwelt. Zusammen mit einer umfassenden Erhebung sozialräumlicher, infrastruktureller, stadtstruktureller und stadtgestalterischer Wohnumfeldindikatoren werden mit dem Instrument der Gruppendiskussion zur Analyse der subjektiven Deutungsstrategien der Bewohner qualitative Interviews geführt, mit der erst die notwendige Relationierung von räumlichen Bedingungen und alltäglichen Verhaltensmustern ermöglicht wird. Mit Hilfe einer bestehenden populationsbezogenen Langzeitstudie mit rund 2000 Studienteilnehmern aus der Stadt Essen werden ausgewählte Stadtteile nach ihrem Risikoprofil und ihrer gesundheitlichen Wirkung typisiert, um daraus gesundheitseffektive Leitlinien und Handlungsempfehlungen für eine gesundheitssensible Stadtplanung abzuleiten.

2 EINLEITUNG

2.1 Hintergrund und Ausgangslage

Angesichts der Tatsache, dass rund 85% der Deutschen in urbanen Gebieten wohnen (Destatis 2005), werden für die Mehrheit der Menschen die gesundheitlichen Verhältnisse und bis zu einem gewissen Grad ihre Verhaltensweisen vom urbanen Raum abhängen und sich vor allem im urbanen Raum abspielen. Obwohl der europäische Lebensstandard im Vergleich zu früheren Zeiten immer höher und der Wohlstand immer größer werden, gehen die „Lebensqualität“ und die Gesundheit der Bevölkerung damit nicht immer und unbedingt Hand in Hand. Zahlreiche Studien haben gezeigt, dass ein Zusammenhang zwischen gebauter Umwelt und Gesundheit der Stadtbewohner heute viel unterschwelliger ist als im Vergleich zum 19. Jahrhundert (vgl. u.a. Committee on Physical Activity, Health, Transportation, and Land Use 2005, Frumkin et al. 2004, European Environment Agency 2009). Verbesserte städtische Ver- und Entsorgungssysteme sowie Wohnverhältnisse haben zu einer deutlichen Verbesserung der Gesundheit der städtischen Bevölkerung geführt. Zusammen mit den Fortschritten in Bereichen des Gesundheitswesens, Hygiene, Ernährung und Arbeitsbedingungen führte dies zu einer drastischen Erhöhung der Lebenserwartung der Menschen. Die durchschnittliche Lebenserwartung in Deutschland ist seit Beginn des 20. Jahrhunderts um mehr als 30 Jahre gestiegen und beträgt derzeit für neugeborene Jungen 77 Jahre und für Mädchen 82 Jahre (Statistisches Bundesamt 2009). Damit verbunden ist allerdings die Zunahme von chronischen Erkrankungen wie Krebs, Herz- und Kreislauferkrankungen, Diabetes oder neurologische Störungen (Gesundheitsberichterstattung des Bundes 2006). Eine in den letzten Jahrzehnten beobachtete kontinuierliche Zunahme von Adipositas wird zunehmend mit der gebauten Umwelt in Zusammenhang gebracht (vgl. u.a. Giles-Corti et al. 2003, Rutt und Coleman 2005, Saelens et al. 2003). Diese gesundheitlichen Entwicklungen führen aus der Perspektive des Individuums neben einer möglicherweise verkürzten Lebensdauer, vor allem zu einer verminderten

Lebensqualität. Aus der gesellschaftlichen Perspektive sind es hier vor allem die hohen finanziellen Belastungen des Gesundheitssystems, die verstärkt dazu geführt haben, hier nach Lösungen zu forschen. Gesundheitliche Themen in der Stadtplanung und im Städtebau werden in Deutschland bislang kaum wahrgenommen. Eine Schwierigkeit liegt darin, die Verknüpfung zwischen einerseits bestimmten städtebaulich-freiräumlichen Konfigurationen und Zusammenspiel der Gestaltungsmerkmale und andererseits den tatsächlichen gesundheitlichen Wirkungsgrad bzw. Einfluss auf die gesundheitsfördernde Verhaltensweise aufzuzeigen.

Im Folgenden sollen Ausgangspunkt und theoretisches Fundament der Essener Studie in bezug auf Gesundheit als gedankliche Verknüpfung zwischen städtebaulicher Qualität und Gesunderhaltung aufgezeigt werden.

2.2 Ausgangsüberlegungen zu Gesundheit

Bemerkenswerte Analogien sind zu erkennen zwischen zwei in ihren jeweiligen Fachbereichen, Medizin und Städtebau, nachhaltig prägenden Konzepten und theoretischen Konstrukten: das salutogenetische Modell des Medizinsoziologen Aaron Antonovsky, das er in den 1970er Jahren entwickelt hat (Antonovsky orig. 1987) und die Studien und Erkenntnisse zur Wahrnehmung städtebaulicher Qualitäten des amerikanischen Stadtplaners Kevin Lynch (orig. 1960), die in städtebauliche Prinzipien und Dimensionen münden.

Von der Kernfrage ausgehend, was Menschen gesund erhält, entwickelte Antonovsky das Modell der Salutogenese als Präventionskonzept. Als Komplementär zur Pathogenese, die die Entstehung und die Entwickung von Krankheit umschreibt, umfasst die Salutogenese Faktoren, die zur Entstehung und Erhaltung von Gesundheit führen. In diesem Zusammenhang entwickelte er den Bergiff „Sense of coherence“ (SOC), ein Kohärenzgefühl, das sinngemäß ein Gefühl des Vertrauens eines Menschen darüber ausdrückt, dass die Ereignisse seines Lebens strukturiert, erklärbar, verstehbar, zu bewältigen und sinnhaft sind (vgl. Antonovsky 1997). Das Kohärenzgefühl umfasst nach Antonovsky die Komponenten Verstehbarkeit, Gefühl von Bedeutsamkeit und Handhabbarkeit (als subjektive Größen bzw. Fähigkeiten). Genau an diesem Punkt sind deutliche Parallelen zu Lynchs (orig. 1960) Kerngedanken über städtebauliche Qualitäten zu erkennen: denn auch in der städtebaulichen Gestaltung existieren übergeordnete Grundprinzipien wie Ordnung, Lesbarkeit, Struktur, Sinn, Identität, Einprägsamkeit, Kohärenz, menschlicher Maßstab – die in engem Zusammenhang stehen mit der Wahrnehmung der gebauten Stadt durch den Menschen, um somit „günstigen Einfluß auf alle örtlichen Aktivitäten auszuüben und die Bildung von ortsgebundenen Erinnerungen zu fördern“ (Lynch 1991:141). In dem Werk „City Sense and City Design“ (Banerjee und Southworth 1990), eine Sammlung von Lynchs Texten und Projekten, tauchen diese Dimensionen ebenfalls immer wieder auf. Sie existieren nicht nur bei Lynch, sondern basieren - zum Teil in ergänzender oder modifizierter Form - vorrangig auf klassischen städtebaulichen Grundlagenwerken (vgl. u.a. Curdes 1997, Prinz 1993/1995, Alexander et al. 1977, Wienands 1985, Jacobs 1995).

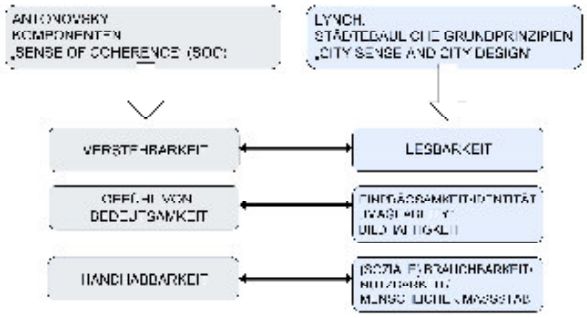

Fig. 1: Analogien zwischen „Sense of Coherence” und “City Sense and City Design” (eigene Darstellung)

Weiterhin bauen die Ziele und Forschungsansätze der Studie auf Antonovskys Überlegungen, dass Gesundheit und Krankheit Zustände sind, die auf einer Kontiuum-Skala Pole bilden. Bei jedem Menschen gibt es kranke sowie gesunde Aspekte, man ist zeit seines Lebens mehr oder weniger gesund. Der Krankheitszustand kann im Gegensatz zum Gesundheitszustand durch gezielte Maßnahmen verbessert werden, während der Gesundheitszustand nach Antonovsky als Prozess zu verstehen und mehrdimensional ist sowie durch viele Faktoren bestimmt wird, deren Zusammenspiel zur Erhaltung der Gesundheit beiträgt (Fig. 2). Die gebaute Umwelt und ihre Auswirkungen, die soziale Struktur, individuelle Verhaltensweisen,

der medizinische Versorgungsgrad, die genetische Veranlagung und die Ernährungsumwelt sind beispielsweise Faktoren, die bedeutsamen Einfluss auf die Gesunderhaltung haben können.

Auf diesen Grundgedanken baut diese Studie auf. Schwerpunkt der Studie liegt dabei auf qualitativen und quantitativen Aspekten der gebauten Umwelt in engem Zusammenhang mit den subjektiven räumlichen Wahrnehmungsmustern der Bewohner/-innen.

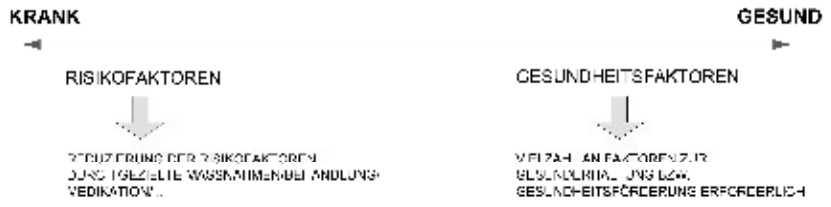

Fig. 2: Gesundheits-Krankheits-Kontinuum, ergänzt (eigene Darstellung)

3 KONZEPTIONELLES GERÜST

3.1 Fragestellung und Ziel

Fußend auf der o.g. Analogie zwischen dem salutogenetischen Modell und den Dimensionen städtebaulicher Qualitäten leitet sich aus der Frage, was den Menschen gesund erhält, die Hauptfragestellung für diese Studie ab: Inwiefern unterstützt die urbane gebaute und soziale Umwelt unser Gesundheitsverhalten und schafft sie gesundheitsfördernde und gesunderhaltende Verhältnisse und Lebensräume? Die meisten Studien hierzu, vor allem aus dem englischsprachigen Raum, legen ihren Schwerpunkt hauptsächlich darauf, Erkenntnisse über die Zusammenhänge zwischen der gebauten Umwelt und körperlicher Aktivität, also lediglich einem selektierten, wenn auch wichtigen Teilaspekt der Gesundheit, zu gewinnen. Was fehlt, sind umfassendere, ganzheitlichere Untersuchungen zu weiteren, möglichst vielen potentiellen gesundheitsrelevanten Faktoren sowie belastbare empirische Langzeitdaten über die unterschiedlichen Risiken und gesundheitsfördernden Aspekten auf Gesamtstadt- und Stadtteilebene, um krankheitsspezifische Ursache-Wirkung-Zusammenhänge nachzuweisen. Von dem salutogenetischen Ansatz ausgehend, ist es übergeordnetes Ziel dieser Studie, die bisher vorhandenen Untersuchungen und Ergebnisse, die sich auf Umweltrisiken und den Sozialraum beziehen, um weitere gesundheitsfördernde Aspekte aus städtebaulicher und sozialwissenschaftlicher Perspektive zu ergänzen. Ziel ist es, über eine möglichst umfassende stadträumliche Bestandsaufnahme, über Gruppendiskussionen mit Bewohnern/-innen und einer quantitativen Fallstudie zu sozialen Einflüssen und Kontextfaktoren gesundheitsbezogener Verhaltensmuster tiefergehende Erkenntnisse zu gewinnen über Zusammenhänge zwischen bestimmten Erkrankungen bzw. Erkrankungsrisiken und Merkmalen und Qualitäten der gebauten Umwelt. Letztlich sollen Städtebaukategorien erarbeitet werden, die für die Gesundheit, das Wohlbefinden und Bewegungsverhalten der Menschen relevant sind.

3.2 Datengrundlage und interdisziplinäre Verknüpfungen

Grundlage für diese Studie bildet die laufende Heinz Nixdorf Recall Studie (HNR-Studie), eine bestehende populationsbezogene prospektive Langzeitstudie mit 4814 zufällig ausgewählten Probanden aus den drei Ruhrgebietsstädten Bochum, Essen und Mülheim, die zum Zeitpunkt der Basiserhebung in den Jahren 2000-2003 zwischen 45 und 75 Jahren alt waren (Schmermund et al. 2002; Stang et al. 2005). Dabei wurden über umfangreiche Befragungen und Untersuchungen Daten zu gesundheitsrelevanten Verhaltensweisen, soziodemographischen Merkmalen und kardiovaskulären Risikofaktoren erhoben. Auf individueller Ebene liegen also detaillierte Informationen vor, die es erlauben, gesundheitliche Veränderungen im Laufe der Studie zu analysieren und mit städtebaulichen, sozialräumlichen und wahrnehmungsbezogenen Aspekten sowie umweltbezogenen Risikofaktoren in mögliche krankheitsspezifische Ursache-Wirkung-Zusammenhänge zu bringen. Da ein „gesunder“ Städtebau in Bezug auf die physisch-materielle Umwelt nicht unbedingt und notwendigerweise gesunde Verhaltensweisen nach sich zieht, ist es darüber hinaus notwendig, auch Wahrnehmungsweisen der gebauten Umwelt und ihrer Belastungen und Risiken zu untersuchen. Denn es ist belegt, dass große Diskrepanzen zwischen den wahrgenommenen und den gemessenen/objektiven Verhältnissen auftreten (European Environment Agency 2009).

Von entscheidender Bedeutung ist daher der interdisziplinäre Ansatz des Projekts (Fig. 3), um objektiv messbare Ergebnisse über Erkrankungen oder Erkrankungsrisiken von Bewohnern in Zusammenhang zu setzen mit qualitativen und quantitativen Faktoren ihrer gebauten Umwelt und ihrer Wahrnehmung durch die Bewohner/-innen.

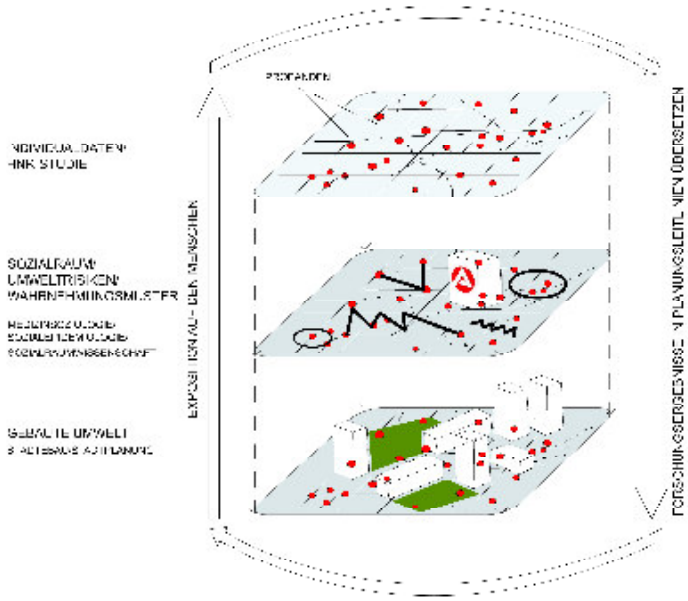

Fig. 3: Interdisziplinäre Betrachtungsebenen des Projekts

4 GESUNDHEITSFÖRDERNDE GEBAUTE UMWELT – STÄDTEBAULICHE PERSPEKTIVE

In diesem Abschnitt wird der Fokus exemplarisch auf die wesentlichen Schritte der städtebaulichen Untersuchung der gebauten Umwelt gelegt. Wo wir wohnen, hat Auswirkungen auf das Wohlbefinden und auf Gesundheitsdeterminanten. Der Städtebau spielt dabei eine wichtige Rolle, indem er die gebaute Umwelt als Lebensraum und „Bühne“ schafft und gestaltet. Planungen der gebauten Umwelt führen zwar nicht zwangsweise zu gesundem oder gesünderem Verhalten, aber sie machen bestimmte Dinge möglich und wahrscheinlicher. Ausgegangen wird von einem Raumverständnis, in dem ein bestimmter Raum nicht nur aus einer physisch-materiellen, sondern auch sozialen im Sinne von werte-, nutzungs- und wahrnehmungsbezogenen Dimension besteht. Die Qualität dieser Dimensionen entscheidet darüber, wie der Mensch diesen Raum wahrnimmt und somit wie er ihn sich aneignet. Kleinmaßstäbliche, feinere städtebauliche Qualitäten haben Einfluss auf das Nutzungsverhalten bestimmter Räume, auf das Bewegungsverhalten, auf die Wahl der Fortbewegungsmöglichkeit und das aktive Freizeitverhalten (vgl. u.a. Glasgow Centre For Population Health 2007, Ewing et al. 2006).

Für diese Studie wurden bisher drei unterschiedliche Stadtteile im Stadtgebiet Essen als Untersuchungsstadtteile ausgewählt, innerhalb derer für die Vorort-Begehung zur Erfassung städtebaulicher Aspekte jeweils kleinere ausschnittartige Untersuchungsgebiete festgelegt wurden.

4.1 Auswahl der Untersuchungsgebiete

Die Auswahl der drei Stadtteile erfolgte in Abstimmung mit Medizinsoziologen und Epidemiologen und auf Basis der Daten der HNR-Studie. Die ausgewählten Stadtteile haben trotz räumlicher Nähe deutliche Unterschiede sowohl hinsichtlich der kleinräumigen Sozialdaten als auch der Sampledaten. Die Stadtteile wurden nach weiteren folgenden Kriterien ausgewählt: in den jeweiligen Stadtteilen wohnt eine ausreichende Zahl an Probanden (mind. 50), sie weisen verschiedene Kontextdaten wie Wohndichte, Arbeitslosigkeit auf, ebenso eine Verteilung individueller Merkmale wie Alter, Body Mass Index (als Indikator für Übergewicht), Kalkscore (ein Maß zur Bestimmung der atherosklerotischen Veränderungen der Koronarterien), Rauchen. Je zwei Untersuchungsgebiete mit durchschnittlicher Größe von 38 ha wurden in den drei Stadtteilen Altendorf, Bochold und Frohnhausen festgelegt. Die jeweils ausgewählten Untersuchungsgebiete, die innerhalb desselben Stadtteils z.T. lediglich 100 m voreinander entfernt liegen, unterscheiden sich deutlich voneinander in städtebaulicher Gestalt, Gebäude-, Grün- und Verkehrsstruktur. Als Grundlage für die Festlegung der konkreten Untersuchungsgebiete diente die Deutsche Grundkarte von Essen und ein Plan mit

Darstellung der Essener Stadtteile. Überlagert wurden diese beiden Pläne mit einer georeferenzierten Karte mit Darstellung der Probandenverteilung aus der HNR-Studie, sodass auf dieser Basis die konkreten Untersuchungsgebiete im Hinblick auf eine ausreichende Probandenzahl und eine städtebauliche Typisierung festgelegt werden konnte.

4.2 Kurzüberblick über städtebauliche Untersuchungsmethode

Durch Schaffung einer gesundheitsfördernden gebauten Umwelt können Planungen 1) es den Menschen erleichtern, sich vor allem im Alltag „gesünder“ zu verhalten, 2) negative Auswirkungen der Stadt (Emissionen, Lärm etc.) abwenden oder reduzieren, die die direkte Gesundheit beeinträchtigen. Daraus folgt, dass sich keine direkten Kriterien für einen „gesunden“ Städtebau ableiten lassen, aber 1) qualitative und quantitative Kriterien für die Erhöhung der Wahrscheinlichkeit, dass Menschen sich gesünder verhalten, 2) vorrangig quantitativ messbare, objektive Kriterien für die Abwendung bzw. Reduzierung von gesundheitsgefährdenden oder gesundheitsbelastenden Faktoren - entsprechend dem salutogenetischen bzw. ergänzend dazu dem pathogenetischen Ansatz.

Bevor die städtebauliche Vorort-Begehung und Merkmalserfassung durchgeführt werden konnte, mussten zunächst diese Untersuchungskriterien identifiziert, erarbeitet und systematisch aufbereitet werden. Der Ansatz zielt darauf ab, die abstrakten Kategorien bzw. Themen auf unterschiedlichsten Erfassungsebenen in Kriterien bzw. Aspekte zu übersetzen, aus denen wiederum handhabbare Indikatoren für die Begehung abgeleitet wurden. Die Kategorien und Kriterien bzw. Aspekte stammen aus der Fachliteratur u.a. aus den Bereichen Public Health, Epidemiologie, Städtebau, Sozialwissenschaft, Wahrnehmungspsychologie (vgl. u.a. Glasgow Centre for Population Health 2007, Papas et al. 2007, Handy et al. 2002, Frumkin et al. 2004, Frank et al. 2006). Hierfür wurden bestehende Studien und Literaturhinweise vor allem zum Zusammenhang zwischen Gesundheitsförderung/Gesundheit und Stadtplanung/städtebauliche Gestaltungsqualitäten gesichtet.

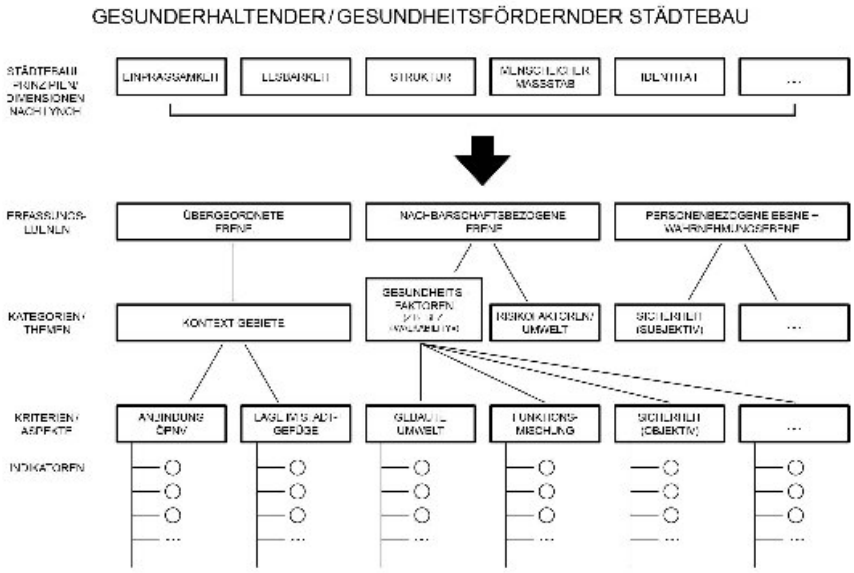

Fig. 4: Kriterienstruktur

Es erfolgte zunächst eine Gliederung der Erfassungsebenen in eine übergeordnete, nachbarschaftsbzogene und personenbezogene bzw. wahrnehmungsbezogene Ebene. In einem weiteren Schritt wurden gesundheitsrelevante Kategorien/Themen entwickelt, woraus Kriterien/Aspekte abgeleitet wurden. Hierbei wurde vornehmlich der Schwerpunkt auf Gesundheitsfaktoren als Komplementär zu den bereits in der HNR-Studie umfassend untersuchten Risikofaktoren der Umwelt gelegt. Ein Teil der Kriterien konnte auf Plänen erfasst und dargestellt werden, wobei es hier vorrangig um messbare, quantitative Aspekte geht. Auf Plänen wurden z.B. Entfernungen zwischen verschiedenen Nutzungen, Entfernungen zu Parkanlagen, die räumliche Verteilung von Einrichtungen für den alltäglichen Bedarf, die Anzahl der Kreuzungen, Radien von Grünräumen sowie die Verortung von Bebauung, Grünräumen, Verkehrsstruktur usw. erfasst und dargestellt.

Weitere wesentliche ergänzende gesundheitsrelevante Kriterien in Bezug auf stadträumliche Qualitäten waren nur vor Ort erfassbar. Denn ob beispielsweise die wohnungsnahen Grünräume nicht nur in Nachbarschaftsnähe vorhanden sind, sondern auch attraktiv und nutzbar sind, wurde erst über eine Vorort-Begehung festgestellt. In diesem weiteren Schritt wurde daher der dreidimensionale gebaute Stadtraum auf Fußgängermaßstab erfasst. In dieser feineren Untersuchung stehen qualitative Merkmale im Vordergrund wie z.B. Qualität von Zugängen zu Grünräumen, Qualität der Grünräume, Straßenräume und Plätze, Art der Läden, Ernährungsangebote usw. Die Indikatoren hierfür stammen aus bestehenden Studien (u.a. Finke 2009, Giles-Corti et al. 2005, Ewing et al. 2006, Papas et al. 2007). Mit Hilfe von Markierungen in Plänen sowie über fotografische Illustrationen der städtebaulichen Elemente und Erläuterungstexten werden diese dargestellt.

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Heritagescape, Urban Planning and Strategies: Studies from India

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1 SCALE OF THE UNESCO WORLD HERITAGE SITES AND INDIAN SCENARIO

Out of 878 heritage sites in the world (as in February 2010; cf. Table 10.1), 29 heritage sites (Cultural 24, Natural 5) from India are included in the World Heritage List (cf. Table 2, Fig. 1). However, the Indian government has declared 150 places as national heritage sites on the basis of the criteria adopted by the Archaeological Survey of India (ASI). The UNESCO committee consists of the three types of programmes, which include research and documentation, training and awareness, and conservation and sustainable planning.

Zone	Natural	Cultural	Mixed	Total	%	State Party represented
Africa	33	42	3	78	9	28
Arab States	4	60	1	65	7	16
Asia-Pacific	48	129	9	182	21	28
Europe & North America (including Israel, Russia)	56	375	9	440	50	51
Latin America & Caribbean	35	83	3	121	14	25
TOTAL	**176**	**689**	**25**	**890**	**100**	**148**

Table 1. Unesco World Heritage Properties; February 2010

Presently a proliferation of international agencies attests the global character of concern for tangible heritage and its preservation; these include the International Council of Museums (ICOM), the International Council of Monuments and Sites (ICOMOS), the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), the International Institute for Conservation of Historic and Architectural Works (IIC-HAW), the World Heritage Centre (WHC) of the UNESCO, and Sacred Sites International Foundation (SSIF). Efforts to develop heritage programmes and heritage resource conservation are promoted by these agencies in different ways and on priority basis in various parts of the globe.

Se.	Category	No.	Heritage Properties (Year of inscription)
	Cultural Heritage		
1.	Fort, Palaces, Tomb	6	Agra Fort (1983), Fatehpur Sikri (1986), Humayun's Tomb, Delhi (1993), Qutb Minar complex, Delhi (1993), Red Fort Complex (2007), Taj Mahal (1983)
2.	Monuments	4	Hampi (1986), Mahabalipuram (1984), Pattadakal (1987), Khajuraho (1986)
3.	Caves, ancient murals	3	Ajanta Caves (1983), Elephanta Caves (1987), Ellora Caves (1983)
4.	Buddhist Monuments	2	Sanchi (1989), Mahabodhi Temple Complex at Bodh Gaya (2002),
5.	Ancient temples	2	Great Chola Temples: Gangaikonda, Airateshvara, Brihadeshvara (1987), Sun Temple at Konârak (1984)
6.	Archaeological Landscape	2	Champaner-Pavagadh Park (2004), Rock Shelters of Bhimbetka (2003)
7.	Mountain Railways (*counted as one group*)	3	Darjeeling (1999), Nilgiri Mountain Railway (2005), Kalka-Shimla (2008)
8.	Church	1	Churches and Convents of Goa (1986)
9.	British Architecture	1	Chhatrapati Shivaji Terminus (formerly Victoria Terminus) (2004)
	Total	24	-----
	Natural Heritage		
1.	Natural Park	4	Kaziranga (1985), Keoladeo (1985), Nanda Devi and Valley of Flowers (1988), Sundarbans (1987)
2.	Sanctuary	1	Manas Wildlife Sanctuary (1985)
	TOTAL	**29**	------

Table 2. India: Heritage Properties as in Unesco World Heritage List, August 2009.

Fig. 1. India: Unesco World Heritage sites, February 2010.

In India, the Archaeological Survey of India (ASI), the Indian National Trust for Art, Culture and Heritage (INTACH) and Indian Heritage Society (HIS) are the prime organisations responsible for protection, conservation and preservation of heritage sites. Recently, the Department of Tourism at the Centre and also its counterparts in all the States are promoting various programmes for sustainable heritage tourism.

Se	Heritage Properties (year of submission)
1.	Temples at Bishnupur, West Bengal (1998)
2.	Buddhist Monastery Complex, Alchi, Leh (Alchi Chos-kor) (1998)
3.	Golconda Fort, Hyderabad, Andhra Pradesh (1998)
4.	Dholavira: a Harappan City, Gujarat, District Kachchh (1998)
5.	Rani-ki-Vav (The Queen's Stepwell) at Patan, Gujarat (1998)
6.	Mattanchery Palace, Ernakulam, Kerala (1998)
7.	Tomb of Sher Shah Suri, Sasaram, Bihar (1998)
8.	Group of Monuments at Mandu, Madhya Pradesh (1998)
9.	Ancient Buddhist Site, Sarnath, Varanasi, Uttar Pradesh (1998)
10.	Hemis Gompa (1998)
11.	Sri Harimandir Sahib, Amritsar, Punjab (2004)
12.	River Island of Majuli in the Brahmaputra River in Assam (2004)
13.	Kalka Shimla Railway (2004; inscribed in List: 9 Nov. 2008)
14.	The Matheran Light Railway (exts. to the Mt. Railways) (2005)
15.	Western Ghats (sub cluster nomination) (2006, again in 2009)
16.	Namdapha National Park (2006)
17.	Wild Ass Sanctuary, Little Rann of Kutch (2006)
18.	Kangchendzonga National Park (2006)
19.	Urban and Architectural Work of Le Corbusier in Chandigarh (2006)
20.	The Kangra Valley Railway, an extension to the Mountain Railways of India (2009)
21.	Mumbai's Churchgate building, presently the Western Railway headquarters (2009)
22.	Mussorie's Oak Grove School premises (2009)
23.	Gwalior's Maharaja Light Railway (2009)
24.	Excavated Remains at Nalanda (2009)
25.	The Jantar Mantar, Jaipur: Astronomical Observatory of India (2009)

Table 3. India: Properties on the Tentative List, February 2010.

Both history and heritage make a selective use and connotation of the past. In most of the cases, the symbolic representations or the visual artefacts are deliberately transformed into a commodity for the satisfaction of the contemporary consumption, and this is commonly referred as 'heritage resource'. This 'commodification' process and its marketing are the basic reality of heritage tourism. To preserve, conserve and maintain the continuity of the essence of heritage is related to the intrinsic nature of heritage planning. This leads to the concept of 'place making' that refers to 'the art and practice of building communities in which all human beings transform the places they find themselves into the places where they live'. Historic

buildings, monuments and associated landscapes are of enormous value in creating places of character — in place-making. Their value stretches at least in three contexts, viz. aesthetic value, community value, and economic value. The three layers (time, city, planning) within the triad nature of their components, ultimately reached to the end process of heritage planning where placemaking exists as pivot.

According to UNESCO a country must first take an inventory of its significant cultural and natural properties, called the Tentative List, a country may only nominate properties that have already been included on this List. The World Heritage Centre offers advice and help in preparing this file. The Indian List includes 25 such properties (Table 3). India has been requested, together with all other State Parties, to develop a Tentative List that is more representative of the time depth of Indian history, the diversity of its cultures and cultural manifestations, and the typology of heritage places. A great number of the current World Heritage Sites in India are ASI (archaeological Survey of India) monuments from different historic periods. These sites are far from representing all relevant periods in Indian history. They also do not reflect the typologies of heritage as defined in the World Heritage Convention. Although being one of the most ancient urban civilizations, India does not have a single city on the World Heritage List. Other heritage types missing are, for example, 'cultural landscapes', 'cultural routes' (silk route, salt route, etc.), industrial monuments, and many other categories.

2 HERITAGE RESOURCE CONSERVATION: SCENARIO FROM INDIA

With a view to promoting dialogue between tradition and modernity and cultural preservation, the Indian National Trust for Art and Cultural Heritage (INTACH) is actively engaged in heritage preservation. The concept of "cultural heritage zone" refers beyond more buildings and artefacts of culture; it also includes a spatial territorial approach to integrate the monuments with people's faith and performance system (sacred ecology). The basic idea behind this approach is "placemaking."

The cultural heritage zone is similar in concept to the European historic town centre and the North American historic district, and implied in Indian context with additive thrust on preservation, overall maintenance, sustainable development, provision of recreation, and maintenance of land reserves. The planning of Cultural Heritage Zone is to be guided by the broad principles and objectives of conservation of urban historic areas, as summarised by the ICOMOS (cf. Menon 1989: 6):

- For the conservation of a historic town to be most effective it should be an integral part of a coherent policy of economic and social development and of urban and regional planning.
- The values to be preserved include the historic character of the historic site and all those material and spatial elements that create this character, especially:
    - the urban pattern and network;
    - buildings and green and open spaces;
    - appearance and morphology of buildings;
    - natural and cultural regional settings; and
    - Changing role of a historic city and consequences.
- The participation and the involvement of the towns people of every age is essential for the success of the conservation programme and must be encouraged. The conservation of historic towns concerns first and foremost residents.
- Conservation in an historic town demands prudence, sensitivity and precision without rigidity, since each case presents a specific problem.

These outlines need modification in Indian condition, as they do not easily fit to our situation. The INTACH had undertaken a heritage preservation plan for the Ganga Ghats, Varanasi, and finally a Master Plan of the entire stretch of the Ghats was framed. It is obvious through this study that an understanding of the characteristics of the heritage of the Ghats provides the appropriate framework for a planning intervention (Menon 1989: 14). A thing is right when it tends to preserve the integrity, stability and beauty of the site as living organism.

A collaborative Indo-US team performed another study of cultural heritage conservation and planning for Sarnath (VDA & DLA 1990). Accepting Sarnath as a microcosm of the cultural heritage of India, attempt was made to integrate tradition and modernity in a complementary manner: preserve the past, introduce the

modem where both can fit easily to make harmonic continuity of the past. The proposed Master Plan is in accord to the heritage conservation, environmental sensibility, people's involvement, users' feelings and the need for the site as a very important tourist centre (ibid.; also Sinha 1991).

In this context Sinha (1991: 30) remarks that a sacred place is not viewed for aesthetic appreciation only (although that may be a part of it) but is also associated with transcendental experience. Therefore its environmental manipulation should be handled extremely sensitively with full awareness of religious history and contemporary cultural meanings." All such sites and places which are living cultural treasures are the heritage of our existence, therefore must be preserved and maintained. Of course, there exists a line of thought that heritage preservation is a luxury expandable, but it is only and marginally true when times are hard.

2.1 Khajuraho: Scenario of a World Heritage Property

The UNESCO World Heritage List includes Khajuraho (79º 55'E and 24º 51'N; Chhatarpur district, Madhya Pradesh; population 7,900 in 2001) which consists of 23 monument sites built by Chandela kings and dating from the tenth century. Neglected and forgotten after the fourteenth century, this site was reported in 1839 by T.S. Burt, an engineer and explorer, as 'probably the finest aggregate number of temples congregated in one place to be met with in all India'. In 1852 F.C. Maisey prepared the earliest drawings of the temples and in the same year Alexander Cunningham drew a plan of Khajuraho, documenting all the temples, monuments and heritage sites of the area (cf. Fig. 2).

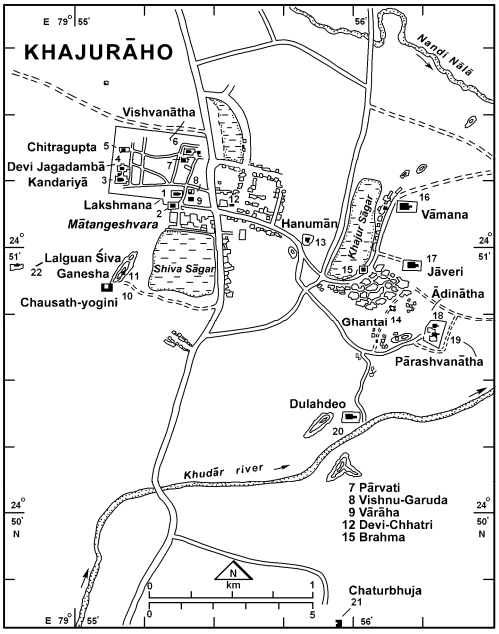

Fig. 2. Khajuraho: Spatial view of monuments.

On the following criteria of the UNESCO WHL enlisting under 'Cultural Heritage', the group of monuments at Khajuraho were enlisted on 28 November 1986:

(i) Criterion I, to represent a masterpiece of human creative genius. The complex of Khajuraho represents a unique artistic creation, as much for its highly original architecture as for the sculpted décor of a surprising quality made up of a mythological repertory of numerous scenes of amusements of which not the least known are the scenes, susceptible to various interpretations, sacred or profane.

(ii) Criterion III, to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared. The temples of Khajuraho bear an exceptional testimony to the Chandela culture, which flourished in India before the Muslim invasion of 1202.

In the passage of time, the comprehensive regional development plan (Master Plan) of Khajuraho is prepared, called 'Khajuraho Vikas Yojana 2011', under the act of 'Madhya Pradesh Nagar Tatha Gram Nivesh Adhiniyam 1973'. The first draft development plan was prepared and published by the Madhya Pradesh State Government on 16 October 1975. Thus, finally following the above perspectives Khajuraho Development Plan came into existence from 10 March 1978, which is replaced by Khajuraho Development

Plan of 1991 that refers to the development vision to 2011 and was approved on 5 June 1995. The main focus of the 2011 Plan is an integrated development of tourism as well as preservation of glorious temples of international recognition and of universal values.

On the line of landscape planning and environmental cleanliness and beautification of the World Heritage Sites of Khajuraho, the INTACH (Indian National Trust for Art, Culture and Heritage, New Delhi) has started its extensive study for the sustainable development of the Khajuraho Heritage Region in 1998. Special emphasis is laid on the expansion and preservation of parkland landscape. The multidisciplinary approach of the restoration project highlights the different historical, archaeological, cultural, social and economical aspects. The final aim is to restore these gardens into their original splendour with their varied horticulture and princely leisure spots, in order to create direct local employment, but also in order to attract the tourists. In accordance with the basic philosophy of INTACH, this restoration is done with the local craftspeople (who receive the appropriate training if necessary); also the exploitation of the domains will be confined to the local population (cf. Robberechts 2005). The motto adopted by the INTACH is: "For and by the local people". Nothing is done without the approval of the local inhabitants, and at each stage in the project efforts are made to use local know-how or to give the training needed to do the work.

Thanks to the recent project of the "Conservation and Sustainable Strategy for the Khajuraho World Heritage Region", under which conservation activities are now taking care. Additionally, under the Restoration of Khajuraho's Gardens Project by the INTACH Belgium, the landscape is coming up in close to historical reality, grandeur and above all the re-visioning the ancient glory (cf. Singh 2006).

2.2 Konark: Scenario of a World Heritage Property

Konark (86º 06' E and 19º 54'N; population 15,020 in 2001), located in the Puri district of Orissa was enlisted as a Un-WHL in 1984. The town area contains monuments which date back to the thirteenth century on a site that was subsequently deserted during the seventeenth and eighteenth centuries. A. Stirling visited the site in 1825, and details of drawings were prepared in 1837 by James Fergusson, and, by 1868, an account made by Rajendralala mentioned that 'the sanctuary was reduced to an enormous mass of stones studded with a few pipal trees here and there' (Mitra 1986: 13).

The main temple complex (Fig. 3) consists of a sanctuary, its attached porch and an isolated pillared edifice. Erected on an impressive platform, the sanctuary and the porch are the two components of a single unified architectural scheme, the whole fabric being designed to represent the celestial chariot of the sun-god who is believed in Hindu mythology to course across the sky in a chariot drawn by seven horses. Treated magnificently, each wheel consists of an axle kept in position by a pin as in a bullock cart, a hub, a felloe and sixteen spokes, of which eight are broad and other eight are thin. Constructed during the thirteenth century, the Sun-god temple is described as 'the most richly ornamented building in the whole world' (UNESCO-IUCN 1992: 182). Now in ruins this temple of the Sun-god once had a tower almost 60 metres high and a massive porch covered with many carvings and sculptures of lions, elephants, human figures and floral decorations (cf. Singh 1997: 124).

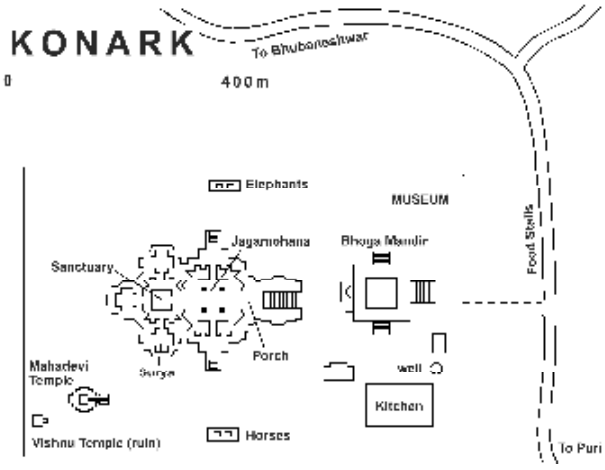

Fig. 3. Konark: the temple complex.

Since the images have long been removed from the main temple, the sanctuary is no longer regarded as a holy place. In the northeast corner of the compound a modem building houses the old doorway arch showing the planets of Hindu mythology; Sun, Moon, Mercury, Venus, Mars, Jupiter, and Saturn; all seated cross-legged on lotus, carrying in the left hand a water pot and in the right a rosary. In addition, a fierce looking Rahu bearing a crescent in both hands, and Ketu holding a bowl of flames in the left hand and a sword or staff in the right, are depicted. In recent years these have become objects of veneration, and Brahmin priests are now in charge of this building as a place of worship. There has also been substantial recent renovation, some of it protective, some replacing fallen stonework and sculptures, so that the appearance of the whole temple complex is now very different from that of even a few years ago.

The conservation efforts of the temple complex are so extensive that they are treated as part of history in themselves. In 1806 the Marine Board made a request to take measures for preservation, but this appeal was not taken seriously and a portion of the temple tower was lost. In 1859, the Asiatic Society of Bengal proposed to remove the Nine-Planet (Nava Grahas) architrave to the Indian Museum in Calcutta, but an initial attempt at removal, in 1867, failed due to transportation problems and the lack of sufficient funds. In 1892 a second attempt was made to transport the Nine-Planet architrave to Calcutta, but this move was stopped, after the shifting of thirteen sculptured pieces, due to the objections of local people.

In December 1900 the visit of Sir John Woodburn, Lieutenant Governor, to Konark, initiated a new programme for heritage conservation. In February 1901, T. Block, Archaeological Surveyor of the Bengal circle, submitted a proposal for the unearthing of the buried portion of the temple and the compound wall and exposed a wheel by excavating a trench at the base of the porch. Within a decade substantial works were undertaken to rescue whatever survived of this stupendous fabric (Mitra 1986: 15-20). The first phase of conservation was completed by 1910, incorporating all work essential for rendering the monument stable at a cost of nearly Rs. 100,000.

In the next phase by 1922 all the major structural repairs, the rebuilding of the wall-tops, construction of the walls, and removal of sand and fallen stones and the development of a sculpture shed were completed. Since then, small scale repairs, like the clearance of vegetation, resetting of loose stones and painting of filling in the crevices, were affected annually until 1953 when the ASI took over responsibility.

The rapid growth of tourism is now leading to ill-conceived plans which do not promote sustainable development. The irrational plan to dereserve large areas of the Reserved and Protected Konark-Balukhanda and Bhitarkanika wildlife sanctuaries for tourism development will harm both the Sun temple at Konark, and wildlife on the adjoining beaches. The trees and shrubs grown in the recent past are proposed to be cleared by mass felling of trees to accommodate various tourism-promotion oriented constructions, a plan not supported by the Union Government in New Delhi.

Recently large scale reconstruction has been carried out in the name of restoration. The Master Plan (1991-2011) for tourism development envisages the dereservation of portions of the reserved sanctuaries, for the construction of modem means of entertainment, leisure and recreation for tourists. Such works, done in the name of development, involve mass felling of trees and the clearing of forests developed over a long period for the safety of the coastal regions and also the hinterland (Sengupta 1995: 11). The immediate surroundings of the Konark temple, according to the Master Plan, are to be preserved by adequate landscaping. But, to boost tourism and to generate land revenue, the provisions of the plan have been flagrantly violated by the construction of a market complex, an auditorium and an office building. The land attached to the temple, declared prohibited under the Ancient Monuments, Sites and Remains Act 1958, has also been encroached upon by new constructions. Three major hotel chains (Taj, Oberoi and Clarks) have obtained land to build hotels on the beach about three kilometres from Konark and may spoil an already crowded and popular site.

A report of the Union Ministry for Forests and Environment mentions that one might grow forests and develop beaches, but not create another Konark temple. As the media highlighted the negligence and inefficiency of the ASI, a team of UNESCO experts visited Konark in September 1980. Their report contends that ‘sand filling has had no obvious damaging effect on the stability of the temple’. But the next UNESCO team of two architect-restorers, visiting in January 1987, thought differently. They suggested that ‘... the dry-stone-filling and sand fill are not required for the overall structural strength of the Jagamohana (i.e. the extant assembly hall)’. The total estimated cost of restoration would be Rs.75 million, though no allocated money was released. Sengupta (1995: 11) suggests, ‘While environmentalists are looking after the

Olive Ridley turtles and forests, adequate attention must be given to properly preserve the Konark temple, the goose laying golden eggs for tourism'.

3 HERITAGE CONTESTATION AND ISSUE OF RELIGION: SOME EXAMPLES

Illustrated with his study of the Indo-Islamic garden in Gujarat, Wescoat (2007: 53-77) has generalised six broad relationships between cultural conflict and heritage conservation, which may occur in any situation and in any part of India or South Asia; they are (ibid: 61-64):

1. Cultural heritage in the context of armed conflict.

2. Places of violence as cultural heritage.

3. Heritage as the object of conflict, destruction, and desecration.

4. Conflict between proposals for economic development and heritage conservation.

5. Conflict among heritage stakeholders over material control and symbolic interpretation of a site.

6. Conflict among heritage professionals over different concepts and methods of conservation.

On 6 December 1992 a mob led by Hindu fundamentalists, the right wing activist from World Hindu Congress (VHP), ultimately in their last attempt succeeded in razing the sixteenth-century Babri mosque (built by Mughal king Babur) in Ayodhya, which was believed to be an important temple site of lord Rama in the early twelfth-century, but converted into mosque after its demolition (Bevan 2006: 134). However, there was no sufficient evidence to prove the existence of Hindu temple at this site. During last four hundred years there had been several attempts to remove the mosque through court, direct action, or planned attacks. After India's independence in 1947 the different religions and their monuments had largely co-existed side by side, as in Bosnia. The Ayodhya crisis must also be seen within the climate of increased tensions between India and Pakistan over the last few decades, and the fundamentalist groups between Hindus and Muslims within India itself (cf. Elst 2003). The VHP extends their agenda for getting under their control several disputed mosques, strongly arguing for the important mosques in the holy cities of Mathura and Banaras (Varanasi). Historian Eaton (2000) clearly shows that cases of destruction of places of worship were not restricted to Muslim rulers alone. He recounts numerous instances of Hindu kings having torn down Hindu temples, in addition to Jain and Buddhist shrines. He says that these must be seen as, above all, powerful politically symbolic acts. Says Bevan (2006: 137), that: "The demolition of sacral buildings has become a key proxy through which post-Partition inter-communal strife is now expressed. Ayodhya is India's Twin Towers – a ground zero from which the waves of violence are spreading to engulf thousands and potentially millions of people".

The Buddhist monastery and temple at Bodh Gaya was built by the king Ashoka during third-century before Christ and remained an active site till 1192 AD when Muslim invaders destroyed it. During the rule of Mughal King Akbar, from 1590, the temple was under the control of a Shaiva Hindu priest who managed to set Shiva Linga in the inner sanctum, which after passage of time turned into religious conflicts. In 1872 under the patronage of Burmese king the temple was renovated and re-built. After independence, since 1949 through an Act both Hindus and Buddhists got authority for worship and joint control. But Buddhist have not accepted this arrangement, thus a continuous movement to liberate this temple from the interference of Hindus is noticed, including peaceful march of around half-million Buddhists from all parts of the world in October 1992 and November 1995. This contestation is still in continuance (cf. Singh 2008).

In Varanasi the existence of an important mosque after demolishing the famous temple of Vishvanatha in 1669 by the order of Mughal king Aurangzeb is a subject of constant conflict between Hindus and Muslims. Aurangzeb did not just build an "isolated" mosque on "a" destroyed temple. He ordered all temples to be destroyed, among them the Kashi Vishvanatha, one of the most sacred places of Hinduism, and had mosques built on a number of cleared temple sites. Until today, the old Kashi Vishvanatha temple wall is visible as a part of the walls of the Gyanvapi (Jnanavapi) mosque which Aurangzeb had built at the site. After demolishing the temple, Aurangzeb had built a mosque there. However, part of the back portion was left as a warning and an insult to Hindu feelings. The Riverfront Heritage of Varanasi underway to get enlisting in the World Heritage site is facing problem of contesting consensus among Hindus and Muslims (see Singh 1993). All other Hindu sacred places within his reach equally suffered destruction, with mosques built on them; among them, Krishna's birth temple in Mathura and the rebuilt Somnath temple on the coast of Gujarat. The

neo-Hindu revivalism and awakening of Hindu identity with vested interest are getting inspiration by the VHP and making their mind to destroy those Muslim monuments built on the razed site of Hindu temples. From the other side, Hancock (2008: 175) notes that "through the creative destruction wreaked by the political economy and the rueful self-regards of cultural intimacy, the same sites disavow the past and anticipate the global connections of the unfolding neoliberal order".

Champaner-Pavagarh (a World Heritage Site, Unesco), like other heritage sites in India, is both an historic and ethnographic landscape. It exhibits both the palimpsest of landscape layers inscribed over time and the juxtaposition of Hindu and Islam traditions in architecture and city planning (see Sinha 2004). Both Hindu and Islamic cultures exploited the visual potentials of the topography. The sense of harmonic relationship between Hindu (like Kalika goddess) and Muslim (like Jami and Shehri mosques) co-exists in maintenance of this heritagescape, which exists facing each other, but this may be questionable in future. The concept of cultural landscape as a heritage resource is a recent development on the line of old idea of historic conservation and certainly did not guide monument-centric colonial efforts at restoration (Sinha and Harkness 2006: 97). On this line the Yamuna riverfront around the Taj Mahal (enlisted in Unesco WHL) is suggested as 'cultural heritage landscape. This also raises the issue of suspicion of tensions between Hindus and Muslims at some places. Defining heritage territory under the strict control of heritage law will help avoiding conflicts and contestation together with active public participation.

4 JNNURM, THE CDP AND CONCERN FOR HERITAGE!

According to the census of 2001 a little over 27.8% of India's total population (1.029 billion; and projected over 2 billions by 2071) lives in urban areas, and it is expected that its share will be close to 45% by 2050. To handle India's rapid urban growth and sprawl and its consequential problems a comprehensive and sustainable development strategy was designed and inaugurated by the Prime Minister of India, Dr. Manmohan Singh, on 3rd December 2005. This is named Jawaharlal Nehru National Urban Renewal Mission (JNNURM), which will work for a period of 7 years beginning from 2005-06 under the central Ministry of Urban Development/ Ministry of Urban Employment and Poverty Alleviation, under the 74th Constitution Amendment Act (CAA), 1992. The main components under the mission include urban renewal, water supply and sanitation, sewerage and solid waste management, urban transport, re-development of inner city areas, development of heritage areas, preservation of water bodies, slum development, basic services to urban poor and street lighting. In the first phase, the Mission is being executed in 63 cities with a population of 'one-million and above', State capitals and 23 other cities of religious and tourist importance. With an estimated provision of Rs, 614.6 billion [1 US $ = Rs 49] for 7 years, the Mission is the single largest Central Government initiative in the urban sector. The PM emphasised the importance of cities that are internationally known for heritage, tourism and pilgrimages and maintained their historical and cultural glories, like Varanasi, Amritsar, Haridwar, Ujjain, Gwaliar, Madurai, etc.

The primary objective of the JNNURM is to create productive, efficient, equitable and responsive cities. In line with this objective, the Mission focuses on: (i) Integrated development of infrastructure services, (ii) Securing linkages between asset creation and maintenance for long-run project sustainability, (iii) Accelerating the flow of investment into urban infrastructure services, (iv) Planned development of cities including the peri-urban areas, outgrowths (OG), and urban corridors, (v) Renewal and redevelopment of inner city areas, and (vi) Decentralization of urban services to ensure their availability to the urban poor. In view of these issues the future vision for heritage cities (Varanasi, Amritsar, Ujjain, Madurai, Gwaliar, etc.) is to keep and develop it as an "economically vibrant, culturally rich tourist city". Under this programme the comprehensive City Development Plans (CDP) were prepared in collaboration with private agencies and INTACH (Indian National Trust for Art, Culture and Heritage). Of course, various CDP reports recognise that 'the process of CDP being a multi disciplinary platform includes various stakeholders who work towards the development of the city. As the stakeholders know the city better and are responsible citizens, their views are important at every step, while preparing the CDP', but in fact, the city authorities have not taken active collaboration with stakeholders or local institutions (cf. Singh 2009a: 135-182).

4.1 Heritagescapes and Riverfront of Varanasi: a case of contestation

The holy-heritage city of Varanasi is known as cultural capital of India since ancient past. The Ganga riverfront with its Ghats (stairways to the river; total 84, cf. Fig. 4) in Varanasi fully fulfil the criteria of

Cultural Landscapes as designated in Article 1 of the UNESCO-WHC Convention (2005) and specifically that of a cultural landscape "that retains an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress" and an associative cultural landscape "by virtue of powerful religious, artistic, cultural associations of the natural element." These riverfront ghats along with the loft palatial building belonging to royal trusts have successively grown up since the mid 11th century and are even today the most alive and picturesque scene in the city.

The conservation of most heritage properties faces intense pressure. These properties are presently in the same physical conditions as in the last couple of decades and their architectural characteristics are being maintained without many legal and administrative measures, however their architectural integrity is now being threatened. Unless stringent measures are taken for protection, there is high probability that new structures, using new building materials, will increasingly replace old architectural shapes and material. Besides these risks, the buffer zones and the skyline of the old city, whose status quo is preserved at this moment, are also being threatened by encroachments and rising heights of buildings.

The increasing impact of pollution and the decreasing volume of water in the Ganga together have a multiplier effect on the riverfront landscape. The main stream has lost the high speed of the current due to less volume and pressure of water. Close to the Asi Ghat, the first one, the river has already left the bank about 7-8m. The existence of Ghats in Varanasi is in danger because the existence of the Ganga is in danger. Since late 1990s, mainly due to loose administration and lack of viable administrative control from the VDA (Varanasi Development Authority), along the riverfront ghats there has been spate of illegal encroachments and opening of restaurants and guest houses, partly conversion of the houses into shops or paying guest houses, silk and handicrafts shops, and also transformation of heritage properties for more economic benefits (cf. Singh, Rana 2009b).

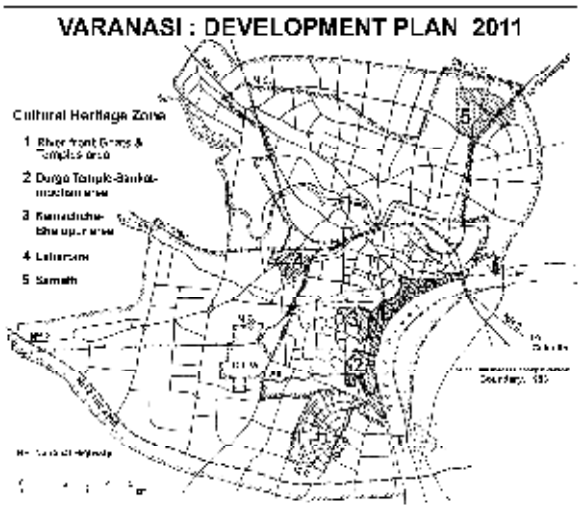

Fig. 4. Varanasi: Riverfront ghats and Heritage Properties.

Based on a survey (2006-7) and understanding the public participation and resultant action (PPRA), it is obviously noted that in order to achieve a long term self-sustained maintenance of the heritagescapes in Varanasi, an extensive programme of public awareness should be conducted to communicate and educate about the value of heritage and their potential socio-economic and cultural benefits that can be enhanced by harmonious integration between the old heritagescapes and the modern constructs. This strategy will help stakeholders to participate in sustainable operations, management and maintenance plan effectively and successfully. The passive fatalism and uncooperative acceptance of 'made-elsewhere' policies that has previously characterized urban planning in Varanasi hygiene, now can be reversed by the methodology of participated programme design, implementation and evaluation that the local development institutions have illustrated and recommended too. In order that this heritage become a resource for development, it needs to be first documented, then protected, maintained and finally utilised according to specific heritage guidelines and legislations.

Let me cite a case of the CDP Varanasi, where surprisingly no where in the CDP these aspects are considered as measures of urban planning, preserving cultural heritage, and promoting religious (like pilgrimages) or sustainable heritage tourism. Since 2001 the city has recorded a mass movement to have the

"Riverfront and Old City Heritage and Cultural Landscape" in the World Heritage List by the UNESCO enlisted. As in case of other nations the process of nominating a certain site or tradition as a world heritage by the UNESCO can be seen as dialectic of the local and the global politics and pressure games. Of course the aim of this global cultural policy as formulated by UNESCO-WHC is to enhance the pride of the local population in their own culture, foster efforts to its preservation as well as to enrich the whole of humanity in creating a cultural memory on a worldwide scale, but the road to reach destination is arduous, time-consuming and full of frustrations (cf. Scholze 2008).

Following the guidelines and identifications of the current Master Plan, 1991-2011, thematic surveys and documentations of the state and conditions of heritage buildings and the regional perspectives were prepared under the auspices of Varanasi Development Authority, and reports were sent to the government. Of course, no progress has yet been noticed, again primarily due to lack of bureaucratic and governmental support, and also of strong public involvement. The critical issues of environmental deterioration, preservation of cultural heritage (tangible and intangible), demographic pressures and illegal encroachments along the riverfront heritage zone are not given a single reference. Additionally, the legislation system and need for citizens' awareness about these subjects are not taken into consideration in the CDP.

5 EPILOGUE

In India, there has been criticism of the roles that urban development and mass media have played in erasing the material relics of the past, as well as in diminishing residents' knowledge of and attachments to those relics. At the same time, the greater value accorded tourism as an avenue for development reflects a perception that the marketing of heritage offers a means of preserving and enhancing the value and visibility of the endangered residues of the past (Hancock 2002: 709). The religious consciousness has left far behind the awakening of the cultural heritage and heritage buildings. Religious buildings form a large part of the cultural heritage in South Asia, but little consciousness of historical value (Feilden 1993: 1).

In India the conservation movement has not yet integrated the religious ethos of Hindus, Jains, Buddhists, Sikhs as well as Muslims and this is a critical area that needs study by persons of their own culture, who understand the ethics and practice of conservation and projection of universal values (ibid.). Cultural heritage in Asian cities is shaped by philosophies and religious systems that emphasize the intangible rather than the tangible, and the built environment is often not integral to memories of the past. Asian cities are treasure of intangible heritages by an abundance of myths, legends, and festivities and rituals associated with sacred places. Without taking these and religious rites into account together, even the best-preserved temple will be merely an empty shell and of little significance to local people (Howe and Logan 2002: 248; cf. UNESCO 2007: 72-73).

Cultural heritage and human rights are entangled with relations of power, and power relations necessarily impact the ideology of universalism underwriting current cultural heritage discourse, which should be inclined to the roots and their cultural setting (Silverman and Ruggles 2007: 17). With the focus shifting from tangible to intangible form of heritage – 'living heritage embodied in people' – the paradigm has shifted with emphasis on 'cultural rights' as a part of 'human right' (Logan 2008: 449). Remember that when tradition is totally ignored, the result can be an environmental and cultural disaster (Orland and Bellaflore 1990: 94). In fact, in most of the developing countries the sacred site and heritage sites are subjected to extraordinary economic pressures and change in lack of sustainable approach and realization by the local inhabitants and authorities. Strategy for sustainable heritage tourism under the purview of 'Healing the Earth' is the message of heritage ecology. This process of healing requires a specific mode of conduct, dharma, a word which root refers 'to hold'. Dharohara, the word for heritage, is derived from the same root, thus the dharma of water is wetness … the dharma of honey is sweetness … the dharma of our culture is to save and sustain its heritagescapes by promoting deeper moral values. The practice of heritage ecology is the 'yoga of place', the sacred attachment to the symbol of the earth spirit which is the meeting point of humanity and divinity (Rana and Singh 2000: 154). Obviously, "with the ongoing integration of new forms of "universal value", the heritagescape will continue to expand, complexifying participants' conceptualisations of their position with others in history and in the world— their very heritage— linking them with disparate times and places, and orienting them towards meaningful future activity" (Giovine 2009: 429). Let us proceed to achieve that noble goal for making happy, friendly and good heritagescapes.

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Integration and Transformation of Post-Apartheid South African City Fabric

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1 ABSTRACT

This paper focuses on attempts to reconfigure spaces in post-apartheid South African cities. The fusion of modernist planning ideologies with racial elaborations during the apartheid era up until the end of apartheid in the early 1990s in the planning of South African cities left them with dysfunctional and segregated spaces. Apartheid cities became synonymous to urban decay, low densities and spatial segregation of different racial groups and land uses with residential areas of poor city residents located at the urban periphery away from socio-economic opportunities. With the advent of democracy in South Africa there have been many serious minded attempts to reorganise and redefine spaces in post-apartheid South African cities with the aim of promoting regeneration, high densities, mixed land uses, spatial integration and hybridity. However, more than 15 years down the line since the inception of such initiatives, spatial segregation and dsyfunctionality still hounds South African cities. This paper critically analyses various initiatives aimed at reconfiguring spaces in the South African city of Durban with the aim of showing the forces and factors that promote the transformation of South African cities. A historical analysis of the city of Durban from colonial times to present is adopted to show how the present spaces of the cities in South Africa gradually evolved. The paper further presents the current approaches/methodologies in transforming the South African city including challenges and the impact of the various city projects.

2 INTRODUCTION

Modernist planning and apartheid segregationist ideologies left the city of Durban highly fragmented along racial lines with residential areas of the poor mainly blacks as in the case of Umlazi, Inanda and KwaMhashu townships situated in locations with limited socio-economic opportunities in their close vicinity. Furthermore, after the demise of apartheid segregationist legislation the inner city of Durban faced the problem of degeneration due to rapid inward migration of mainly poor people from rural areas and the simultaneous flight of the white middle class and most commercial services to sub-urban locations. In order to foster the integration and transformation of the Durban city fabric since the dawn of the democratic dispensation in 1994, the Durban Municipality embarked on a number of projects focusing on inner city neighborhood revitalisation projects, inner city redevelopment, creation of new mixed nodes for integration on buffer zones that separated different races during the apartheid era and the upgrading of town centres in townships with limited social and economic facilities. The paper critically evaluates the Umlazi Township Town centre upgrading project, the Bridge City project a new mixed node for integration located on a buffer zone that separated the four main races African, Indian, Coloured and Whites during the apartheid era, Florida Road Heritage Precinct project an inner city neighborhood revitalisation project and finally the Durban Point Water Front redevelopment project which is an inner city redevelopment project. The paper uses the above projects to demonstrate the extent of transformation and integration in the post-apartheid democratic South African city with an aim of providing a critique of factors of built environment constrain and opportunity for integration in the planning and making of cities for all.

2.1 Integration and Transformation: The South African city context

Cities in South Africa have been shaped by a variety of historical and economic factors, but the most significant factor was the arrival of modern planning and architecture from Europe and the United States of America as early as 1925. This was applied in the service of the apartheid state and as a means to implement segregationist legislation mainly the Group Areas Act (Murray, 2007). The Act clearly spelt out that South Africans of different racial groups as indicated by the Population Registry Act of 1950 (Whites, Blacks, Indians and Coloureds) were supposed to live in different neighbourhoods. Whilst a loose, zonally-organised pattern of segregation prevailed in most South Africa cities by 1950, what emerged after the application of the Act was 'a city more structured and quartered than anything which had preceded it (Davies, 1976, cited in Turok, 1994). As such apartheid plan¬ners created the racialised grids of the apartheid city as black and coloured city residents were removed from the multiracial working-class inner-city neighborhoods as in the

case of District Six in Cape Town and Cato Manor in Durban in the 1960s, and relocated to the outlying areas as Manenberg and Gugulethu in Cape Town and Umlazi in Durban respectively (Robins, 2007).

In the light of the aforementioned problems of the apartheid city, since the advent of democracy in South Africa, in 1994, concerted efforts were made to promote the integration and transformation of the apartheid city fabric. Integration acknowledges the existence of ethnic/racial diversity and ensures the rights of individuals to retain their cultures hand in hand with enjoying full access to, participation in and adherence to constitutional principles and commonly shared values prevailing in a society (Inglis 1996: 16 cited in Dijkstra et al 2001). Therefore integration in the context of South Africa acknowledges the existence and constitutional rights of mainly four racial groups Blacks, Indians, Coloureds and Whites on which the spatial hierarchy of urban areas in the pre-democratic era was based (urban African townships, located in peripheral areas far from the core, core and suburban areas composed nearly entirely of whites or Indians; and core, primarily white communities) (Schensul, 2008). As such transformation of the post-apartheid city encompasses the vision of a non-racial, non-sexist, democratic spatial order where different forms of geographic space, socialized through a specific configuration of social relations/experiences of work, residence, recreation and cultural heritage, amongst others, are readily accessible to most citizens (Williams, 2000).

Notable pieces of legislation introduced by the government in a bid to support the transformation of South African cities include the Development Facilitation Act (1995) and the Local Government Transition Act Second Amendment (1996) which came into the arena, overhauling the South African planning legislative framework forcing all councils to draw up plans that amongst others promote sustainable integrated settlements, higher densities and mixed use of land. The other main policy that was put in place is the Breaking New Ground (BNG) of 2004 whose aim is also “to promote the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing” (Dept. of Housing 2008: 4).

2.2 Integration and Transformation of the Durban City fabric

The city of Durban is located on the east coast of the South Africa’s Province of KwaZulu-Natal covering an area of 2 300km2. The city is a microcosm of the typical former and post-apartheid cities of South Africa. At the height of formal apartheid in the mid-1980s, the majority of the city was composed of three types of areas: urban African townships, located in peripheral areas far from the core, where 75% of the Africans in Durban lived, core and suburban areas composed nearly exclusively of whites or Indians; and core, primarily white communities (Schensul, 2008). Most notable projects to transform space post-apartheid in the city of Durban to date include the Florida Road Heritage Precinct project an inner city neighborhood revitalisation project, the Durban Point Water Front redevelopment project which is an inner city redevelopment project, the Bridge City project a new mixed node for integration located on a buffer zone that separated the three main races, blacks and whites during the apartheid era and the Umlazi Town centre upgrading project a township town centre upgrading project.

Figure 1: KwaMnyandu node Site Location, Figure 2: Concept Plan- Source BKS consortium

2.2.1 Umlazi Town Centre Upgrading Project

The township of Umlazi is located on southern periphery of the city of Durban. It was established in 1950 during the previous apartheid regime as a commuter township supplying labour to the city’s industrial area. In a bid to stimulate development in one of the socio-economically depressed city’s townships the municipality of Durban in 2009 commissioned Ambro Afrique Consultants, Walkersmith Consultants and

BKS consultants to come up with an Urban Development Framework Plan (UDFP) to provide an integrated urban design vision for the development of KwaMnyandu node shown on Figure 1 below in Umlazi Township.

The consultants came up with a proposal shown on Figure 2 for the design precinct that were structured on two spines, aiming to integrate, upgrade, and enhance the use and sustainability of the existing sport, recreational and public facilities through the establishment of a development node that is centred on the stadium and proposed adjacent multi-modal transportation hub which incorporates the KwaMnyandu Station and a new taxi rank. The principles that were adopted were aimed at fostering the mixed use of social facilities amenities, and commercial, office and higher density residential land uses. These uses were structured around an integrated network of pedestrian oriented public spaces comprising approximately landscaped boulevards, concourses and squares. The design proposal for the area was based on a phased development of the area which could be developed by the public or private sector as separate projects, or together in partnerships. Finally, as the success and sustainability of the proposed node will be dependant on the future maintenance and management of the public spaces created, it was recommended that consideration be given to establishing a dedicated precinct management structure.

2.2.2 Bridge city

The Bridge City project was initiated to directly address the issue of buffer zones that physically separated residential areas of different races leaving them with poor access to socio-economic facilities under apartheid spatial planning in South African cities. The Bridge City uses the buffer zone to develop a new town centre for integraqtion. It is located 17 kilometeres in the North West of the Durban city centre connecting the townships of Phoenix (predominantly an Indian residential area during apartheid) and Inanda, Ntuzuma and KwaMhashu (INK)(mainly black residences during apartheid) Figure 3. The municipality of Durban also noted that it will be a catalyst for economic growth and the empowerment of surrounding communities by improving their access to public transport and opportunities to work, travel, shop and do business within the INK area, via a symbiotic relationship between the public and private sectors. Thus foster the integration of the divided spatial form and creating mixed use residential area for use races.

Figure: 3 Bride City Concept-Source: Nortje, 2009

The left over space used in the apartheid planning ideology to separate population groups, gave rise to an opportunity in democratic South Africa to transform cities by integration and linkage of spaces into a comprehensive whole. The Bridge city project set a good example of how a place of negative connotation can be transformed positively through urban project intervention.

2.2.3 Florida Road

Florida Road is situated in Windermere, a suburb in Durban and it acts as a minor collector characterised by a number of residential and commercial land-uses. The case of Florida Road area is different from that of Umlazi Town Centre upgrading, Bridge City, and the Durban inner city in that it was identified during the Durban municipality's Urban Core Extension Project as an area possessing special historical, architectural and townscape qualities. As such, the project designated Florida Road as an Architectural Heritage Precinct that requires special development and management intervention (Ethekwini Municipality, 2009). This consequently led to the inception of the Florida Road Precinct Project a partnership between the city of Durban Municipality and the private sector property developers whose aim was to define the special character of the area through the conservation the physical fabric and artifacts contained within the precinct.



Figure 4: Street character, Figure 5: Street Texture, Figure 6: Mixed use development

With positive and strategic objectives the Florida Road has become one of the good examples of revitalisation and gentrification of old precincts/neighborhood that have been transformed into the integrated whole in Durban city. The blending of the old and the new architecture, space and people has given a new meaning with a well articulated aesthetics quality in place making for a multicultural society to create a livable space (Figure 4, 5 and 6). The open public space that was once used by one population group based on the apartheid planning ideology has also been transformed to function as a multi-racial social space.

2.2.4 Durban City Centre and Waterfront

The city centre of Durban's revitalisation initiatives were linked to the Durban Point area, the city centre's waterfront edge, a narrow split of land with a harbor on one side and protected beaches on the other. The Point area redevelopment, and the importance of the Port of Durban in the total economic strategy, was recognised as key in the regeneration of the Durban city centre because of the linkages between the Durban Point area and the rest of the city of Durban.


Figure 7: Point Waterfront Revitalisation Revitalisation Master Plan- Source: Peters (2008), Figure 8: Point new development built environment

To realize the revitalisation of the Durban Point area and city centre the following design principles were adopted (Figure, 7 and Figure 8); an urban intensity of scale and an urbane character of development, a structure based on canals, water bodies, boulevards, vistas, urban squares, avenues, lanes and parks, all creating memorable places and an emphasis on mixed-use developments which encourages the integration of retail, commercial, office, entertainment and residential activities including safe, quality pedestrian movement spaces, and clean attractive and secure environment. But, regardless of all this, development integration has not been achieved by the revitalization of the Point area. The water canal next to the Indian Ocean is not really necessary as it increases the cost of the development, thus excludes most of the inhabitants of Durban who are in the low income bracket. A well positioned large pedestrian movement and square with hard and soft landscape would have created a more integrated urban character. Thus accordingly the key criticism of this project is of target group of rich affluent people which excludes the rest of the population. This is because prime land of estate is converted to expensive water use that requires high maintenance. Thus hybrid African cities concept has not been realized because of the exclusion of the poor and the determinist nature of the property markets and competitiveness of the city using grand architecture.

3 CONCLUSION

The various projects demonstrate their intention in transforming the apartheid city with specific focus of intervention. There is a level of success in creating new places and architecture, such as the Florida Road, in creating a vibrant urban space of integrating people, place and accommodating old and new architectural character. Through conservation to give an identity of unique space, on the other hand the point water front strives to achieve the same but failed to include all population groups due to the nature of the development

concept that is based on water and property market development. The South African city strives to be renewed and communities transformed to present a democratic space for development within a new political ideology.

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Is Junik unique? Devising planning policy documents "in-house"

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1 ABSTRACT[1]

Preparation of a Municipal Development Plan (MDP)[2] is a statutory requirement for Kosovo municipalities. General practice for producing planning policy documents is through outsourcing this task to private consultancy companies. This implies substantive costs and in many cases a low level of ownership of the plan, which consequently has limited prospects for implementation. An alternative approach is being applied in drafting an MDP for Junik municipality. This is a municipality initiative assisted by the Municipal Spatial Planning Support Programme (MuSPP)[3], Cultural Heritage without Borders (CHwB)[4] and ISP[5]. The process of drafting MDP was initiated by a visioning workshop in 2008. At this time, the Municipality was completing its Urban Development Plan (UDP) and it was logical that the next step could successfully follow. Although the UDP was done by a consulting company, the municipal staff had confidence that if assisted by MuSPP and CHwB, it would be able to draft MDP though internal mobilisation of human resources. The previous successful cooperation between the municipality, CHwB and UN-HABITAT, a UN development agency mandated for the promotion of sustainable human settlements, resulted in the decision of starting the MDP drafting process in June 2009. This is done by a joint team composed of representatives of the parties who work together in managing the 'in-house' planning process and using 'learning by doing' method of capacity building. By presenting the Junik approach, this paper aims to demonstrate the advantages and drawbacks of this approach to drafting local development plans. The paper will seeks to define the value of the alternative approaches to strategic planning which can improve implementation prospects, whilst stressing the importance of engagement of municipal staff and elected officials for developing the sense of ownership and prospects of the implementation of the Plan.

2 BACKGROUND

2.1 Strategic spatial planning- a new planning approach set in Kosovo

In the last few decades Kosovo has undergone multiple transformation processes from socialistic society, managed by state institutions, which were the 'owners' and the only investor in communities, to a market economy being accompanied with challenges of building new institutional and legislative framework. This fundamental socio-economic and political change has had an impact to the planning system too, requiring new ways of managing current spatial developments and challenges: unplanned and uncontrolled developments, environmental degradation, poor management of resources as well as lack of new investments targeting economic development resulting in high rate of unemployment and poverty.

In the light of an urgent need to manage these challenges, the new approach of strategic spatial planning has been introduced by UN-HABITAT programmes in Kosovo. Planning as per this approach is more flexible and responsive to the current developments taking into consideration priorities of different sectors, especially with the purpose to direct investments and oriented towards a more inclusive and participatory approach. The new strategic planning practises pay an especial attention to the promoting of principles of sustainable development and integrated planning approach including elements of mobility, economic development, social, environmental and other strategic policies for the municipality. In addition, application of the good urban governance norms to the planning process, such as effective involvement of civil society and other stakeholders in the planning process, transparency and decision making, inclusiveness and wide public

[1] This is a revised version of the original Abstract
[2] MDP - Municipal Development Plan is a multi-sectoral plan that determines the long term goals of economic, social and spatial development and deals with the issues of environmental sustainability.
[3] MuSPP - Municipal Spatial Planning Support Programme implemented by UN-HABITAT and funded by Sida
[4] Cultural Heritage without Borders is a Swedish Foundation mainly financed by Sida which is active in the Balkan Region, including Kosovo
[5] ISP – Institute of Spatial Planning, Kosovo

participation and taking into account the equality aspects: minorities, women, children, the elderly, disabled persons (addressing needs of such groups through public participation).

Setting up a new inclusive and strategic planning approach in Kosovo required working at central and local level of governance, engagement of civil society organizations and community, development of new planning legislation (i.e. the new spatial planning laws), intervention in organisational structure and establishment of the Institute for Spatial Planning and applying new planning practices and tools.

A demand for building capacities at each of governance levels was high and is still an ongoing process. When evaluating the application of this approach in Kosovo institutions and especially for the municipalities, there are still mayor challenges ahead. A research[6] showed that municipalities don't have enough capacities to manage this planning approach with its requirements, recommending the need for continuation of working in three areas of capacity development: human resource, organisational and institutional development. In a given situation, supporting municipalities with on-the-job advice and professional expertise with applying the method of 'learning by doing' form a basis of an alternative approach to solving the issues mentioned above. This is an approach that UN-HABITAT in Kosovo is applying through its Municipal Spatial Planning Programme in secondary and some smaller, recently established municipalities of which Junik is one.

2.2 Spatial Planning system in Kosovo

The Spatial Planning system in Kosovo functions within a new planning legislative framework[7] according to which Kosovo has two levels of planning (see Fig 1):

- 1. Planning at Kosovo level including following policy documents (spatial plan for the whole territory of Kosovo and spatial plans for special areas, e.g. National Parks, industrial areas)
- 2. Planning for the territory of municipalities (municipal development plan and urban development plan and urban regulatory plans)

LSP entitles the Ministry of Environment and Spatial Planning (MESP) to coordinate spatial planning activities on the whole Kosovo territory, proposing spatial development policies, reviewing and monitoring the planning documents; monitoring and harmonising planning activities on local level and ensuring compatibility of planning policies as well as offering advice and assistance to municipalities in drafting spatial, urban and regulatory plans. At the local level, municipalities are entitled to execute activities in spatial and urban planning and the land use within their territory. Hence, municipalities are required to draft the Municipal Development Plans, Urban Development Plans and Urban Regulatory Plans.

3 CURRENT TREND OF PLANNING POLICY DEVELOPMENT

As mentioned above municipalities are responsible for the spatial planning process in their territory including the provision of planning policy documents (in this case the MDP). According to the legislation, municipalities can outsource the drafting of these policy documents to different agencies or private organisations. And this was the practice applied in the last decade. The experience showed that not in all cases this method is the best one[8]. In cases when municipalities do not have enough capacity to manage the planning process of preparation of MDP, the applied method of outsourcing has shown to be a not so good approach. As a consequence of this the outsourced companies were in a position of not only being responsible for drafting the planning policy document but of being a manager of the planning process. Thus the result was a delivery of low quality product and none/or poor involvement of the main stakeholders in the process. The effect of this was difficulties in the implementation process, lack of municipal ownership of the document while generating large financial implications for municipal budget.

[6] Gashi, L. 2005
[7] Law on Spatial Planning (LSP), adopted in 2003
[8] Gashi, L. 2006

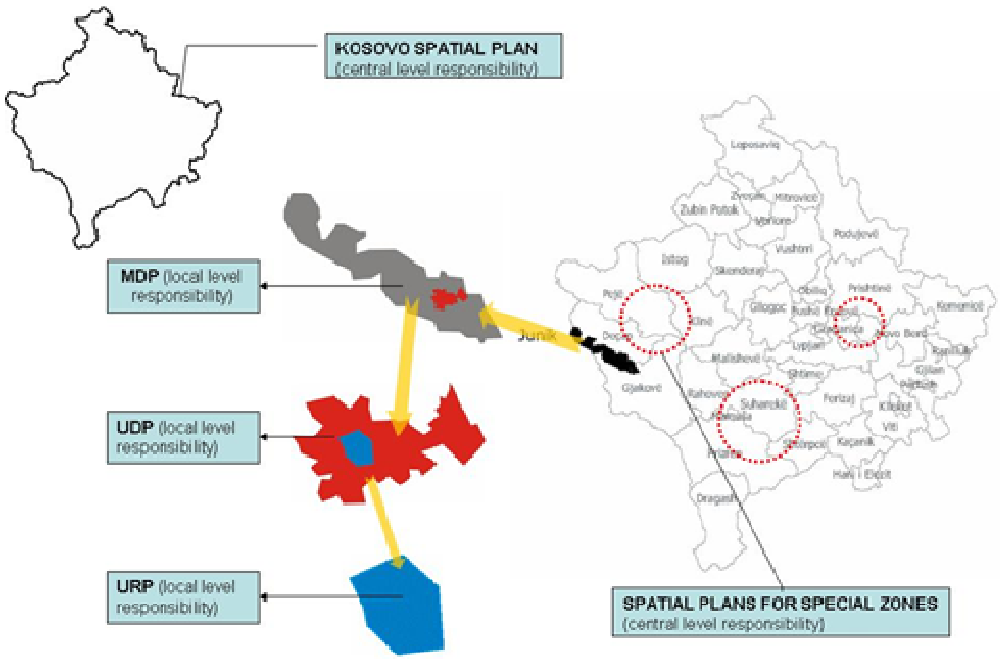

Fig. 1: Plan making hierarchy according to LSP

3.1 Junik approach

Junik is a recently established municipality; it functioned as a pilot new municipality from 2006-2008 and then became a fully recognised municipality on 13 August 2008. Its territory covers an area of 77.77 km² and it has great natural and cultural potential for development. However, it manages a very limited investment and operational budget. Drafting of the Municipal Development Plan as legally binding document is crucial to ensuring sustainable development based on efficient use of resources, infrastructure development, cultural and natural heritage preservation and promotion. This implies costs and human resources. The directorate of planning and urbanism in Junik operates with one architect only, a civil engineer and two cadastre officers. The professional planners are scarce and the existing capacity within municipality to produce spatial plan is very limited. In addition, planning directorate staff is expected to carry their day-to-day business of serving community needs and therefore they have a very limited time to allocate to policy making activities.

In an attempt to be in line with legal requirements at one hand and bringing proper planning policies on the other, in a response to actual developments and challenges such as protecting and promoting the natural and cultural heritage values, dealing with environmental issues, reducing unemployment rate and stop migration of youth abroad, Junik applied an alternative approach which can improve implementation prospects and subsequently have impact on increasing quality of life of its citizens. By doing so, Junik is the first municipality making the MDP IN-HOUSE, with the support from the MuSPP, CHwB and ISP.

3.1.1 Phases of plan-making and the process of involvement

The plan-making process started with the decision from Municipal Assembly on 27 March 2009 which followed by establishment of Junik team (JT) composed of Municipal Working Group (MWG) which is comprised of municipal staff working in deferent departments, MuSSP/UN-HABITAT professional staff cooperating with the municipal staff on a daily basis, CHwB and ISP representatives. The JT began researching and coordinating tasks amongst each other to produce the required pool of information for drafting the MDP. The following is the contents required for the preparation of a Municipal Development Plan (MDP) are Profile and analysis of existing situation (Chapter I), Vision, principles and aims of municipal development (Chapter II), Spatial development framework which establishes the desired spatial situation (Chapter III), Strategy and actions for implementation (Chapter IV), Provisions for implementation (Chapter V). Although still an ongoing process, (Chapter IV currently being developed), advantages and disadvantages and some lessons learnt can be drawn form this process.

3.2 Advantages of Junik approach

3.2.1 Human resource aspect

The process of doing planning policy “in-house” using the methodology of learning by doing provides opportunities for contribution to the quality of the product and the process itself.

The main attribution of “in-house” approach is the ownership of the policy document and of managing the planning process by municipal staff and leadership. It has been witnessed through having municipality in leading role to this process, and by being supported by MuSPP and CHwB team as a facilitater and mediater. Another feature is an increased understanding of strategic spatial planning approach by applying it in practice. Undertaking an inclusive and participatory planning process through public participation and consultation meetings, trainings, thematic workshops and the use of different tools (e.g. brainstorming sessions, SWOT analysis, visioning, setting goals and objectives and scenario building exercises), the impact leading to strengthening organisational skills and project management of the project staff involved and of project managers exclusively was noticed.

3.2.2 Organisational aspect

By this we make reflections on whether the “in-house approach” contributed to some organisational issues that needed to be influenced. For example, the organisational culture and the structure of planning directorates, level of pay scale, level of communication between different directorates etc.

Firstly, we have noticed improvements on organisational culture and increased coordination and communication between different directorates. Representatives of different directorates participate and contribute with inputs of the area/service their directorate covers. Board of directors gets involved in important stages of the process.

Bearing in mind that salaries of public administration staff are generally low, different workshops and training opportunities were seen as non-monetary stimulation for keeping the high level of motivation among the municipal staff. It is also worth remembering that as Junik Municipality has been relatively recently established, its staff lack experience in fields of development control. In this way, MUSPP team has provided support and achieved to amend and improve the current practices of development control. Skills and knowledge of development control instrument and procedures has increased.

Moreover, it is also worth mentioning that the project has managed to convince the municipality on setting up a MWG which was developed under the direct request from the Junik Mayor. An issue that needs further input is the institutionalization of municipal planning unit considered as a discussion topic to be brought up in future with central level as well.

In terms of costs, the “in-house”approach implies less cost for the municipality (at least 4-5 times less than outsourcing) and makes the optimal use of professional expertise of donors’ staff and other partners involved in the planning process.

3.2.3 Institutional, legal aspect and cooperation

Addressing the need for political support, legislative and institutional coordination and support from central institutions and donor agencies are an important component of strategic spatial planning process. The “in-house” approach contributed to getting knowing better the planning legislation. However, there is a need for further support within lifetime of the project. Subsequently, getting the political support and contributing to raising awareness and up-lifting planning issues at political agenda is essential. Although, Junik MDP faces changes at political level due to local elections, that didn’t affect the planning process; the new leadership reaffirmed political support to the “in-house” planning approach. The project in Junik has contributed to strengthening cooperation between the municipality and MESP. As an outcome, the Institute for Spatial Planning joined the project to contribute with professional expertise. The consultation process on the MDP involved also other relevant governmental institutions as well as neighbour municipalities for getting the input to the document and harmonise it with their policies and projects. Furthermore, the consultation process seeks to involve also donors, private businesses and NGO’s in the phase of assessing the capacities for potential investments.

3.3 Shortcomings identified

In applying this methodology it is noted that amongst the key shortcomings is the time factor and the need for exact evaluation of human resources to carry out the process.

Timeline factor relates to the process of 'in-house' plan-making which tends to take longer when compared to alternative outsourcing approach. The logical reasoning behind is that when outsourced the winning consultant company has prepared human and financial resources to have a non-stop input into the plan-making process. While, the 'in-house' approach depends widely on the availability of the MWG members which quite often have other duties to perform. This is linked to the missing component of planning policy unit within the structure of urbanism directorate, mainly due to limitations imposed from central level government and deriving from recommendations of International Monetary Fund.

Another difficulty in applying Junik approach is that this approach is very demanding for organisations providing technical assistance and municipality. Thus, they all need to assess carefuly the human resources, capacities, and experience of the municipality (especially Urban Planning Directorate) and organisations capacity in spatial planning process as MDP plan-making is a very demanding in professional and financial terms.

Moreover, stil remans a challenging factor the issue of salaries and grades at municipal level which are considered to be too low and too little to attract and retain qualified and experienced staff for the efficient operation of the MWG.

4 CONCLUSION & LESSONS LEARNED

Municipalities play an important role on leading their communities, creating wealth and enforcing the local identity. The society needs to have a strong leadership that brings together all relevant stakeholders, community and business representatives, civil society and international organisations which can contribute in developing a strategy based on an overall vision. This is one of the crucial activities that municipalities are expected to conduct. It is interesting to note that under current circumstances the role of international agencies (such as Un-HABITAT) is larger than expected due to donor grants, to a point that it is consider a stakeholder in the process. Nonetheless, as time passes and the municipalities show increased levels of professional and financial capacity, the role of international agencies will have to be reduced to only stimulate processes and projects. The experience in the past, pre-conflict planning (where most of assets where state owned) was that local government would facilitate and provide all these activities themselves. Whereas, contemporary strategic planning promotes the approach by which local government are expected to conduct most of its activities in partnership with private sector and international agencies, while consistently involving voices of community. In this respect, Junik approach to the MDP (although not yet completed process), is unique and despite some minor drawbacks, it pays off when devising policy document in-house.

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Konfliktsituationen in der (offenen) Planung: Lösungen und Anforderungen an die Städte

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1 ABSTRACT

Konfliktsituationen – warum? Interessenskonflikte ; Wertekonflikte im sozioökonomischen und politischen Zusammenhang.

Offene Planung – oder welche Form der Planung? Wer kommt, ist da und erwünscht; oder wen brauche ich in der integrativen, partizipativen Planung (Analyse)?

Aktuelle Erfahrungen mit städtebaulichen Planungen.

Städtebauliche Planung im Brennpunkt zwischen Anforderungen der Verwaltung, der Politik, von Investoren und der Bevölkerung:

- Asperner Flugfeld: städtebauliche Verdichtung in extremer Randlage für eine einkommensstarke Bevölkerung, auf Basis eines Integrativen Informationsprozesses;
- Entwicklungsgebiet Lassallestrasse als Wirtschafts- und Bürozone von Investoren geplant;
- Bahnhof Wien Mitte: rechtlich festgelegte Nutzungsoptionen, die zu einer Monostruktur und funktionellen Barrieren führen können;
- aktuelle Entwicklungsziele in Wien Nord gegenüber den analogen Entwicklungen in den nördlichen Umlandgemeinden: Als kommunalwirtschaftlicher Optimierungsprozess.

Lösungen – Beiträge zu Planungsprozess und Umsetzung.

In den beschriebenen – natürlich auch überzeichneten – Beispielen soll aufgezeigt werden, welche Probleme vor allem im Rahmen großräumiger städtebaulicher Planungen bzw. Planungs- und Umsetzungsprozesse entstehen. Die vorrangige Orientierung auf kurzfristige betriebswirtschaftliche oder politische Ziele blockiert Lösungen und Entwicklungen, die von der Bevölkerung langfristig getragen werden und angenommen werden.

Eine Veränderung der Entscheidungssysteme kann nur in den Machtstrukturen der betroffenen Systeme integrative (partizipative) Planung, Investoren(planung), Verwaltung und Politik geschehen.

Anhand der benannten Beispiele aus Wien im Vergleich zu anarchischen Systemrevolten in Hamburg sollen diese Vernetzungen aufgezeigt, bewußt gemacht und somit auch schon bewegt werden.

Die Anforderungen an die Städte ergeben sich aus diesen Beispielen und der Systemanalyse.

2 ALLGEMEINE EINLEITUNG

Bei allen Planungsansätzen/-methoden bleibt das Risiko von Fehlentscheidungen. Planung kann vor allem dann fehlerhaft sein, wenn sie sich über die Ziele und Bedürfnisse der Menschen, aufgrund einer emotionsfreien Orientierung und ausschließlich technischen Konzeption bzw. einem scheinbar rationalen Umsetzungsprozess, hinwegsetzt.

Planung ist immer auf den Menschen orientiert, der nicht rein rational denkt und handelt, sondern sich in vielen Fällen mit Emotion und individuellen Eigeninteressen – infolge individueller Lebensformen – mit der Planung beschäftigt.

Zur Bewältigung der aus Planungsprozessen resultierenden Akzeptanzprobleme wird diesen durch die Entwicklung und Anwendung verschiedener Partizipationsmodelle bzw. verfahren begegnet. Damit sollen sowohl der Planungsprozess als auch die Planungsinhalte entsprechend den Intentionen der externen Beteiligten beeinflusst bzw. angepasst werden. Dieses Ziel kann dann nur schwer erreicht werden, wenn innerhalb der zu beteiligenden Gruppen unterschiedliche Auffassungen und Motive zum Beteiligungsprozess bestehen. – und diese von den fachlich orientierten Projektsteuerungen nicht verstanden werden können.. Die vorherrschende Meinungsvielfalt innerhalb eines Partizipationsprozesses, ist durch den heterogenen Adressatenkreis und unterschiedliche Lebensziele und Erwartungen bzw. Bedürfnisse geprägt.

Gerade bei umfassenden und großräumigen Planungsaufgaben gibt es einen weiteren Aspekt. – Hier gelangt ein partizipatives Planungsverfahren mit den Forderungen hinsichtlich bestimmter kleinräumiger, zeitlicher, funktioneller oder struktureller Ziele an seine Grenzen, da dadurch die kommunalpolitischen und kommunalwirtschaftlichen Ziele der wesentlichen Entscheidungsträger nicht immer erreicht werden – wodurch ein wesentlicher Konflikt entsteht.

Am Beispiel der städtebaulichen Konzepte großer Teilräume einer Stadt, wie diese in Wien im Gebiet des früheren Nordbahnhofes, des Flugfeldes in Aspern oder des Entwicklungsgebietes beim künftigen Hauptbahnhof bestehen, kann dieses Problem mit der erforderlichen Integration der Bürger beispielhaft besprochen werden.

3 KONFLIKTSITUATIONEN – WESHALB ODER WODURCH?

Konflikte bzw. konfliktauslösende Situationen können vielfältig sein und sind auch am Entwicklungsprozess einer Stadt ablesbar. Die Ursachen können vielfach sein und haben verschiedene Konfliktebenen bzw. Beteiligte, was sich im Dialogprozess unterschiedlich abbilden kann:

- Wertekonflikte im sozioökonomischen und politischen Zusammenhang – für wen wird geplant, welche Bevölkerungsschichten, welche sozialen Ziele werden verfolgt (Integration, kaufkräftige Bevölkerung, Lebensqualität etc.);
- ökonomisch bedingte Konflikte – hohe Rendite für Investoren, hohe Erträge für die Stadt (Steuereinnahmen, Kommunalabgaben etc.);
- stadtentwicklungspolitische Konflikte – konzeptionelle bedingte Gegensätze (Schwerpunkbildung ohne funktionelle Absicherung/kein ÖPV, mit EKZ, Verlust an Grün etc.).

Die aktuellen Diskussionen auf politischer und fachlicher Ebene in Hamburg, aufgrund einer geplanten großräumigen Umnutzung eines Stadtviertels, zeigen die Bandbreite von Konflikten, wie sie heute zunehmend im städtischen Raum entstehen können, wenn vorher kein ausreichender Informations- und integrativer Planungsprozess initiiert wurde.

4 OFFENE PLANUNG – JA, ABER WIE?

Der Begriff „offene Planung“ ist eine Verfahrensform, die nicht eindeutig definiert werden kann. Offen hinsichtlich des angestrebten Ergebnisses ist oft nicht möglich ebenso wie eine Offenheit hinsichtlich der Mitwirkung aller Interessierter. Das heißt, dass die Konzeption der Tiefe und der Form der Mitwirkungsmöglichkeiten der relevante Aspekt ist, um eine Eingrenzung von Konflikten zu ereichen, die eine fachliche und politisch abgestimmte Stadtentwicklung gewährleistet.

5 AKTUELLE ERFAHRUNGEN MIT STÄDTEBAULICHEN PLANUNGEN IN WIEN

Städtebauliche Planungsprozesse stehen im Brennpunkt zwischen den Anforderungen der Verwaltung, der Politik, von Investoren und natürlich der Bevölkerung:

- Asperner Flugfeld: städtebauliche Verdichtung in extremer Randlage für eine einkommensstarke Bevölkerung, auf Basis eines großräumigen Integrativen Informationsprozesses (v. a. SUP und UVP);
- Entwicklungsgebiet Lasallestrasse: vor allem vorerst als Wirtschafts- und Dienstleistungs-/ Bürozone für Investoren mit Insellage zwischen Wohngebieten und Bahntrassen;
- Bahnhof Wien Mitte: von Stadt und Investoren rechtlich festgelegte Nutzungsoptionen und Monostruktur (Handel und Dienstleistung) mit funktionellen Barrieren gegenüber den angrenzenden Bezirk;
- Stadtentwicklung am künftigen Hauptbahnhof als kommunalwirtschaftlicher Optimierungsprozess im Verbund mit Umnutzung für Wohnen, Bildung, Gewerbe und Grünraum.

Ein Vergleich dieser größeren städtebaulichen Planungen in Wien – diese erstrecken sich teilweise über einen Zeitraum von annähernd 30 Jahren – zeigt eine höchst unterschiedliche Vorgangsweise im Planungsprozess, die aufgrund zwischenzeitlicher Erfahrungen mit Planungsmethoden, Verfahrenserfordernissen und Konfliktlösungsbedürfnissen, durch eine zunehmende Beachtung

soziokultureller und gesellschaftlicher Aspekte gekennzeichnet ist. Wesentlich ist, dass einerseits die unmittelbar oder mittelbar berührte Bevölkerung sich eindeutig und fordernd artikuliert und andererseits von Seiten der Planungsträger und Investoren dieses Interesse offen aufgegriffen wird. Erkennbar werden dabei folgende Muster:

- Wenn die Stadt selbst plant, ist eine Integration der Bevölkerung leichter zu erreichen, da auch die politische Relevanz (=Risiko) eines Planungsmangels oder –fehlers höher ist. Das politische Interesse nach Konfliktfreiheit ist unmittelbar berührt.
- Wenn Investoren planen, kann eine Beteiligung mit Einfluss auf die städtebaulichen Entwicklungsziele nur – mittelbar – über die Genehmigungsbehörde (=Stadt) erreicht werden – die Stadt versucht über einen Planungsausgleich divergierende Ziele (zwischen Investoren und Bevölkerung) abzustimmen.
- Wenn die mittelbar oder unmittelbar berührte Bevölkerung aufgrund von Bildung oder sozialem Status kein ausreichendes Artikulationsvermögen hat, wird Planungsbeteiligung nicht praktiziert.. Beteiligung kann in diesem Fall nur mit fördernder Unterstützung und/oder Beteiligung durch beauftragte Stellvertreter erfolgen.

Gebiet	Ziele	Planungs-methode	Beteiligung	Resumeé
Entwicklung am Gebiet des ehemaligen Nordbahnhofs Seit 1990	Umnutzung einer ehemaligen Bahnbrache, Sanierung von Altlasten, Bebauung als zentrumsnaher Entwicklungsraum	Städtebaulicher Wettbewerb, abschnittsweise Bebauung	Keine Beteiligung im Planungsprozess; Bevölkerung im umgebenden Bestand nicht partizipativ orientiert	Planung für einen bisher undefinierten Teilraum ohne spezielle Orientierung; keine ausgewiesene Planungsbeteiligung aufgrund des Desinteresses der Bürger
Entwicklung am Flugfeld Aspern Seit 2001	Umnutzung eines ehemaligen Flugfeldes; Stadtentwicklung als Strategie zur Sicherung der Bevölkerungsentwicklung gegenüber den Umlandgemeinden; Entwicklung als multifunktionaler Siedlungsraum am Stadtrand mit zentralen Funktionen, Bildung, Wohnen und Gewerbe sowie Dienstleistung	SUP SUPer NOW, Städtebaulicher Wettbewerb, UVP zu Teilgebiet, Konkretisierung der Planung zur Umsetzung	Beteiligung im Rahmen der SUP sowie im Rahmen der folgenden Vorbereitung des Wettbewerbes, Information im Rahmen des UVP-Verfahrens, Einladung zur Mitwirkung bei der Konkretisierung der Planung (v.a. für Eigenheime); Bevölkerung im umgebenden Planungsgebiet interessiert und fordernd hinsichtlich deren Einbeziehung	Planung für einen bisher wenig beachteten Teilraum in Randlage der Stadt; hohe Planungsbeteiligung aufgrund des Interesses der Bürger an einer intakten Umwelt
Städtebauliche Entwicklung beim Hauptbahnhof Seit 2004	Wohngebiete mit Grüninsel und Betriebs-/Dienstleistung zur Abschirmung gegenüber der Bahntrasse	UVP, städtebaulicher Wettbewerb, abschnittsweise Realisierung	Information im Rahmen des UVP-Verfahrens, derzeit keine weiterführende Integration; Bevölkerung im ungebenden Bestand mehrheitlich nicht partizipativ orientiert	Planung als Investorenplanung zur Umnutzung von ehemaligem Gewerbegebiet in relativ zentraler Lage; wenig ausgewiesene Planungsbeteiligung aufgrund des Desinteresses der Bürger – abgesehen von bezirkspolitischen Positionierungen und Forderungen
Entwicklung des Zentrums „Bahnhof Mitte“ Seit 2003	Neugestaltung eines zentralen Bereiches zur Optimierung der Nutzungen und wirtschaftlichen Erträge der Grundeigentümer/Investoren	Städtebaulicher Wettbewerb, Konkretisierung der Planung zur Umsetzung	Keine Beteiligung im Planungsprozess; Bevölkerung im umgebenden Bestand nicht partizipativ orientiert; Positionierung erst bei Themen der Baudichte (Weltkulturerbe)	Planung als Investorenplanung zur Neugestaltung eines zentralen Bereiches der Stadt; keine Planungsbeteiligung – abgesehen von bezirkspolitischen Positionierungen und Forderungen

Tabelle: Ziele, Planungsmethoden und Beteiligung

6 LÖSUNGEN – BEITRÄGE ZU PLANUNGSPROZESS UND UMSETZUNG

In den beschriebenen – natürlich auch überzeichneten – Beispielen sollte aufgezeigt werden, welche Probleme vor allem im Rahmen großräumiger städtebaulicher Planungs- und Umsetzungsprozesse entstehen können. Die vorrangige Orientierung auf kurzfristige ökonomische Ziele sowohl auf Seiten der Stadt wie auch der Investoren blendet die Berücksichtigung der langfristigen Bedürfnisse der Bewohner und Konsumenten aus. Es genügt nicht diese in die letzte Stufe des Umsetzungsprozesses einzubeziehen, wenn alle relevanten städtebaulichen Grundsätze bereits abgestimmt und erfüllt sind. Erforderlich ist ein Planungsprozess, der sowohl in der städtebaulichen Rahmenplanung als auch in den Quartiers- und Objektplanungen ein gewisses Maß an Integration der aktuellen und künftigen Nutzer/Bürger sichert und eine offene Kommunikation mit Verbindlichkeit gewährleistet ist.

Je nach Stufe der Kommunikation mit den verschiedenen Beteiligungsgruppen ergeben sich verschiedenste Intensitäten in den Konfliktbewältigungsstrategien:

- Information der Bevölkerung, dabei sind Rückmeldungen möglich, aber nicht unbedingt erwünscht.
- Konsultation verschiedener Gruppen in verschiedenen, definierbaren Gruppen oder auch einfach in der Öffentlichkeit, werden bei Diskussionsveranstaltungen oder Befragungen, Meinungen eingeholt und in die Planungen – je nach Gutdünken – eingearbeitet.
- Mitbestimmung, hier werden – auch in definierten Gruppen – Meinungen, Diskussionen, Erfahrungen in die Planung eingearbeitet und wieder rückgemeldet und allenfalls nochmals diskutiert, bis ein gemeinsames Ergebnis erarbeitet ist.

Meist ist es jedoch so, dass die am höchsten eskalierte Konfliktstufe nur noch über eine Mitbestimmung in der Planung steuerbar ist. Hier kann nur mehr durch Mitarbeit in den Planungen das Vertrauen erarbeitet werden, das in den zuvor nicht erfolgten Kommunikationsprozessen verloren gegangen ist.

Gerade diese Aspekte einer hohen Konflikteskalation können durch gut gesteuerte Kommunikations- und Planungsmodelle mit einer Analyse der Beteiligten vermieden werden. Hierzu ist vor allem wichtig, sich über die möglichen beteiligten (Konflikt-)Parteien einen Überblick zu verschaffen:

- Verwaltung
- Projektwerber
- Bestehende Strukturverwalter (z.B.: Kaufleute aus der Umgebung, Nutzer der bisher unbebauten Grünbrache,...)
- Politische Mandatare (welche Gruppen haben Zugang)
- Betroffene (wodurch? Baumaßnahmen, Umstrukturierung, Verkehrzunahmen,...)

Als Folge einer nicht optimalen Stadtpolitik und städtebaulichen Planung können die aktuellen Probleme der Stadt Hamburg angesehen werden, die eigentlich nach den Erfahrungen der Stadtentwicklung und Stadterneuerung der 70-er-Jahre längst bewältigt sein sollten. Stadtplanung und Stadtentwicklung weisen heute ein gegenüber früher wesentlich umfassenderes planungsmethodisches und technisches Instrumentarium auf, vergessen aber – trotz beispielsweise auch positiver Ansätze in Wien – auf die Berücksichtigung sozialgeografischer/gruppendynamisch/systemisch orientierter Kommunikationsverfahren, über die eine Einbeziehung von Entwicklungsträgern, Nutzern und Betroffenen frühzeitig möglich ist. Nachgeordnete mediative Verfahren sind aufgrund des großen Kreises von Betroffenen zu aufwändig, kommunalpolitisch zu unsicher und bieten nicht immer jenes Ergebnis, das für die Gesamtstadt erforderlich ist.

In den beschriebenen Beispielen wurde versucht kursorisch aufzuzeigen, welche Probleme vor allem im Rahmen großräumiger städtebaulicher Planungen bzw. Planungs- und Umsetzungsprozesse bestehen können. Die vorrangige Orientierung auf kurzfristige betriebswirtschaftliche oder politische Ziele blockiert Lösungen und Entwicklungen, die von der Bevölkerung langfristig getragen und angenommen werden.

Eine Veränderung der Entscheidungssysteme kann nur in den Machtstrukturen der betroffenen Systeme „integrative (partizipative) Planung“, „Investoren(planung)“ und in Verwaltung und Politik geschehen.

7 KONKRETE LÖSUNGSANSÄTZE FÜR DIE WIENER ERFAHRUNGEN

Mit den in Folge dargestellten Anforderungen kann nur ein Beitrag formuliert werden, der auf verschiedenen Handlungsebenen angelagert sind: Berührt sind natürlich die kommunale Politik bzw. die politischen Entscheidungsträger, die speziell in Wien zentralisiert handeln. Eine Stärkung und Einbindung der Entscheidungsträger auf der Bezirksebene ist erforderlich wie auch eine Förderung von Mitwirkenden auf Stadtteilebene.

Benötigt wird eine (fach-)politisch akzeptierte Zwischenebene zwischen STEP/Rahmenplan und Flächenwidmung. Dies könnte ein Entwicklungskonzept mit speziellen Festlegungen sein, das funktionelle Teilziele und strukturelle Festlegungen enthält (Form und Dichte der Bebauung, Qualität des ÖPV, etc.). Dieses Konzept kann in Form eines inhaltlich erweiterten Masterplanes erstellt werden, in dem jene Vorgaben enthalten sind, die nicht Bestandteil der Verordnungsplanung sein können (z.B.: CO2-Level, Emissionsgrenzen, Grünraumgestaltung und –nutzung, soziale/gesellschaftliche Durchmischung).

Vor allem diese Planungsebene muss bereits im Rahmen eines offenen bürgerorientierten Prozess behandelt werden (ohne zu große Vorgaben, abgesehen von dem übergeordneten Rahmenplan für die Gesamtstadt), auch wenn die Repräsentativität der Beteiligten ein Problem sein kann. Die Form der Einbeziehung und deren Vergütung sind dabei zu klären, da ohne entsprechende finanzielle Aufwendungen bzw. Entschädigungen der Beteiligten dieser Prozess nicht erfolgreich sein kann.

Es muss „offene“ Zonen in der Stadt geben, die sich gewissermaßen ohne zu detaillierte funktionelle Vorgaben entwickeln dürfen – vor allem zum Vorteil sozioökonomisch schwächerer Gesellschaften. Erforderlich können dabei strukturelle Vorgaben sein, in denen beispielsweise die Maximalgröße eines Bauplatzes für einen Eigentümer (Person oder Gesellschaft), die maximale Dichte und eine erforderliche Nutzungsmischung vorgegeben werden (bezogen auf eine bestimmte Grundfläche).

8 ZUSAMMENFASSUNG

Konflikte ergeben sich aus den verschiedensten Ursachen,. Nur eine Analyse der konkreten Ursachen und eine Berücksichtigung des Konfliktumfeldes führen zu Lösungsansätzen, die von den Konfliktbeteiligten getragen warden. Niemals können Konflikte nur von “Experten” gelöst werden. Die Beteiligten müssen integriert werden, ansonsten gibt es keine tragfähigen Lösungen.

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Linz Charter – Guideline for Urban Development: Architecture, Traffic and Urban Planning have become "Deaf" Disciplines in which Acoustic Consequences are Treated Without Concern

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1 ACOUSTICS: A TOPIC OF THE CITY OF THE FUTURE?

Why should acoustics become a topic of the city of the future?

- Because our acoustic living environment has been radically changed by technical revolutions and requires new patterns of behavior.
- Because our ears are open 24 hours a day – from the 50th day after conception to our last breath of life, every day, every minute, every second, without interruption.
- Because access to our body is possible through the ears without interruption – just as through the respiratory organs.
- Because permanent stress due to noise and background music is just as harmful to people as brief periods of peak stress.
- Because hearing damage is accompanied by the risk of damage to the sense of balance and orientation, which are also located in the ear.
- Because people cannot defend themselves against acoustic dangers, because hearing, balance and orientation are unconscious processes, just like breathing.
- Because every person has a right to an acoustic environment that does not cause health damage.
- Because every type of construction and urban planning is acoustic design, regardless of whether this is done consciously or unconsciously.
- Because noise impinges on children's ability to learn in school. Scientific studies have shown that students' performance drops by 10 to 25 percent even with moderate background noise, and permanent noise can increase hyperactivity and weak concentration among children.
- Because "noise impaired hearing" is the most frequently occurring recognized occupational disease.
- Because noise has such a massive impact on the human circulatory system that according to an estimate by the German Federal Environmental Agency about 4,000 heart attacks each year in Germany are due to traffic noise.
- Because the acoustic living environment is increasingly becoming a characteristic of social differentiation ("those who are poor, live with noise").

So we can say that acoustically aware planning is worth the effort:

It is worth having environmental psychologists take an early look at the architect's blueprints. The increase in productivity that is later reflected in lower fluctuation, less sick leave and greater attractiveness for new employees far outweighs the original effort.

From the newspaper: Frankfurter Allgemeine Zeitung, 18. 11. 2006

2 HÖRSTADT: ACOUSTIC CITY

2.1 Our acoustic space

In acoustic space our living conditions become concrete, both directly and – because we cannot turn off our hearing – unavoidably. Nevertheless, acoustic awareness is still seriously underdeveloped in our society. Traffic noise sounding everywhere has flattened the once individual soundscapes of the cities into a monotone roar, which no one can overcome even with the most expensive noise pollution control measures. Architecture, traffic and urban planning have become "deaf" disciplines, in which acoustic consequences are treated without concern. The technical revolutions of recent years have made possible the emission of sound at all times and in every place, which is accompanied by an economization of hearing: Products from cars to cookies have long since also been acoustically designed to suggest or express quality, while corporations

have moved to acoustic styling to avoid the increasing ineffectiveness of conventional advertising due to visual over-stimulation. Supermarkets, businesses, shopping centers, restaurants, waiting rooms, telephone on-hold systems and even toilets subject millions of citizens every day to a more or less intentionally imposed environmental noise with music.

All of this happens outside the realm of noise pollution legislation in the narrower sense in a legal vacuum. We experience the Wild West of hearing, in which there are practically no binding rules of the game for how people live together acoustically in a democratic society.

2.2 Hörstadt: Acoustic City

Acoustic City is an initiative developed in the year of Linz 2009 European Capital of Culture for an arrangement of our audible living environment appropriate for human beings and in keeping with human dignity, developed for our acoustic space.

Acoustic City is an idea: people are deeply touched and affected by what they hear. Because three existential senses are united in our ears: the sense of balance, the sense of orientation and the sense of hearing. For this reason, human beings have a right to an acoustic environment that does not make them sick – due to noise, acoustically inadequate architecture and permanently imposed music. People have the same right to this as to clean air and pure drinking water. Making acoustic space liveable and worthy of a civilized democratic society is a political task, - and of course a task of urban development and planning. This means much more than noise protection and prevention of noise pollution.

2.3 Is anyone allowed to use two entrances to our body without asking?

The city has always been a loud place, and surprisingly, it is relatively certain that cities in the 19th century were louder than the cities of the present. However, their sonic diversity was richer and not yet dominated by the noise of motorized traffic that sounds the same everywhere.

Our sense of hearing can deal with heavy acoustic strain, but only as long as it also has times and zones of quiet to regenerate. The successive disappearance of quiet phases and peaceful space due to permanent traffic noise, due to background music from the supermarket to the restrooms in restaurants, and the constant use of headphones leads to strains that are more than we can anatomically and mentally cope with. The consequences are cardiovascular diseases, stress, hyperactivity among children, decreased performance, irreversible hearing loss for every fourth young person.

Foto: Gerd Langer

2.4 „Ruhepol" the Center of Calm

With the "Ruhepol" Center of Calm at the cathedral Acoustic City operates a exemplary quiet space that is publicly accessible free of charge. It is located in the steeple of Austria's largest church, the Cathedral of Our Lady. This space has unique measurements and equally unique acoustics.

2.5 „Beschallungsfrei – Zone Without Background Music“

Imposed noise with background music in countless spaces of the public sphere, from the meat counter to the restroom, is a violation of the elementary right to bodily sovereignty – a heavy mental burden for retail employees unremittingly exposed to it and dubiously patronizing towards citizens for economic motives. The label “Beschallungsfrei – Zone Without Background Music” designates spaces that dispense with imposed noise. This decision is not only a valuable contribution to maintaining the health of our hearing, but also to upholding our human rights. The campaign “Beschallungsfrei” is conducted together with unions and churches.

Foto: Pondell

Since Autumn 2008 major public administration offices in Linz and Upper Austria designate their spaces as free from imposed noise to set a good example.

2.6 The Akustikon

The Akustikon – World of Hearing is a house of hearing and a research and education and consulting center for acoustic issues in our society. The central aim of the Akustikon is to raise awareness for the sense of hearing in our society and to place hearing in a socio-political context.

The five guidelines of the Akustikon are:

Free hearing, which means that in the Akustikon people open themselves up to the world through their ears and hear freely. Not isolation from the world, but becoming immersed in the world is the program. For this reason, there are no headphones in the Akustikon.

Hearing as a trinity, which means that the Akustikon focuses on the ear as a holistic sensory organ. This applies to all three senses located in the ear – balance, orientation and hearing.

Monomediality, which means that sound is neither prepared in a purposely visual way nor placed in a synaesthetic context.

Learning to hear is learning to think is the motto. The Akustikon is a school of hearing.

Spatial diversity means striving for a diversity of spatial structures in all aspects (size, form, material) to enable experiencing spatial perception as a function of the act of hearing.

2.7 Architecture designs acoustic environment.

The architecture, in which we live and work, is a substantial factor for our acoustic wellbeing – the acoustics of every building are created along with the building itself. Unfortunately, the conscious planning and design of acoustic conditions plays no more than a marginal role either in theory or in practice. Parallel, smooth, vertical walls and facades, hard and highly reflective building materials transform entire streets into canyons of noise, resulting in spaces where we do not feel comfortable, where we cannot follow a conversation or can neither concentrate nor relax.

Acoustically building correctly means grasping the building as a unit because acoustically, building the building itself can cause the most damage. Poor planning for conduits for water ventilation data, and electricity can make life a living hell. Undesired noises are reinforced and unintentionally passed on over long stretches. This means social conflicts are inevitable.

Foto: Pondel

A vision of urban planning: parallel buildings along traffic routes veritably captures the sound waves of noise. They are constantly bounced from one surface to another, endlessly reflected and amplified. Curves or slanted surfaces allow the sound to escape and reduce noise pollution. This knowledge was already put into practice in the Renaissance. In many North Italian cities the main thoroughfares are arranged in slight curves. Here a study of the street Elisabethstrasse in Linz.

3 THE LINZ CHARTER

3.1 Acoustic space planning

Initiated by Acoustic City, on 22 January 2009 the City of Linz passed the Linz Charter: it is an attempt to imagine urban development acoustically and to compile a catalogue of goals and values for city life and urban design in an acoustic sense, so that acoustic criteria play a central role from construction and commercial regulations to traffic planning and area planning all the way to the conscious design of the sound environment. Linz is thus the first city in the world to address acoustic concerns at the political level. The Linz Charter is the basis for developing a branch of research we may call acoustic space planning.

The wording of the Linz Charter:

The City Council of Linz resolves upon the following ‘Linz Charter’ and invites other cities to join it.

LINZ CHARTER

Acoustic space is everything we hear. In it our living conditions become both concretely direct and – since we cannot turn off our hearing – unavoidable. Acoustic space can be formed. It can be designed, cultivated and developed.

We recognize acoustic space as an elementary component of our habitat and commit ourselves to taking into consideration the following values in designing and developing it:

- Acoustic space is a public good. It belongs to everyone.
- The arrangement of acoustic space is the right and the concern of all people. Participation in this requires equal opportunities.
- Participation in acoustic space requires the right to acoustic self-determination and the development of a sense of acoustic responsibility.
- Cities are places of acoustic diversity and acoustic richness that should be open to all without barriers.
- In acoustic space people also have the unlimited right to personal physical sovereignty and the right to personal health.

Based on these values, we are oriented to the following goals:

- We want to enable and foster acoustic diversity and richness of sound.
- We understand construction, traffic and urban development processes in our city also as acoustic processes.
- We want to keep all publicly owned spaces, including all public transportation, free from permanent noise imposition.
- We seek a reduction of noise imposition in the public sphere for the protection of workers and consumers.

- We want to ensure full public participation for all hearing-impaired persons.
- We call on all educational institutions – especially kindergartens – to focus on the acquisition of auditory skills in their work.
- We want to promote responsible, innovative and socially engaged acoustic behavior and take new directions in fighting noise pollution.

With the "Linz Charter" we make hearing one of the core areas of our politics and invite other communities to join the "Linz charter". We appeal to law-makers to take acoustic space into consideration as a central area of life. We do so in the knowledge and the conviction that human beings are influenced and touched by what they hear even in their innermost being.

Acoustically aware action creates quality of life and fosters individual participation in social communication."

4 WHAT DOES THE CITY OF THE FUTURE NEED?

A different and thus acoustically less stressful mobility, a knowledge and appreciation of its sonic richness, a consciously acoustic design of living spaces, an experimental and creative way of dealing with noise, building construction appropriate for our sense of hearing, a sufficient number of zones free from imposed noise. A sonic map of the the city that also ensures social justice in terms of acoustics, so that poverty is not equated with living in the noisy zones of the city.

The city of the future needs an acoustic space planning.

The Linz Charter can be the basis.

www.hoerstadt.at

MARIA – Mobile Assistance for Barrier Free Mobility in Public Transportation

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1 ABSTRACT

The objective of MARIA is the development of a mobile service for continuous assistance with the purpose of barrier-free usage of public transportation. Relevant social communities such as elderly people, illiterates and immigrants are completely involved in technical design and evaluation. The innovative service includes image based text recognition and translation, location awareness and mobile speech recognition.

2 INTRODUCTION

2.1 Motivation

Use of public transportation is an essential prerequisite for barrier-free mobility and from this for long-term integration in social environments. The richness in the information offers in public transportation nowadays may also cause counterproductive consequences with respect to the usablity of already existing services. In particular, there may occurr problems if the information cannot be perceived and understood appropriately. This may occur in the case of (1) elderly people with problems in recognition and with cognitive impairments, of (2) immigrants with initial lack of expertise about a local language and (3) functional illiterates with principal problems in the understanding of text. In common is a request for moving forward a fundamental step for the integration of the mobility of these groups by introducing an assistive technology for barrier-free usability of public transportation, especially for autonomous access to textual information.

The project MARIA is targeting at the following objectives,

- Mobile assistance for social target groups. In contrast to previous only highly local supportive systems, MARIA develops a service for continuous assistance and support of passengers, especially in critical situations (selection of traffic lines, navigation, entering and leaving vehicles).
- Image based assistive technology for intelligent access of appropriate information spaces. Information text at bus stops and in trains can represent a challenge and form barriers in language comprehension and understanding. MARIA offers a service for image based text recognition and automated translation for the better usage in public transportation as well as in everyday situations.
- Information interaction with public transportation infrastructure for a most actual information access. Only the access to actual, most essential information (coach position, delays, etc.) enables efficient and comfortable assistance behaviour for the benefit of the passenger.
- Iterative integration of social requirements during the entire development process and the associated usability research. MARIA guarantees through its professional treatment of social requirements a fundamental, actual and complete consideration of social target groups within the design and functioning of the technology.
- Semantic analysis of ways of social target groups. MARIA enables the analysis of anonymised protocol information (geo-information, interactions, reported data, decisions) and from this a semantic evaluation of ways and objectives of the targeted groups.

The basis for this technology is mobile phones that are already available on the market, with graphical displays, a camera and innovative image analysis methods. The scenario is to direct the mobile camera to a public transportation sign (bus stop) or a textual region (at the bus stop or within the train) and to receive audiovisual information for assistance, for example, by text to speech or easily understandable graphical instructions. MARIA includes an intuitive assistance for barrier-free use of public transportation. Images of signs or text are analysed, the context associated and the system may start appropriate assistive behavior to support the user.

MARIA significantly discriminates from previous projects via its professional treatment of socially relevant groups into the process of technical developments. Profile of requirements, interaction design and iterative development using evaluation results are determined, accompanied and decided by the social target groups. MARIA represents a fundamental step towards a really efficient integration of social groups for barrier-free transportation.

2.2 Related Work

An essential feature for a barrier-free usage of public transportation is an appropriate access to information about navigation in terms of bus lines and hours. Information about routing from location A to B is offered within any major public transportation provider and its internet based representation. It has been recognised, however, that this information should as well be available for the mobile user, the passenger in the field. Therefore these services are provided for mobile phones in order to offer the clients to plan their trip independent on time and space. All major of such systems of public transportation providers in Europe do not adjust these services to special target groups and favour the „all-for-one“ type design. Actual systems are focussing on routing information and can be subdivided technically into three major categories, (1) simple information pages available in the internet, these are adjusted for the mobile phone specific presentation, (2) applications that are specially designed for mobile phones, these require mostly a continuous connectivity and data exchange, or that store specific route information for off-line processing thereafter, (3) mobile services that carry the complete routing information statically on the phone and that do not need connectivity. The most simple systems are based on a homepage that can be opened via a preinstalled browser, such as the system of Nürnberg[1], that does not actually provide assistance. Other systems provide information about specific routes that can be used without any costs for connecting, such as is used by the Verkehrsverbund Berlin Brandenburg[2]. A typical off-line service is provided by the Münchner Verkehrs- und Tarifverbund GmbH that integrates the complete map of the urban public transportation[3]. The state-of-the-art is defined by the software „Quando“[4] that is offered by the Wiener Linien and Verkehrsverbund Ost-Region (VOR) since 2009, including a real-time information about the state of the public transportation, routing, GPS based local assistance additional services for ticketing, interactive city maps and temporally appropriate event information. The Austrian project „MIP“ (Mobile Information Point) develops highly local information support with support of mobile cameras (QR coding) and near-field communication (NFC)-technology.

In contrast to the other mentioned systems, MARIA enables a functionality for continuous assistance with image recognition technology that can be universally applied and forces a precise analysis and application of user requirements through the associated usability research. MARIA’s intelligent service with barrier-free assistance is at the moment neither under investigation nor available on the market.

3 MOBILE ASSISTIVE TECHNOLOGY IN PUBLIC TRANSPORTATION

Current passenger information and routing systems are usually accessible via the homepage of the corresponding transportation service provider. From this the service is only available with standard web browser usage and causes problems because these browsers are not optimised for the mobile phone type display. Furthermore, the performance of web browsers on the mobile is not comparable with those available at desktops, regarding dynamic content and interactivity. Partially these problems have been covered with specific software such as in quando, offering routing about usage of public transportation, however, intelligent assistance for supporting the user at the navigation points – where the media of transportation is

[1] www.vgn.de.
[2] http://www.vbbonline.de
[3] www.mvv-muenchen.de
[4] www.qando.at

changed - is not part of it. This is the reason why these kinds of systems are not suitable in case of barrier free guidance and impose difficulties for orientation and understanding.

The project MARIA intends to provide a mobile assistance for barrier-free navigation, targeting at social groups with problems to orientate and understand standard type guidance information, and in this way contrasts to any other system available at the moment. MARIA will be developed in terms of a separate application for modern mobile phones and will continuously assist the passenger on its way. Intelligent guidance is provided through an on-going computation of geographic and semantic context that enables the service to appropriately react in response to characteristic situations without the need for interaction by the user. Context recognition takes advantage of nowadays multisensory equipment of mobile phones, for example, to decide whether the user is taking a stroll in the city or using a tram or bus. Position and acceleration sensing, digital compass and GPS/GALILEO receivers are provided to support the contextual computing unit. A typical example for contextual support is requested at navigation connection points: the unit will analyse whether the user enters the targeted tram line or not, and if not, the system can appropriately respond for further support. MARIA will also develop towards extended usability in terms of the design of the mobile graphic display that will be in contrast to the de-facto standard. The graphical user interface will be designed according to the requirements defined by the targeted social groups, in order to guarantee a most comfortable usability.

The assistive mobile service aims at the implementation of a interface between the user and the MARIA system. The passenger should be enabled to use all functionalities independent on choice of time and locaton. The key features targeted at are as follow,

- Intuitive user interface: The user interface provides access to all functionalities via specific a social group specific user interface according to the requirements determined by usability analysis.
- Intelligent navigation assistant: Implementation of real time navigation and bidirectional passenger service. Implementation of user specific intelligent guidance with appropriate speech output. This will include on the one hand consideration of various information sources for the actualisation of time plans, information about position and delays. Furthermore, the navigation assistant will be equipped with moble augmented reality functionality to overlay the real-time camera image with guidance information.
- Context recognition based on multisensor information for the support of navigation. The automated context recognition system will be capable to interpret movement patterns and from this the behavior of the mobile users, and finally conclude about appropriate mobility of the target user. In case of deviations to the planned behaviors, the intuitive interface will activate appropriate functionalities in order to alert the user and inform about a targeted compensation behavior.
- Integration of the camera interface for real time augmentation of navigation information.
- On-board service. There will be an interface from the mobile service to the bluetooth based infrastructure within the coach. This service will enable to utilize informations about the status of the coach, such as, opened doors or position of the coach within the city map, that support intellitgent navigation and interaction with the passenger.

4 MOBILE ASSISTIVE VISION SERVICES

The project MARIA will initially make use of marketed standard software for text recognition that will be applied in the mobile service for the specific target groups. The user points his camera phone towards a text, such as information by public transportation, snaps a photo and receives in turn the translation of the text using earphones or the loudspeaker of the cellular. In case of immigrants we intend to use an automated language translation service. In cooperation with usability research and professional translators with experience with immigrants we will attain an appropriate mapping from text to a translation of most used phrases. A software that was used for the identification of medicaments (Kalcher et al., 2006) will become the basis for further research and development in order to develop a robust service. The objective is to develop a service that is operating in real-time and in a robust way since text recognition in real world outdoors is a challenge. In addition, a mapping between public transportation signs, such as at bus stops, and appropriate information services is considered. The software will be based upon mobile vision services for geo-indexed object recognition in urban environments (Paletta 2007; Amlacher et al., 2008a,b).

The camera phone will act as an "intelligent loupe" to the passenger, including the functionalities of (i) text detection with mobile images, (ii) recognition of general text in images, for the (iii) magnifying of recognised text and for (iv) the translation of text in foreign language into the specific mother language of the passenger, and (v) for acoustic presentation of recognised text. Initially, the loupe will operate in client-server mode. Finally, a client based service will contain relevant functionalities for computer vision for the rapid interpretation of text at the site. The intelligent loupe represents a central element for the implementation of barrier free mobility in public transportation and can be used by passengers as well for support in everyday life. Research towards a robust service is challenging because image based services are seriously dependent on illumination conditions and thus represents an active field of research.

5 USABILITY ANALYSIS TARGETING AT KEY SOCIAL GROUPS

5.1 User Centred Design

The key idea behind MARIA is to develop a user specific service that is in contrast to all existing general purpose public transportation services. In contrast to the "design for all" concept (Stephanidis, 2001, 2009; Shneiderman, 2000) there exists a cocept for multimodal interaction that makes use of audio and voice (Benoit et al., 2000; CURE, 2004), eye movements (Forbus et al., 2003), and mobility (CURE, 2004) or haptic interactions (Yonezawa et al., 2008) that aims at identifying the various requirements of specific user groups. Multimodale interfaces enable sequential, parallel, independent and combined interactions (Olwal & Höllerer, 2005). Furthermore, the emotional status of the user and his reactions can be extracted and classified (Glowinski et al., 2008). In MARIA the focus of usability research is on the investigation and evaluation of user experience factors, with respect to the individual social target groups and types of ways that are travelled by the passengers in natural mobile environments. Results of this investigation should impact the design and the functionality of the mobile service.

MARIA involves a user centred design strategy with direct involvement of the user in order to attain universal accessibility, usability and user experience. Focus groups will be investigated together with specific user groups to develop scenarios for the use of the MARIA functionalities. Problems and requirements will be protocolled and mapped to a valid support of the technological development process. Living Lab methods (z.B. ESM, Remote Usability Testing) will be investigated that deliver in real-time information about the usage of the system, interactions and user experiences in interaction with a specific system version in the natural environment.

5.2 Elderly People

There is a wealth of products that is specifically suited to elderly people, such as the Nokia Emporia phone. For the development of these technologies, the cognition and the physical constraints of elderly people should be considered in both design and functionality. However, in contrast to the exhibited sensibility for problems and requirements, the use of technical equipment still remains a grand challenge to elderly people. Most important, the inclusion of elderly people into the design process is a major issue in order to guarantee improvement of their quality of life. In MARIA it is important to develop a continuous service for assistance which is a major concern for support of the perception of the environment and the mobility of elderly people.

5.3 Immigrants

Immigrants are experiencing many barriers for participating in public space, such as, use of foreign language, different scripture and use of functionality in public transportation. Immigrants with initial knowledge of local language are often misguided by misapprehension. In the city of Graz, announcements in English are not helpful for the majority of immigrants that originate from Turkey and East-European countries. Immigrants therefore need support, mostly through family members if available, another strategy is to avoid public transport. A specific target group consists of low educated females and young mothers that need support about the cultural use of public symbols, about how to autonomously proceed with their kids in the urban environment. The objective in MARIA is to provide the mobile service to immigrants with neglectable knowledge in German language that recently entered Austria, some immigrants are illiterates that need special support. The mobile service will be delivered as part of a „welcome package" to immigrants in Graz.

5.4 Functional Illiterates

Functional illiteracy refers to the level of competence in reading and profoundly depends on the social and the temporal context of the individual. The information and communication society imposes specific challenges on the individual that cannot be met by 10-20% of the public according to studies of OECD International Adult Literacy Survey, PISA and estimates of the European Parlament. The key problem for illiterates is navigation that mostly is based on text within urban environments (including maps, graphics, etc.). Functional illiterates proceed mostly on well known routes, whereas new targets, such as at hospitals, impose barriers that cannot be passed by illiterates. The innovative technical solutions in MARIA are therefore highly relevant for this specific social group.

6 CONCLUSION

The application of mobile services for specific target groups and the resulting benefit for the passenger will cause in parallel improvements in economics. The project MARIA aims at an increased involvement of elderly people and immigrants in public transportation due to the better support in navigation and assistance in critical situations, such as in decision points for navigation. The focus on meeting the requirements of specific user groups will enable a tight binding of these passengers to the public transportation services which finally represents a modal shift resulting in less pollution of the urban environment. At the same time, the citizens become more satisfied, can act better according to their true interests and from this communication and investment will be intensified in the urban environments.

7 ACKNOWLEDGMENTS

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Mikrosimulation von Mischverkehr – Konzept MiMiSim[1] und Ausblick auf MixME[2]

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1 ABSTRACT

Within the approach to design self-explaining roads to navigate through urban conflict areas several concepts of mixed traffic were developed and evaluated all over Europe. Mixed traffic philosophies can be compared to toolboxes themselves where a flexible and sensitive way of application is necessary. Microscopic traffic simulations allow the highly detailed modeling of pedestrians, vehicles, driver behavior and the interaction among each other and with the infrastructure. The state of technology and available simulation software don't provide sufficient degrees of freedom and capabilities to reproduce dynamic and social interaction.

The undertaken concept study evaluated the basic underlying questions and possible model approaches. The promising Multiagent-Social-Force Model describes the impact of social and technical interaction of traffic dynamics by establishing fields of force in road spaces similar to physical models in Newton dynamics. This approach was used to discuss the detailed modeling of interactions between road users and infrastructure.

Based on the findings of the concept study, a microsimulation model of mixed traffic will be implemented to evaluate its applicability to certain urban scenarios. The major aim is to describe interaction processes between motorised and unmotorised traffic as well the effect of infrastructural parameters and layouts. Calibration and validation is undertaken based on real world data, generated by semi-automatic tracking and classification of video footage.

2 HINTERGRUND

2.1 Mischverkehr

In Ortsgebieten kommt es verstärkt zu Konflikten zwischen Verkehrsteilnehmern verschiedener Modi. In der Vergangenheit wurden diese Konflikte meist durch eine weitgehende räumliche und zeitliche Trennung der jeweiligen Verkehrsmodi gelindert. Dennoch führte eine solche Trennung nicht zur Erfüllung der gewünschten Verkehrssicherheitsziele. Europaweit sind daher in den letzten Jahren verstärkt Konzepte zur gemischten Führung des Verkehrs untersucht und umgesetzt worden.

Bei Planungen neuer Mischverkehrsanlagen sind durch mangelnde Erfahrungen und Richtlinien planerische und politische Unsicherheiten vorprogrammiert. Dies stellt insbesondere Planer in partizipativen Planungsprozessen vor völlig neue Anforderungen. Unterschiedliche Topografien, komplexe Verkehrssituationen und umfangreiche gestalterische Details verhindern one-size-fits-all Lösungen. Auch die wissenschaftliche Diskussion gelangt zu keinen klaren Anwendungsrichtlinien, sondern durchaus zu kontroversen Ergebnissen (vgl. Euser, 2007, Gerlach et al., 2008, GDV, 2007). Gefragt sind daher Planungswerkzeuge, die einerseits bestehende Richtlinien und Erfahrungen einbinden, andererseits jedoch auch lokale Besonderheiten berücksichtigen können.

2.2 Mikrosimulation des Verkehrs

Die Multimodalität der Mikrosimulation des Verkehrs gewinnt international zunehmend an Bedeutung, getrieben durch das wachsende Interesse an der Gestaltung und Optimierung von Verkehrssystemen für nichtmotorisierte Verkehrsgruppen.

Anwendernahe Mikroskopische Verkehrsmodelle sind ideale „Werkzeuge" für Verkehrsplaner und Verkehrstechnologen um Maßnahmen szenarienbezogen zu gestalten und hinsichtlich unterschiedlicher Kriterien wie Leistungsfähigkeit, Sicherheit oder Emissionen zu optimieren. Außerdem bietet Simulationssoftware auch Möglichkeiten zur Evaluierung von Nachfrageentwicklungsszenarien und besitzt die Möglichkeit zur grafischen Visualisierung von Verkehrsabläufen.

[1] Die Konzeptstudie MiMiSim wurde durch Fördermittel des BMVIT im Rahmen der Initiative ways2go ermöglicht (2008/2009).
[2] Das Forschungsprojekt MixME wird ebenfalls im Rahmen von ways2go als kooperatives Forschungsprojekt finanziert. Beteiligte Partner: mobimera Fairkehrstechnologien, AIT, TU Graz, Rosinak & Partner, SLR engineering (Zeitraum: 2010-2012).

Marktführende Unternehmensgruppen (PTV AG, TSS & LEGION) veröffentlichen derzeit Lösungen, um Personenverkehr mit den herkömmlichen Fahrzeugmodellen in Softwarepaketen zu kombinieren, die Interaktionsfähigkeit ist jedoch lediglich auf Kreuzungen von separaten Bewegungsflächen begrenzt und daher für die Simulation von Mischverkehr nicht ausreichend.

3 KONZEPT

3.1 Verkehrsverhalten

Die in der STVO definierten Verhaltensnormen wurden, teilweise mit Hilfe von Interpretationsliteratur, paragrafen- und absatzweise hinsichtlich folgender Aspekte gefiltert:

- I.Relevanz für Verkehrsablauf
- II.Relevanz in Bezug auf Shared Space Projekte
- III.Differenzierung Verkehrsteilnehmer / besondere Gruppen

Ergänzend wurden auch verhaltensbezogene Erkenntnisse aus Literatur und Richtlinien angeführt. Die Regeln wurden extrahiert, kommentiert und stellen die Basis des Anforderungskatalogs dar.

Eine Auswahl von dokumentierten Shared Space Zonen wurde getroffen und auf die Erfüllung konkreter gestalterischer und verkehrstechnischer Maßnahmen geprüft. Ziel war es, einen zusammenfassenden Katalog von tatsächlich durchgeführten Umsetzungen zu schaffen, um die projektbezogene Relevanz einzelner Maßnahmen zu beurteilen.

3.2 Modellansätze

Eine Evaluierung unterschiedlicher Modelltypen hinsichtlich ihrer Eignung für ein Mischverkehrsmodell wurde vorgenommen. Dabei wurden folgende Modellarten in Betracht gezogen:

- I. In Knoten-Kanten Modellen wird ein Verkehrsnetz als Graph bestehend aus Knoten und unidirektionalen Kanten dargestellt. Der Verkehrsablauf wird durch Longitudinalbewegungen (Fahrzeugfolgemodell), Lateralbewegungen (Fahrstreifenwechsel) und deterministischen Regeln an Kreuzungen modelliert. Die Anfänge der Fahrzeugfolgemodelle liegen weit zurück (Reuschel, 1950), heutige Simulationssoftware setzt weiterentwickelte psychophysische Bewegungsmodelle (Wiedemann, 1974) und (Fritzsche, 1994 und 1999) ein.
- II. Zelluläre Automaten benutzen eine Diskretisierung des Raumes mittels eines Gitternetzes und modellieren die Bewegungen der Agenten durch die explizite Beschreibung der Zellübergänge in Abhängigkeit der Belegung der einzelnen Zellen und unter Berücksichtigung eines expliziten oder impliziten kognitiven Modells. Beispiele mit zellularen Automaten sind in (Ahuja, 2001), (Burstedde et al., 2001), (Lan und Chang, 2005) und (Nagel und Schreckenberg, 1992) zu finden.
- III. Social Force Modelle gehen von einer Analogie zur Physik aus und modellieren die Beschleunigung der Agenten als Funktion der Position in der Infrastruktur sowie der Positionen der umliegenden Agenten. Die Modelle wurden von Helbing und Molnar (1995) erstmals für verkehrliche Anwendungen diskutiert und sind in den letzten Jahren verfeinert worden.

Die Evaluierung zeigt das vielversprechende Potential von Social Force Modellen auch zweidimensionale, intermodale Interaktionen in Verbindung mit den Bewegungsabläufen über weiche Grenzen zwischen den Straßenflächen abzubilden.

3.3 Mikrosimulation durch das Social Force Prinzip

Die im Folgenden beschriebenen neuen und bislang nicht erforschten Lösungsansätze für eine Umsetzung der Anforderungen in einem sozialen Kräftemodellen basieren auf zwei weiteren Submodellen:

- I. Das Fahrzeugmodell inkludiert die Abbildung physikalischer Bewegungsprozesse, entsprechend angepasster Kraftfelder und deren deterministisch/stochastische Zuweisung an individuelle Fahrzeuge.
- II. Das Leitfeld wird in Ausrichtung, Art und Größe gewissen Fahrbahnteilen zugeordnet und repräsentiert durch finite Kräfte die optische Wirkung einer „weichen“ Trennung von

Gestaltungselementen. Dieser Hypothese nach ist somit eine differenzierte Nutzung von unterschiedlichen Straßenflächen durch die unterschiedlichen Eigenschaften der Verkehrsteilnehmer (Agenten) möglich.

In Fig. 1 ist beispielhaft ein Attraktivitätspotential der Fahrbahn eines Kreisverkehrs aus Sicht eines Fahrzeugs illustriert. Die Gradienten des Attraktivitätspotentials in Fig. 2 bestimmen in jedem Punkt die Kraft, mit welcher der Lenker in Richtung seiner „idealen" Fahrlinie gezogen wird. Eine mögliche Bewegungslinie (ohne weitere Beeinflussung durch andere Verkehrsteilnehmer) ist durch die schwarzen vollen Pfeile angedeutet.

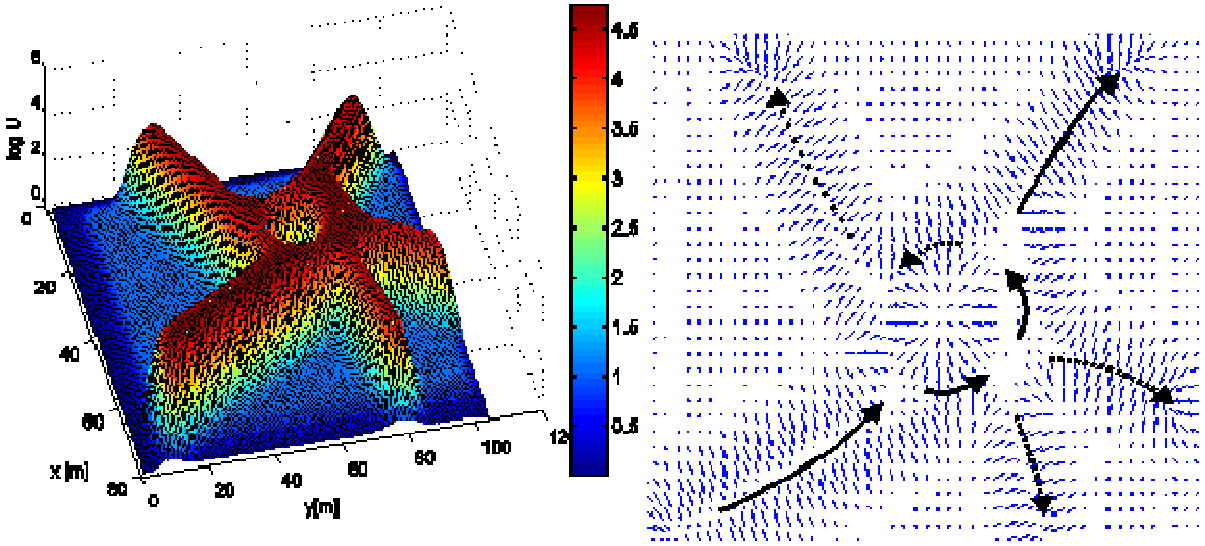

Fig. 1: Visualisierung des positiven Attraktivitätspotentials eines Kreisverkehrs aus Sicht eines Fahrzeugs, Fig. 2: Kraftfeld der Kreisverkehr-Fahrbahn aus Sicht eines Fahrzeugs

Wenn die Interaktionen mit anderen Fußgängern und Fahrzeugen es erfordern, ermöglicht dieses Prinzip das Verfolgen der präferierten Route und das gleichzeitige Abweichen von dieser. Ein begrenzender Aspekt ist die Bewegungsphysik. Der Verlauf dieses Felds wird durch die Topographie der Straße bestimmt und von jeweiligen Verkehrsteilnehmergruppen unterschiedlich interpretiert.

4 MIXME – MIXED TRAFFIC MICROSIMULATION ENVIRONMENT

Um die Forschung an konkreten planerischen Anforderungen auszurichten, werden zuerst die planerischen Anforderungen erhoben, um aus der Synopsis mit dem Stand der Technik die noch gefragten Funktionalitäten festzustellen.

4.1 Systembeschreibung

Die theoretischen Ansätze werden anhand einer Implementierung weiter erforscht. Die Integration der unterschiedlichen Modellansätze erfolgt in eine Tool-Lanschaft mit VISSIM und eigenen Softwaremodulen. Dadurch können bestehende Funktionalitäten und Parametersätze eingesetzt und entsprechend erweitert werden. Der Einstatz des Simulationskerns und Teilen des Editors von VISSIM erleichtern die Entwicklungsarbeit und bieten eine Nähe zu einer bereits verbreiteten und anwendernahen Planungssoftware.

4.2 Integration der Modelle

Die Bewegungsmodelle für die unterschiedlichen Verkehrsteilnehmer müssen in einem gemeinsamen System integriert werden, um das Interaktionsverhalten untereinander umzusetzen zu können. Die simulierten Verkehrsteilnehmer(Agenten) verhalten sich dabei vorausschauend und schätzen die Bewegungslinien der anderen Verkehrsteilnehmer für die nächsten Sekunden ab. Die dafür notwendigen Rechenverfahren sind Lösungsmethoden für Differentialgleichungen und mechanische Bewegungsgleichungen.

Im taktischen Bereich (~mehrere Sekunden) ist das Social Force Modell nicht für alle auftretenden Situationen weitblickend genug. Algorithmen zur Wegfindung werden adaptiert, um in der heterogenen Infrastruktur und Verkehrssituation reale Lösungen zu finden.

4.3 Validierung und Anwendbarkeit

Zu Evaluierungszwecken werden Umsetzungen von Mischverkehrskonzepten in Österreich aus geeigneten Perspektiven aufgenommen und aus den beobachteten Fahrzeugen und Fußgängern Bewegungsdaten generiert. Fig. 3 zeigt die empirische Ausrichtung des Modellerstellungsprozesses.

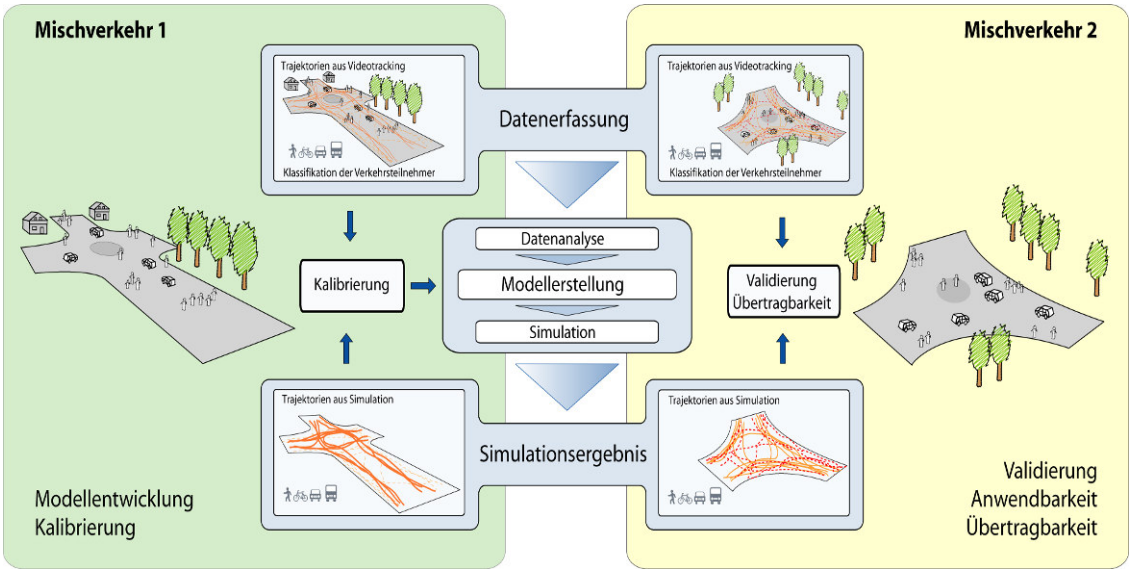

Fig. 3: Modellerstellungsprozess der integrierenden Umgebung

Das kalibrierte Modell wird durch mindestens einen neuen Datensatz überprüft. Die Übertragbarkeit ergibt sich aus den Abweichungen zwischen den Simulationsergebnissen und den erfassten Daten. Die Auswahl der Orte erfolgt unter Berücksichtigung planerischer Aufgabenstellungen.

4.4 Semi-automatische empirische Erfassung

Es wird im Rahmen von MixME der Ansatz verfolgt, die Videoannotation bzw. Erfassung der Objektströme so weit als möglich zu automatisieren, dem Anwender jedoch die Kontrolle und Korrektur der Daten zu überlassen. Diese semiautomatische Lösung ist in den angedachten komplexen MixME Szenarien notwendig, da vollautomatische Methoden für die Erfassung, Klassifikation und Verfolgung (Tracking) von Personen und anderen Objektklassen technisch noch nicht ausgereift genug sind (Krahnstoever et al., 2009) und nach wie vor eine sehr große technische Herausforderung darstellen (Hampapur et al., 2009). Die Herausforderung in MixME besteht darin, dem Anwender ein Tool mit einer graphischen Benutzeroberfläche zu bieten, das die Erfassung der Trajektorien gegenüber einer rein manuellen Annotation stark vereinfacht und die dafür benötigte Zeit verkürzt.

5 RÉSUMÉ

Das Soziale Kräftemodell wurde in einer Evaluierung von unterschiedlichen Modellierungsansätzen als jener Ansatz ermittelt, der die theoretischen Modellanforderungen am besten erfüllen kann. Die Betrachtungen beinhalten auch die Differenzierung von Personen mit speziellen Mobilitätsbedürfnissen (Kinder und alte Menschen). Die Notwendigkeit der Neuentwicklung zweier wesentlicher Module wurde identifiziert. Im Simulationsmodell sollen die Eigenschaften der Straßeninfrastruktur durch sogenannte Leitfelder abgebildet werden, die durch finite Kräfte die Geometrie der Straße sowie die Wirkung von Gestaltungselementen repräsentieren. Außerdem soll ein Fahrzeugmodell physikalische Bewegungsprozesse von motorisierten und nichtmotorisierten Fahrzeugen und deren Funktionalitäten im sozialen Kräftesystem wiedergeben.

Die erwarteten Ergebnisse im Forschungsprojekt MixME sind Erkenntnisse über das operative und taktische Verhalten, von Teilnehmern in Mischverkehren, den Einflüssen der Straßenraumgestaltung und deren Abbildung in einer Simulation. Abschließend liefert die Beurteilung der Modellansätze die Aussage, ob jene Modellqualitäten erreicht werden können, die für Raum- und Verkehrsplaner notwendig sind, um eine objektive Bewertung von Auswirkungen geplanter Veränderungen durch Mischverkehr im Bezug auf Sicherheit und Komfort treffen zu können. Die entstandenen Softwaremodule und die damit gewonnen Erkenntnisse bilden eine Grundlage zu weiterer Forschung und Entwicklung mit folgenden Perspektiven:

- I. Planung von Mischverkehrsanlagen: Das Simulationstool erlaubt eine Analyse der Auswirkungen der geplanten Anordnung auf die auftretenden Verkehrs- und Fußgängerströme.
- II. Evaluierung von Mischverkehrsanlagen: Überprüfung der Anordnung auf ihre Tauglichkeit im Hinblick auf kritische Situationen und Sicherheit.
- III. Semi-automatische Erfassung empirischer Daten: Tracking und Klassifikation von Fußgängern und Fahrzeugen zu Kalibrierung und Validierung.

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Mobi-Kid – Kindergerechte Information für die sichere und nachhaltigen Nutzung des ÖV

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1 KURZFASSUNG UND ABSTRACT

Mobi-Kid ist ein vom Bundesministerium für Verkehr, Innovation und Technologie (bmvit) und der Österreichischen Forschungsförderungsgesellschaft (FFG) gefördertes F&E Projekt innerhalb der Programmlinie ways2go (1. Ausschreibung) mit dem Ziel kindergerechte Information zur sicheren und nachhaltigen Nutzung des Öffentlichen Personennahverkehrs (ÖPNV) bereitzustellen. Durch einen spielerischen kindergerechten Ansatz, Online Information und bewusstseinsbildenden Maßnahmen sollen die Hürden zur Nutzung des ÖPNV beseitigt und ein nachhaltiges Mobilitätsverhalten gefördert werden.

Mobi-Kid is an R&D project fundend by the Federal Ministry for Transport, Innovation and Technology (bmvit) and the Austrian Research Promotion Agency (FFG) within the programme line ways2go (1st call). Mobi-Kid's objective it to provide child-friendly information on safe and sustainable use of public transport. Through a playful child-friendly approach with online information and awareness-building measures the barriers to the use of public transport should be eliminated and a sustainable mobility behavior encouraged.

2 PROJEKTDETAILS

Der Projektstart von Mobi-Kid war November 2008. Aufgrund der Projektlaufzeit von 24 Monaten wird das Projekt mit Oktober 2010 fertig gestellt. Das Mobi-Kid Projektkonsortium besteht aus den Wr. Linien GmbH & Co KG (Antragsteller), ABC Consulting, Factum Chaloupka & Risser OHG, Fluidtime Data Services GmbH und dem Verkehrsverbund Ost-Region (VOR) GmbH. Wie bereits eingangs erwähnt, handelt sich bei Mobi-Kid um ein gefördertes F&E Projekt.

3 ZIELGRUPPE

Als Zielgruppe des Projekts wird in erster Linien auf Kinder zwischen 6 und 12 Jahren abgezielt, die sich selbstständig im öffentlichen Verkehrssystem bewegen dürfen, allerdings noch in einem geringen Ausmaß selbstständig entscheiden und mobil sein können und dürfen. Eine indirekte Ansprache von Eltern und Lehrern ist ebenso angedacht.

4 AUSGANGSSITUATION

Ab dem 7. Lebensjahr sind Kinder berechtigt allein die öffentlichen Verkehrsmittel zu benutzen. In vielen Fällen besteht aber bis zur ersten anfänglichen Selbstständigkeit entweder kaum die Notwendigkeit oder die Motivation den ÖPNV in Anspruch zu nehmen. Kinder im Volksschulalter kommen in vielen Fällen kaum mit dem Öffentlichen Verkehr (ÖV) in Kontakt. Die häufigsten täglichen Wege umfassen den Weg zur und von der Schule.

Eine auf der Uni Bochum im Rahmen des Projektes MOBILANZ durchgeführte Studie zum Thema „Begleitmobilität von Kindern" hat aufgezeigt, dass bei den untersuchten deutschen Modellstädten in mehr als 35% der PKW verwendet wird, um die Kinder zur Schule zu bringen bzw. abzuholen, gefolgt von den Wegen zu Fuß. Der ÖV nimmt nur einen verschwindend geringen Anteil in der Höhe von ca. 3-5% ein[1]. Ein ähnliches Bild zeichnet sich in Wien ab. Ein im Rahmen des klima:aktiv Programms in Baden durchgeführtes Projekt beschäftigte sich mit der Einbeziehung von Kindern in die Schulwegplanung. Auch hier zeigten die Vorerhebungen, dass, besonders bei den jüngeren Jahrgängen, in mehr als einem Drittel der Fälle der PKW für die Fahrt zur Schule verwendet wird.

[1] BÖHLER, Susanne: „Ergebnisse zur Begleitmobilität von Kindern", Wuppertal Institut für Klima, Umwelt, Energie GmbH, März 2006

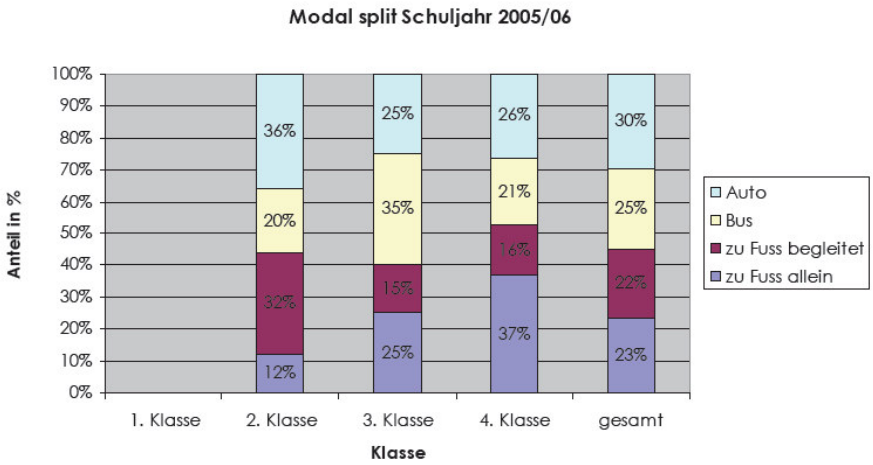

Abbildung 1: Modal Split Schulweg Baden (Quelle: Madreiter 2007)[2]

Durch die ansteigende Nutzung des motorisierten Individualverkehrs nimmt die Lebensqualität in den Städten zusehends ab. Weiters dürfen die finanziellen und zeitlichen Belastungen der Eltern nicht außer Acht gelassen werden. Um diesen Entwicklungen entgegenzuwirken, wird von verschiedensten Stellen versucht, Eltern bewusst auf die Problematik aufmerksam zu machen bzw. Kinder aktiv mit dem ÖV in Kontakt zu bringen, z.B. in Form der Aktion „Schulwegpläne“ der MA 46 und der AUVA, der Verkehrserziehung oder der Kooperationen der Wiener Linien mit ausgewählten Wiener Schulen (Führungen durch die Station etc.). Hierbei handelt es sich allerdings um Einzel- bzw. einmalige Aktionen, die Aufmerksamkeit und Interesse wecken, aber ohne Möglichkeiten nachhaltig einen Effekt sicherzustellen sind. Der tägliche Umgang mit dem ÖV wird aber kaum gelernt und geübt. Kinder haben sowohl eine hohe physische als auch kognitive Hürde vor sich, die den Zugang zum System erschweren.

Neben der Erfahrung mit dem täglichen Umgang stehen weitere Hürden zwischen Kindern und ÖV-Nutzung. Fehlende kindergerechte Information über den ÖV erschweren das Überwinden der Hindernisse im Umgang mit den öffentlichen Verkehrsmitteln. Für Eltern wiederum spielen Sicherheitsfragen im öffentlichen Raum eine große Rolle. Generell liegen sehr wenige Informationen und Daten über die Problematik von Kindern im Umgang mit dem ÖV, bzw. die Anforderungen der Eltern vor.

Unter diesen Rahmenbedingungen fällt es ÖV-Unternehmen schwer, passende Services für Kindern und Eltern entsprechend, u.a. den oben erwähnten Anforderungen und Lebensstilen anzubieten.

5 ANSATZ

Mobi-Kid versucht mit einem sehr breitgefächerten Ansatz und der Kombination von bewusstseinsbildenden Maßnahmen und dem Einsatz intelligenter Technologie einen Schritt in Richtung „ÖV für Kinder“ zu gehen.

Durch kindergerechte Informationen und Hilfestellungen sollen die Hürden zur Nutzung des ÖV verkleinert bzw. überhaupt beseitigt werden. Durch ein Zusammenspiel verschiedener Herangehensweisen soll im Rahmen des Projektes ein nachhaltiger Ansatz zur Verstärkung der Nutzung des ÖV durch Kinder geschaffen werden:

- Kindergerechte New Media Informationen wie z.B. einfache Informationen gepaart mit Unterhaltung im Web und am Handy. Um die Kinder an die sichere und langfristige Nutzung des ÖV heranzuführen, wird auf kindergerechte Information und Unterhaltung in Form eines Spieles (Brettspiel) und von Web- und Mobile Informationen gesetzt. Dies bildet die Kernelemente einer spielerischen Verkehrserziehung. Bei der Gestaltung und Umsetzung dieser werden gezielt Eltern und Pädagogen einbezogen, um einen nachhaltigen Erfolg zu gewährleisten.
- Bewusstseinsbildende Maßnahmen in Bezug auf Plattform und kindergerechte Infos vor Ort über Verbände, Schulen, Nachmittagseinrichtungen (z.B. Kinderfreunde), Bezirksjournale, Magazine der Betreiber öffentlicher Verkehrsmittel. Stationstests zum Kennenlernen der Gegebenheiten in den Stationen.

[2] MADREITER, Michael: „Kinder-Verkehrskonzept“, klima:aktiv mobil zur Schule, Wien, 2007

6 ERGEBNISSE

Die umfangreichen Recherchearbeiten haben gezeigt, dass eine reine Handy-Applikation für die Zielgruppe der 6-12 jährigen nur teilweise zielführend ist. Aufgrund dessen erfolgte im Projekt Mobi-Kid die Trennung der Altersgruppe in zwei Bereiche. Für die Gruppe der 7-10 jährigen, welche hauptsächlich aus Volksschülern besteht, wurde ein Brettspiel entwickelt. Für die ältere Gruppe der 10-12 jährigen, welche IKT-Technologien wie Mobiltelefone oder das Internet bereits intensiver nutzen, wird das Brettspiel auch als Webapplikation und in weiterer Folge für das Mobiltelefon verfügbar sein.

Folgende Ergebnisse und Erkenntnisse konnten bis bislang innerhalb des Projekts Mobi-Kid erzielt bzw. erlangt werden.

6.1 Erkenntnisse aus den Fokusgruppen

Im Rahmen von Fokusgruppen-Interviews mit der Zielgruppe (Kinder zwischen 6 und 12 Jahren und deren Begleitpersonen wie Eltern oder Lehrer) wurden die sozialen Rahmenbedingungen für die Öffentliche Verkehrsmittelnutzung von Kindern sowie die Anforderungen an eine Mobilitätsplattform für Kinder erhoben.

- Alleinfahren im ÖV
    - Alleine fahren im ÖV geschieht ab ca. 9 bzw. 10 Jahren. Der Grund ist im Schulwechsel des Kindes zu finden (Umstieg Volksschule zu Gymnasium/Hauptschule, etc.), dadurch wird der Schulweg zumeist länger.
    - Befahren werden hauptsächlich bekannte und „trainierte“ Strecken, neue Strecken werden nur vereinzelt ab 11 Jahren gesucht.
- Die ÖV Nutzung ist abhängig von der Klasse bzw. Schule:
    - Im Volksschulalter wird großteils zu Fuß gegangen (geringe Entfernung).
    - Ab 10 Jahren (größere Distanzen) wird großteils der ÖV genutzt, unter anderem auch alleine.
    - Klassenfahrten in Wien werden praktisch ausschließlich mit dem ÖV durchgeführt.
- ÖV Nutzung in der Freizeit:
    - Im Volksschulalter ist der Radius der Kinder gering und wird zu Fuß, oder mit Roller aber kaum mit dem ÖV zurück gelegt.
    - Ab 10 Jahren gibt es zunehmend „trainierte Standardstrecken“ um alleine ins Schwimmbad, zum Fußball, oder zu Verwandten zu fahren.
    - Ausflüge an Wochenenden werden mehr mit dem Auto durchgeführt, auch in der Stadt.

Die im Antrag erläuterte Idee einen eigenen Kids Corner in den Stationen der Wr. Linien zu errichten (niedrigere Info-Tafel, etc.), stellte sich im Rahmen der Interviews als nicht zielführend heraus, da ein weiteres neues System für Kinder lediglich den Lernaufwand beim Umstieg auf das „Erwachsenen-System“ erhöhen würde. Ziel ist es hingegen, die Kinder bestmöglich an das bestehende System heranzuführen!

6.2 Fragebogen zur Symbolkenntnis im ÖV und Stationstests (in Wien)

Im Zuge der Status-Quo Analyse wurden weiter soziale Erhebungen wie eine Umfrage nach den Kenntnissen der Wr. Linien Symbole und Stationstests durchgeführt.

6.2.1 Symbolquiz

Das Symbole-Quiz war als Fragebogen konzipiert und wurde mit einem Begleitschreiben für Lehrer/-innen an 132 Kinder in 5 Schulklassen vergeben (4 Volksschulklassen und 1 Gymnasiumklasse). 24 Symbole und einige Zusatzfragen (ÖV-Nutzung, Alter, Geschlecht, Ticketkauf) wurden unter Aufsicht von Lehrern im Zeitraum Ende Mai bis Mitte Juni 2009 abgefragt. Folgende Darstellung zeigt die Auswertung einiger Symbole aus dem Symbolquiz (die vollständige Auswertung ist bei dem Projektkonsortium erhältlich).

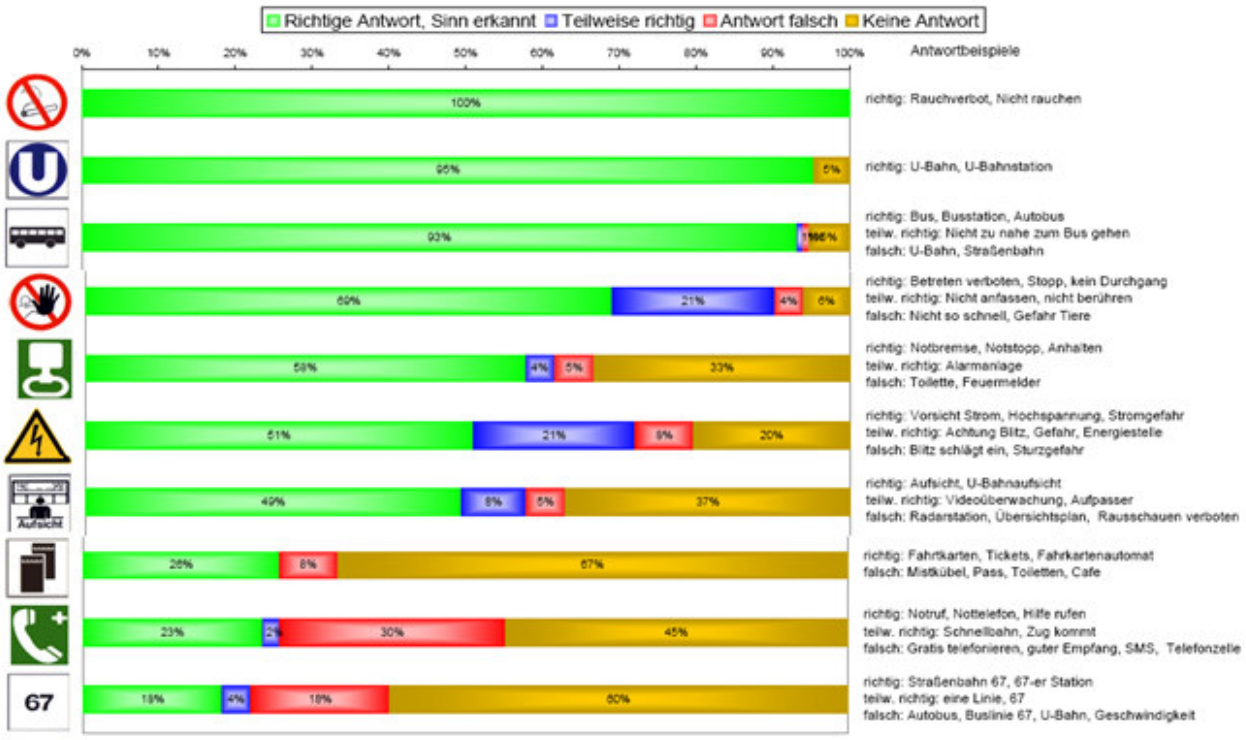

Abbildung 2: Auswertung Symbolquiz Teil 2

Den Kindern hat die Beantwortung des Fragebogens Spaß gemacht. Die bekanntesten Symbole waren bei den Kindern das Symbol „Rauchverbot“, gefolgt vom U-Bahn und Bus Symbol. Weniger bekannt waren hingegen sicherheitsrelevante Symbole wie die Notbremse, die U-Bahnaufsicht oder das Nottelefon. Hier sieht das Projekt Mobi-Kid einen seiner größten Ansatzpunkte.

Die Wirkungen der Durchführung eines solchen Fragebogens sind ebenfalls als positiv zu bewerten. Durch den Fragebogen wurde den Kindern bewusst gemacht, welche Symbole es überhaupt gibt. Die Fragebogenbearbeitung hatte auch einen bewussteren Blick im Alltag auf die Symbole als Folge. Auch für Lehrerinnen waren die Ergebnisse überraschende und unerwartete (z.B. wenig Kenntnis des Info-Symbol). Der Einbau in Lehrausflüge (Symbole am Weg erklären) ist deshalb zu empfehlen.

6.2.2 Stationstests

Mit 10 Kindern zwischen 8 und 12 Jahren wurde im August/September 2009 eine teilnehmende Beobachtung beim Orientierungsverhalten von Kindern in der Station „Volkstheater“ durchgeführt. Den Kindern wurden jeweils 7 Orientierungsaufgaben (tlw. mit Zweitaufgaben) und eine optionale Zusatzaufgabe gegeben. Diese Aufgaben wurden in Kärtchenform nacheinander vorgegeben und nach der Instruktion selbstständig bearbeitet. Ein begleitender Beobachter (immer gleiche Person) verfolgte das Geschehen mit einem Protokollbogen.

Grundsätzlich lieferten die Tests folgende allgemeinen Ergebnisse:

- Das Verhalten der Kinder ist sehr heterogen und stark von der Persönlichkeit der Kinder abhängig (Neugier, Selbstvertrauen, Mut vs. Vorsicht, Ängstlichkeit, Inaktivität)
- Vor allem jüngere Kinder blieben bei Unsicherheit oder Nicht-Auskennen oft stehen und waren „paralysiert“. Diese Kinder warteten dann auf eine Ansprache der Begleitperson
- Erfahrungen im Umgang mit dem ÖV (vor allem das alleine fahren) hatten einen starken Einfluss auf den Test
- Die Kinder sind leicht ablenkbar und müssen sich genau auf Aufgabe konzentrieren und öfter Kärtchen nachlesen. (z.B. Etwas erzählen und Symbole beachten schwer möglich)

- Kinder sind sehr genau und orientieren sich exakt am Leitsystem, Abstraktionsleistungen (Pfeil nach unten zum Beispiel schon einige Meter vor dem eigentlich Abgang) können oftmals nicht durchgeführt werden
- Lerneffekte solcher Tests sind sehr groß!

Anbei sollen zwei Beispiele einige der identifizierten Problembereiche innerhalb der Tests aufzeigen

Abbildung 3: Identifizierte Problembereiche aus den Stationstests

Resümee und Empfehlungen aus den Stationstests:

- Wegweiser sollten genau platziert werden, da sich Kinder streng danach richten!
- „Sackgassen“, Pfeile zu nicht möglichen Wegen sind zu vermeiden
- Eine durchgängige Beschriftungen von Wegen ohne Lücken ist zielführend
- Auch im Lift sollten die Symbole neben den Druckknöpfen angebracht werden
- Touristen, Ortsunkundige und „ÖV-Ferne“ haben ähnliche Probleme! Würden ebenfalls von Änderungen profitieren
- Stationsrallye ist ausbaubar als Mittel zum selbstständigen Kennenlernen des ÖV und zur Problemstellenidentifikation

Fotomontage

Da die Implementierung der Stations-Maßnahmen aus vielerlei Gründen (Entscheidung gegen Kids Corner, Umbau der Stationen nicht möglich/zulässig) nicht durchführbar war, entschied man sich zu der Erstellung einer Fotomontage, in welcher die Problemstellen grafisch gelöst (Verrückung von Schildern, Aufbringung weiterer Tafeln) und im Anschluss an die zuständigen Mitarbeiter bei den Wr. Linien versandt wurden.

6.3 Brettspiel

Wie bereits mehrfach erläutert, wurde für den ersten Teil der Zielgruppe (6-10 jährige Kinder) ein Brettspiel entwickelt, da diese Zielgruppe noch kaum Umgang mit Handy oder Internet hat. Durch das Brettspiel sollen den Kindern spielerisch Informationen zur Benützung des Wiener Linien Systems beigebracht werden. Das Spielbrett besteht in der derzeitigen Version aus einer Karte für den 7. Wiener Gemeindebezirk, auf welcher die dort verkehrenden U-Bahn, Straßenbahn und Buslinien und verschiedene Points of Interest (POI, wie Schwimmbad, Oma, etc.) eingezeichnet sind. Die Aufgabe der Kinder ist es die verschiedenen POIs durch die Benutzung des ÖVs zu sammeln. Um ein Feld auf dem kartenbasierten Brettspiel vorrücken zu können, muss eine Frage zu den Öffentliche Verkehrsmitteln richtig beantwortet werden. Aktionskarten, wie zum Beispiel Betriebsstörungen, sollen den Spielverlauf für die Kinder unterhaltsamer machen.

Abbildung 4: Brettspiel Mobi-Kid

6.4 Online Spiel

Für den zweiten Teil der Zielgruppe (10-12, bzw. 14 jährige) wurde ein Online Spiel entwickelt. Ziel des Spieles ist für die Kinder das Sammeln von Punkten um sein Avatar aufzufüllen (je mehr Punkte desto mehr Items hat der Spieler zur Verfügung).

Um „Mobikid“ online spielen zu können muss sich der Spieler mit der Handynummer registrieren, welche für den Spielverlauf benötigt wird. Nach dem erfolgreichen Einloggen erhält der Spieler folgende Seite.

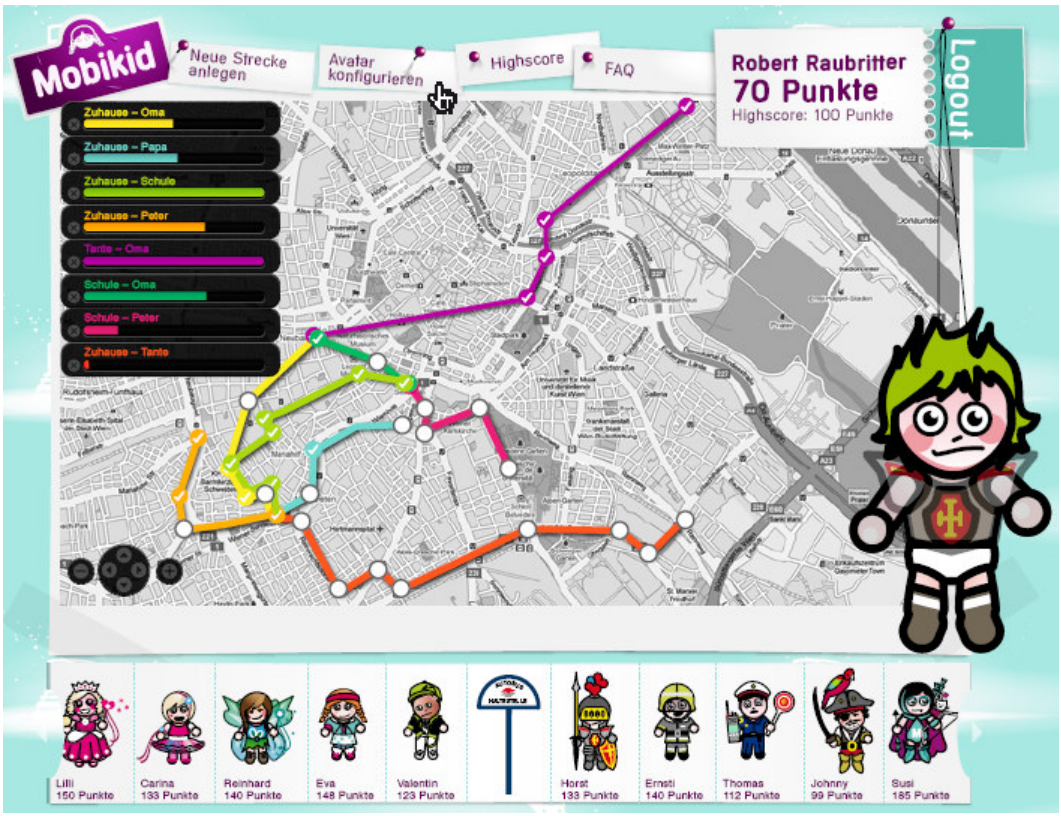

Abbildung 5: Streckenübersicht Online Spiel Mobikid

In dieser Ansicht (Abbildung 5) erhält der Spieler eine Übersicht über seine bereits angelegten Routen und den Vollständigkeitsgrad dieser als auch seines Mobikids. Die Routen unterscheiden sich sowohl in der Übersicht als auch in der Karte farblich voneinander. Das moderne aber kinderfreundliche Design soll die Zielgruppe ansprechen und zum Spielen animieren.

Zum Sammeln der Punkte hat der Spieler 2 Möglichleiten:

- Abfahren realer Routen: Der Spieler muss sich dazu in das reale System der Wr. Linien begeben und seine vorhin definierten Routen tatsächlich abfahren. Punkte können in diesem Modus gesammelt werden, wenn der Spieler die Stationsnummer, die bei Bus- und Straßenbahn auf den Haltestellentafeln zu finden ist, via SMS an die Mobikid Datenbank übermittelt. Für jede Station ist eine Stationsnummer vorhanden, die aus dem RBL der Wiener Linien kommt. Pro frei geschalteter Station erhält der Spieler ein auf seiner Route und Punkte auf seinem Punktekonto.
- Beantworten von ÖV bzw. Wiener Linien relevante Fragen.

Je höher das Punktekonto des Spielers ist, desto mehr Items hat er zur Auswahl bzw. desto kräftiger werden die Farben der einzelnen Items (zu Beginn scheint das Mobikid Avatar noch durchsichtig auf). Die Mobikid Avatar Gestaltung ist in 9 Kategorien aufgegliedert woraus der Spieler zwischen den angebotenen Items und Looks, ähnlich der Mii auf der Wii, frei wählen kann.

Abbildung 6: Beispiele für Mobikid Avatare

Durch den realen Bezug des Spiels (Abfahren der Strecken und Aufsuchen der Stationsnummern) sollen die Kinder spielerisch den Umgang mit dem ÖV erlernen. Die Beantwortung von verkehrs- und sicherheitsrelevanten Fragen unterstützt die Wissenserweiterung der Kinder beim sicheren Umgang mit dem ÖV.

6.5 Nächste Schritte

Als nächste Schritte im Projekt Mobi-Kid sind der Roll Out des Brettspiels und die Vermarktung dessen (Ferienspielpass, Sponsoren auf der Packung und in der Karte eingezeichnet, etc.) geplant. Angedacht wird hier die Vergabe einer Kleinserie an Schulen. Die Entwicklung des Webspiels befindet sich im finalen Stadium und soll nach dem Teststadium evaluiert und freigeschalten werden. In einer weiteren Entwicklungsphase soll der spielerische Ansatz in Richtung Jugendliche (Stichwort Smartphone und Social Networks) weiterentwickelt werden.

7 FAZIT

Es kann jetzt schon festgehalten werden, dass die einzelnen Maßnahmen positive Effekte zeigen. Angefangen bei der Durchführung des Symbolquiz‘ bis hin zur Entwicklung des Brett- und Online-Spiels kann Mobi-Kid Lerneffekte sowohl bei Kindern als auch bei Begleitpersonen verzeichnen. So kann mit relativ geringem finanziellem Einsatz (das Brettspiel und die Online Version sollen sich teilweise über Sponsoren finanzieren) ein nachhaltiger ÖV-Nutzungs-Effekt erreicht werden.

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Mobility survey based on intelligent technologies (MOBIFIT)

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1 ABSTRACT

The main objective of MobiFit is to develop a method for collecting mobility data of people based on tracking their changes of location by GPS-Technology and to develop a method of data processing and analysing for the collected mobility data with the goal to achieve results comparable to traditional, survey-based mobility studies. The mobility survey will be based on a data collection via GPS to improve the knowledge on modal choice, purpose of trips, trip length as well as its changes in time. This should result in more accurate mobility data (often incomplete statistical registration of data by test persons etc.), availability of a dynamical data collection, as well as a reduction of time efforts of the test persons.

2 PROJECT OVERVIEW

2.1 Initial situation/Motive

Mobility needs will underlie fundamental changes as regards its quantitative, spatial and time related patterns in the future. The mobility in the modern society will be influenced by fundamental trends caused by changes to a more flexible lifestyle as regards the organization of work and spare time, ageing society, emerging information technologies as well as increasing mobility needs. Furthermore mobility patterns in the future will be influenced by a changing spatial, economical, societal and environmental framework. These changes will induce new demands and challenges for the future transport policy. Therefore, reliable data for the future needs are necessary for decision making in transport policy. Knowledge of mobility patterns in the society are fundamental, e.g. data on which transport modes are favoured by the population and knowledge on motives for modal choice.

Current mobility surveys are mainly executed by paper-pencil surveys and telephone interviews. These methods are static and in particular time and work intensive for the test persons.

2.2 Aim of the Project

The main goal of MOBIFIT is to develop and test methodologies and technological applications to achieve basic mobility data in passenger transport assisted by intelligent technologies (tracking changes of location via GPS-Technology).

Thereby it will be possible to provide a broad knowledge on mobility in passenger transport to detect trends and future demands in time,

- with significantly reduced efforts for test persons (interaction needs), and
- more realistic results achieved compared to traditional paper-pencil surveys as well as
- to solve the often incomplete statistical registration of mainly short trips. Corrections of the collected data may then be carried out by weighting these system immanent errors derived from paper-pencil surveys.

Furthermore the results will make a contribution secure and improve mobility needs and options with innovative mobility tools or new forms of mobility from an organizational point of view.

At the end of the research project MOBIFIT, concrete results of three kind of mobility surveys will be presented for comparison:

- Mobility behaviour of the population surveyed by Technology and additional validation of the surveyed mobility

- Mobility behaviour of the population surveyed by Technology and in parallel by a “conventional” survey method
- Mobility behaviour of the population surveyed by a “conventional” survey method only, without using Technology

Furthermore, the survey area is divided in urban and rural cases.

3 TECHNOLOGICAL POSSIBILITIES FOR UPCOMING MOBILITY SURVEYS

The goal of this research project is to obtain adequate and current data bases on the mobility behavior of individuals by means of a dynamically applicable collection and analysis technology in future. The so recoverable, improved, more accurate and dynamic mobility data provide a basis for improved planning, particularly in the areas of transport and spatial planning. The project brings new dimensions for transport planning using state of the art technologies and methods.

For implementation major carrier technologies such as GPS are needed. The first pilot applications of so-called "new technologies" to collect personal mobility data have been made only since 2002, mainly because of technological developments. These are technologies in order to determine the spatial position of the subjects at a given time. This position is defined by corresponding receivers in frequency (e.g. every second). From the spatial and temporal sequence of data points it is possible to obtain conclusions about movements of the person.

Because of the distribution and availability in Europe mainly Navstar GPS is used. Currently, commercially available GPS receivers, supply position information with an accuracy of ± 5 m or better. GPS signals, as opposed to GSM or other technologies, receive worldwide coverage.

Basically we have to differentiate between passive and active data collection methods. The term "passive tracking" summarizes survey methods, in which during the survey and recording of the trips no active intervention by the subject is necessary. The effort for test persons is limited to carry and maintain the survey equipment. In contrast, the "active tracking" requests additional information from subjects during the collecting and recording the trip such as trip purpose and mode choice. This considerable additional work requires special cooperation from the test persons. This leads to higher costs due to more complex devices, data transfer and data volume but also to savings in staff and in data analysing.

Almost all recent GPS-based mobility tracking surveys are a combination of GPS-tracking and interview method, as certain characteristics (such as trip purpose) are difficult or impossible to be collected without additional information from the subjects. These additional surveys will be carried out before and / or after the GPS survey. Different survey methods are used: telephone, in person, and recently more often through the Internet (risk of distortion).

3.1 Advantages and disadvantages of data collection by means of (interactive) GPS devices

The potential advantages of those survey methods are manifold:

- By means of GPS
  - source
  - target and
  - Route Information
- are accurately recorded without any need for interaction of the subject.
- Trips which the subject would forget in conventional surveys are also recorded (completeness).
- Beginning and ending times and
- Trip duration and trip lengths are also recorded automatically.
- GPS data can be combined with GIS data and information collected in advance (homes, workplaces, etc.) to verify the recorded data (map-matching).
- By means of active collection methods additional information such as trip purposes or vehicle types can be collected.

- The quality of data recording is thus substantially improved with significantly less effort for the test persons.

In contrast there are also disadvantages:

- Position inaccuracies of GPS and random errors caused by problems in satellite orbits, receivers, signal disturbances or reflections (especially in buildings).
- The raw data collected with passive GPS receivers is not directly usable for analysis. For further processing of the data more or less sophisticated software solutions are necessary, depending on the desired accuracy of results.
- It is difficult to collect informations about the transport mode, about trip purposes or for example about the occupancy of vehicles.
- It is not possible to collect data such as travel expenses or the personal situation of the subjects.
- Significant costs and expenses for post-processing of the data (post-processing) are to be expected.
- Another problem is the possible duration of the collection, which is limited by battery life and storage capacities of the devices.
- Risk of faulty handling of the devices by the test subjects, such as forgetting the devices, not power on, not charging, etc.

4 PROJECT COURSE

Until now the following project targets could be achieved.

4.1 State of the Art research:

- Weaknesses of traditional survey methods
- Requirements for future data collection methods and mobility data
- Analysis of past, technology-based survey methods
- Technological options for future collection methods (Positioning / GPS)
    - Passive vs. active collection methods
    - Issues regarding the involvement of the test persons

4.2 Preparation of the GPS data collection Showcase:

- Definition of the survey approach and necessary survey contents
- Selection of survey technology, with an extensive set of test runs on various GPS data loggers
- A Partner for the GPS technology was found
- Survey organisation was planned
- Survey guidelines were created
- Surveyors were selected and trained

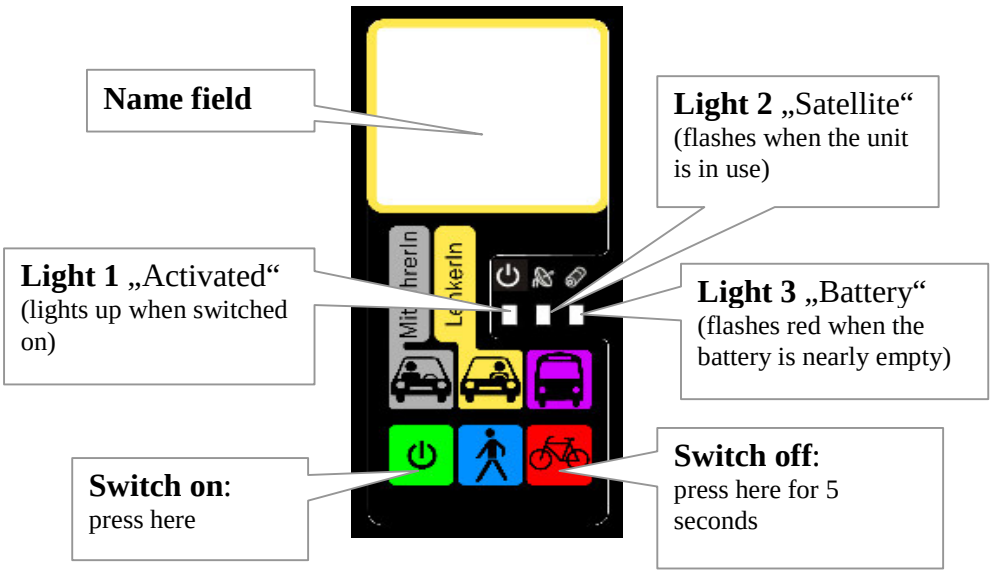

Figure 4.1: Used GPS Data Logger

4.3 GPS data collection Showcase

- Implementation of the first phase survey in the region of Tulln an der Donau in Nov / Dec 2009 with 53 test subjects
- Adaptation of the survey concept and improvement the data collection procedures
- Implementation of the second phase survey in the city of Graz in Jan / Feb 2010 with 81 test subjects

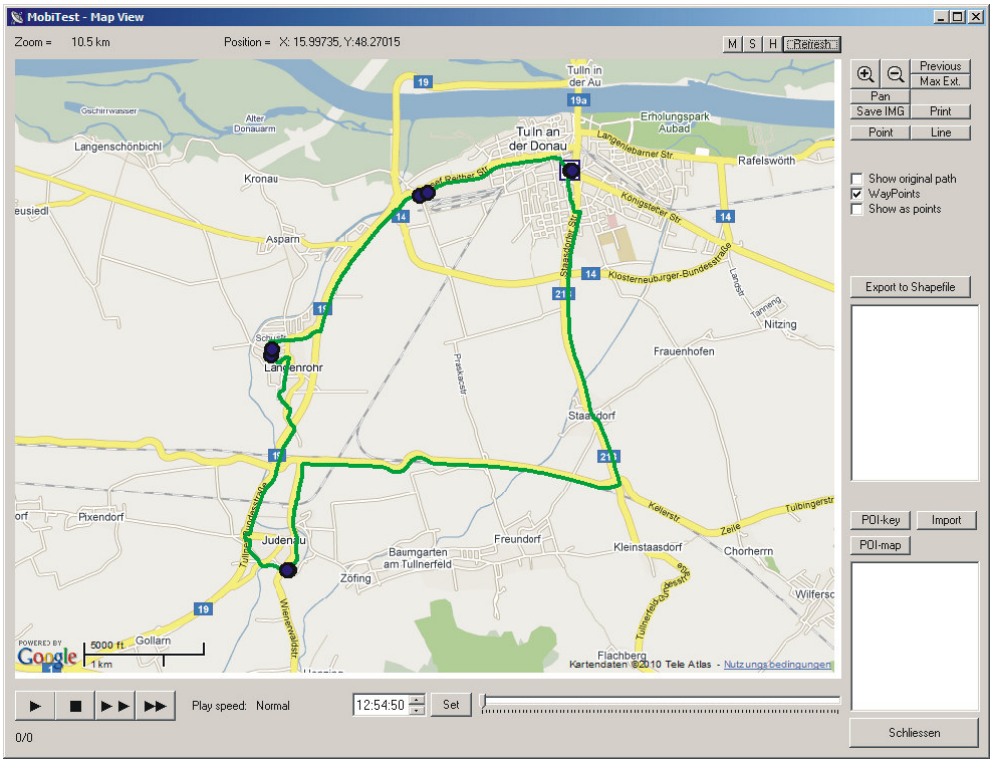

Figure 4.2: Collected GPS data of a subject

5 CONCLUSION AND LESSONS LEARNED

- As regards analysis of the recorded GPS data yet no appropriate procedures could be developed. This is currently being solved by developing a simplified semi-automated data analysis approach in cooperation with the manufacturer of the GPS devices. A standard software for the analysis of the recorded GPS data is not currently on the market.

- The technology has been partly overestimated. The quality of the GPS position data is already very good but not optimal for use in mobility surveys.
- The GPS records show partly outliers, which mainly due to lack of signal quality.
- Well thought-out hardware and software solutions for this problem can be found on the market barely.
- There is less information from the literature on specific survey methods, response and refusal rates, data analysis and expectable data quality.
- The applied survey method (in this variant) is partly time consuming and relatively expensive.
- For a broad-based GPS survey, it is necessary to develop a simplified procedure. But the project "MobiFit“ is testing a mobility survey based on intelligent technologies as a whole and therefore will gain important informations for future use.
- The participants of the test case consistently indicate that their effort for participating in the GPS based survey method is very low and that they clearly prefer this over a paper survey.

Therefore it remains to solve the task, how best to combine and apply traditional and new survey technologies in future, broader mobility surveys to benefit best of different survey methods, particularly those of technology assisted surveys, with regard to contents and economic issues.

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Neoliberalism and public participation in urban regeneration in Portugal

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1 ABSTRACT

The concept of the revanchist city will be discussed in the light of dismantling public assistance policies as an attempt to provide incentives to private economic initiatives which are characteristic of neoliberal urban governments. The welfare state crisis, associated with the entrenchment of conservative agendas and responsible for producing changes in urban governance, also play a role in studying this concept. Besides this, the concept also shows how the discourse on urban regeneration within the scope of urban policies and the production of the city's image, aims at keeping the present population in the area, while modernising the economy, increasing employment rates and promoting economic growth.

The aim of this paper is to make an assessment of the participation process in the measure called "Initiative for the Qualification and Urban Re-insertion of Critical Neighbourhoods" (commonly known as the "Critical Neighbourhoods" Initiative). It is one of strategic measures coming within the Cities Policies launched by the present Portuguese government and aims at integrating peripheral spaces and urban areas in crisis into the social-urban network. For our case study, we shall be looking at the Cova da Moura Quarter situated in the municipality of Amadora in the Lisbon Metropolitan Area. The model underpinning the public's active role and following an "entrepreneurial mimetic" in all but name, is based on efficiency. It has neglected to take into account the specific nature of the public services, mainly where the responsibility of the voters and their lawful rights and duties are concerned, as well as the very concept of truly active citizenship.

2 INTRODUCTION

The first symptoms of the welfare state crisis were felt in mid-1970s. From then on, the progressive breakdown of the predominant model of public intervention has been simultaneous to the replacement of fordism by post-fordism, making it more difficult for the state to find the necessary resources so as to guarantee expenditure in public interventions, contrary to what had happened in previous years. Strategic business-led management now guides urban governance, where public resources favour investment, a service supply that is geared to the market and the private sector, and where public-private partnerships are reinforced.

The concept of the revanchist city will be discussed in the light of dismantling public assistance policies as an attempt to provide incentives to private economic initiatives which are characteristic of neoliberal urban governments. The welfare state crisis, associated with the entrenchment of conservative agendas and responsible for producing changes in urban governance, also play a role in studying this concept. Besides this, the concept also shows how the discourse on urban regeneration within the scope of urban policies and the production of the city's image, aims at keeping the present population in the area, while modernising the economy, increasing employment rates and promoting economic growth. On the other hand, it also works as a mechanism that legitimises power and mobilises important public investment used to subsidise the wealthier strata of the population instead of benefiting those in need. Finance, the large economic groups, civil construction groups, entrepreneurs and the governing class among others, all help to polarise society.

The aim of this paper is to make an assessment of the participation process in the measure called "Initiative for the Qualification and Urban Re-insertion of Critical Neighbourhoods" (commonly known as the "Critical Neighbourhoods" Initiative). It is one of strategic measures coming within the Cities Policies launched by the present Portuguese government and aims at integrating peripheral spaces and urban areas in crisis into the social-urban network. For our case study, we shall be looking at the Cova da Moura Quarter situated in the municipality of Amadora in the Lisbon Metropolitan Area. The model underpinning the public's active role and following an "entrepreneurial mimetic" in all but name, is based on efficiency. It has neglected to take into account the specific nature of the public services, mainly where the responsibility of the voters and their lawful rights and duties are concerned, as well as the very concept of truly active citizenship.

3 CRISIS IN THE WELFARE-STATE, NEOLIBERALISM AND THE PRODUCTION OF THE REVANCHIST CITY

In this chapter we will be talking about the changes that took place in the principles guiding the economic system and the way it was regulated. They left their mark on the transition from a Fordist mode of accumulation based on Keynesianism and predominant in Western countries and metropolises between the 2nd World War and the 1970s, to a flexible mode of accumulation situated in an economic framework that has been greatly influenced by neoliberalism. As we shall see later on, neoliberalism largely explains the emergence, proliferation and reinforcement of the urban regeneration trends witnessed during the last few decades of the 20th century.

During the 1960s and 1970s, evidence of the welfare-state's expansion and consolidation was seen in the way the state diversified its supply of goods and social services where this supply enjoyed a high standard of benefits and quality. Persistent inequality and the emergence of new demands seemed to have largely been out-manoeuvred by consolidating and extending social rights. It was the era of positive discrimination, programmes aimed at fighting poverty, improving social services and fomenting the value of benefits and transferences. It was the era of the Fordist pact and the welfare state. Fordism undeniably represented more than just an economic development model. In fact, the very nature of this model favoured the emergence of a well-defined set of social actors and provided the conditions for creating standard rules of procedure in the relationships established among them. As from the 1940s, the State became the most important stakeholder in supplying assistance to the most under-privileged strata of the population. This assistance became generalised and widespread although in nearly all of the developed countries it varied according to different the kinds of assistance and their geographical intensity. The expression welfare state became common coinage to describe the direction along which state policy was heading where organised power used the term to change the path of market forces in at least three directions: guaranteeing individuals and families a minimum wage; reducing the degree of job insecurity and giving individuals and families the conditions whereby they were able to handle certain social contingencies (for example, illness, old age, unemployment) which otherwise would cause them suffering; ensuring that all citizens had at their disposable the best possible standards offered by a moderate range of social services (MELA, 1999).

Keynesian policies kept abreast with and stimulated Fordist urbanisation, giving rise to a “welfare city” (in keeping with the welfare state) in order to cement the Fordist pact between entrepreneurs and workers and thereby uphold social harmony and the capitalist system’s reproduction. This was done by the state giving state incentives to the economy by making public funds available for collective facilities and welfare housing, as well as by favouring the industrialisation of the building trade and public works by repeatedly placing large-scale orders. Nevertheless, nowadays this way of producing urban space and indeed, the whole Fordist philosophy, have been plunged into crisis (ASCHER, 1998).

The first symptoms of the welfare state's crisis became apparent around the mid-1970s. From then on, the gradual disintegration of the predominant model of public intervention was witnessed at the same time that Fordism gave way to Post-Fordism. This situation made it increasingly more difficult for the State to find the necessary resources to guarantee public funding at the same rate it had managed to do in previous years. In addition to the inevitable precarious state of the job market affecting unskilled labour and the most under-privileged strata of society, was the deregulation of the housing market and urban land use which now tended to favour a more randomised pattern in the temporal and spatial production of urban events. This pattern is simply the social outcome of the interplay involving an inadequately regulated real-estate market based on speculation and pricing activities rather than owing to localities and their distances from/to the centre or work places, or the local standards of trading, facilities or environmental quality. Urban governments have followed a managerial model (the strategic management imported from the business world) where public resources are provided so as to attract investment. Furthermore, the provision of services has now been taken over by market forces and the private sector and public-private partnerships have been up-graded (HALL, 1998).

Following upon the fairly active production-based interventionist State, although the degree of this intervention varied from country to country, now came a State which sought to transfer many of its services to the private sphere (transports, housing, communication and electricity distribution networks…). The idea - how often only in appearance - was emphasised that by making such transfers, economic activities were more efficiently regulated (by means of laws, inspections, setting up regulatory committees overseeing the

stock-exchange, telecommunications, etc.). This same State which was shaped by the neoliberal reference framework in the 1980s and 1990s still exerts a heavy influence today (SMITH, 1989; PIMENTA DE FARIA, 2002); it has reinforced competitive rationales of a spatial nature (DOMINGUES, 1996; PECK, TICKELL, 2002) and housing policies (WEXLER, 1996, 1999). The depression experienced by the large cities which characterised the end of the post-war economic cycle was followed by a new urban policy that was far more geared to the market and therefore affected by philosophies based on promoting consumption, inter-city competitiveness, and the protagonism of private stakeholders in the city's planning process and production (LEY, 1980; BARATA SALGUEIRO, 1999; HALL, HUBBARD, 1996).

It is a fact that, associated with the first signs of the crisis in the welfare-state and the emergence of neoliberalism in the 1980s but more particularly in the 1990s - and even later in Portugal, namely the collapse of this model founded on public intervention mainly lay at the bottom of new fast-growing social inequality. The situation has become worse to the extent that the most developed countries have tended to regress back to levying indirect taxes rather than direct taxes, or at least to exert fiscal pressure once again on income gained from labour which benefits capital-generated income. The purpose of doing away with public welfare policies in an attempt to encourage the kind of private economic initiative that urban governments have been promoting in their neoliberal drive, together with the crisis in the welfare state, is also linked to the conservative agenda flexing its muscles. It has played a powerful role in producing the radical changes taking place in city governance which, as SMITH (2005: 75) defends, has led to the revanchist city that has come about owing to:

"Las enormes subvenciones concedidas al capital mundial; la destrucción y el desmantelamiento sistemático de servicios públicos (por ejemplo, la educación) y la crisis de la reproducción social; y las nuevas ambiciones políticas de las ciudades en la economía global. [...] El argumento general que deseo plantear aquí es que la ciudad revanchista [...] forma parte de todo un nuevo régimen de desarrollo desigual que encaja com el nuevo globalismo. Conjuntamente con una mayor represión política, representa elementos centrales de un nuevo régimen de desarrollo desigual que se vuelve cada vez más visible en las economías capitalistas avanzadas" .

As an activist and social critic, SMITH (1996)[1] has denounced the discourse favouring the kind of regeneration dependent on urban policies that seek to enhance the city's image even if such policies promise to keep its present population, modernise the social fabric, offer more jobs and promote economic growth. The truth is that it will still not stop it from working as a means of legitimising the powers-that-be and attracting large-scale public investment which in a last analysis, will not be used to help the most needy but will act as subsidies to the wealthiest (banking, financial institutions, large economic groups, construction companies, entrepreneurs and governing officials, etc.). Smith works on the basic premise that the body of laws governing capitalist society is necessarily bourgeois (under the control of the dominant class) and it serves the interests of capital and not the social majority. The same may be said of the State which, even under a liberal guise and legally acting on behalf of the whole of society's interest (in the discursive theoretical sense), in fact really represents the domination exerted by the "bourgeois class" particularly in this mode of production. In other words, the groups enjoying the highest social and economic status as well as the interests serving big capital

The public interventions aimed at enhancing the city spark off a chain of contradictory mechanisms leading to expulsion and re-appropriation. New urban policies mean a sharper turn towards the market and the consumers in detriment to the most under-privileged classes. The selective nature of investments favouring capital reproduction means abandoning, forgetting about and paying less attention to the "city of the majority", and all the more so in the already needy areas where the under-privileged are concentrated (BRENNER, THEODORE, 2002; JESSOP, 2002). Rather, according to Smith's theory which he has been busy exploring recently (1996, 2001, 2002), what we have is the emergence of the "revanchist" city produced by the neoliberal offensive. In this way, the author has unmasked the reality behind the social concerns and

[1] "The enormous subventions carried out in the capitalist world; the destruction and the systematic dismantling of public services (for example, education) and the crisis in social reproduction; and the cities' new political ambitions in the global economy. […] The general point I would like to make here is that the revanchist city is a part of a whole new system promoting unequal growth that is contained within the new globalism. Together with greater political repression, it represents the central paraphernalia of new governance based on unequal development that is becoming increasingly more evident in the advanced capitalist economies". (From the Spanish).

the "institutional generosity" which have inherently accompanied new urban management's recent real-estate products and he has explained how they have promoted a rationale based on social control that is favourable to the reproduction of capital and the dominant classes.

4 SOCIO-ECONOMIC LOCALISATION AND CHARACTERISATION OF THE COVA DA MOURA QUARTER

The last four decades of the 20th century bore witness to deep political, economic and social changes in Portuguese society. Such changes were without precedent and exerted a tremendous effect on the Portuguese population not so much from a quantitative point of view as the total Portuguese population did not increase to any great extent, but in its type of distribution and structure. Perceived from within this framework of change, the heterogeneous nature of the Lisbon Metropolitan Area appeared to be a spatial unit. Apart from its marked demographic growth, not only were its demographic-spatial features observed in the rest of the country - for example, the aging of the population as well as the population drain particularly in the rural areas, the growth of the tertiary sector in the active structure, an improvement in the level of education, etc. – but in terms of its urban-metropolitan nature, a clear definition was obtained of the kind of demographic-spatial features that were typical of a large urban area that was (still) growing and has only now been consolidated. Without any doubt, it is at this level that the specific character of the Lisbon Metrolpolitan Area resides: in addition to the first phenomena happening within it and referred to above, other overlapping phenomena have occurred, such as suburbanisation and peri-urbanisation; large, on-going, diversified immigration flows; the gentrification and regeneration of the historical quarters of the city; de-industrialisation and the relocation of industry; de-polarising economic activity and a concentrated flow to the coast owing to tourism and leisure that are now more easily reached owing to greatly improved accessibility.

Amadora was the first Lisbon suburb to grow and develop. Its growth was the result of the migration flows in the 1960s and 1970s, its availability of housing, its proximity to the capital and the urban axis mushrooming along the Sintra railway line. The process involving Amadora's rapid growth gave rise to a densely populated area that failed to conform to urban standards and was further complicated by the added burden of becoming the first municipality in the country to gain this status after the 25 April 1974 Revolution.

The Cova da Moura Quarter is situated on a steep slope and covers an area of about 16.5 hectares to the east of the Amadora municipality, very close to Benfica (Lisbon). Its administration is shared between the Damaia and Buraca parish councils (Figure 1), although most of Cova da Moura is situated in Buraca. To the West, it is bound by various high-rise buildings belonging to a private estate which has partially cordoned it off with a fence. To the South, East and North, it is bounded by roads forming a ring around the neighbourhood, and includes the Sintra railway line running North as well as the beginning of the IC19 motorway going South. It may be said that Cova da Moura owes its existence to the 25 April 1974 Revolution when the expatriates or retornados returning from the former Portuguese colonies found a place to build their homes in although it already contained some older houses built by people coming from other areas of the country and some farm buildings serving the surrounding farmlands. During the second half of the 1970s and the beginning of the 1980s, in the period following the transfer of colonial power and associated with the effect brought about by the so-called immigrant network, there was a marked increase in the number of families mainly coming from the Cape Verde Islands and squatting on nearby vacant land. Their dwellings which were very flimsy shanties at first were gradually improved over the years. The neighbourhood has an extremely flexible urban fabric which is the result of people constantly moving there to live and build their homes, and the gradual addition of urban facilities namely with regard to sewerage, tarred roads, garbage collection and street lighting, as well as collective facilities.

The majority of the Cova da Moura resident population is composed of black Africans and their descendents, where most have their origins in the Cape Verde Islands although many have been born in Portugal. Therefore more than 40% possess Portuguese nationality even though the fact is relevant that almost 2/3 of the residents were born in abroad.

In terms of their qualifications regarding work and their socio-professional level, it is natural that the population in this neighbourhood present a basically unskilled/semi-skilled labour profile where workers are often employed doing short-term piece-work drawing low wages. The fact that Cova da Moura is over-

represented by this sort of indifferentiated, socially stigmatised activity where instability is common, is due not only to little schooling or the urgent need to guarantee income but also to employers' prejudices. They rank people of African origin in the unskilled bracket of the labour market and construct social representations that end up by erecting barriers against obtaining jobs offering a better professional status.

Because Cova da Moura has a predominantly young, active population, it is natural that the largest groups are comprised of workers (42%) and students (about 23%). Although there are cases involving dependent residents (pensioners and people receiving subsidies who are grouped under "others"), their numbers are not really very significant. Only a few residents are unemployed but this number is not relevant owing to the fact that the macro-economic variable is heavily influenced by conjunctural factors.

Most of the men work in the building trade, where a number of them are contractors and subcontractors who recruit many of their workers through family and neighbourhood networks. These small-time entrepreneurs and self-employed workers are listed as building and public works "companies" with their offices in Cova da Moura although it is frequently the case that their offices and their homes are one and the same. Despite the fact that they do not put up business signs outside their buildings, the local population knows where to find them. The women are employed as domestic workers, office cleaners, home-helps, caterers, street hawkers or stall-keepers at small local markets. The study in Figure 2 shows the polarisation in employment based on unskilled labour (personal and domestic service and the building trade). It reveals a clear dichotomy in the way professional activity is carried out according to gender (MALHEIROS et al., 2006). At the moment, the Cova da Moura Quarter is one of the most problematic areas in Greater Lisbon due to its high population density and its large numbers of illegal homes, as well as the lack of or not enough urban infrastructures, social facilities, open areas and green spaces. The neighbourhood also suffers from serious weaknesses in the buildings already standing in terms of their solidness, robustness and healthy environments; the Amadora Municipal Council (AMC) has made them the target of repair work with the aim of not only regenerating the neighbourhood but also socially integrating the population that lives there.

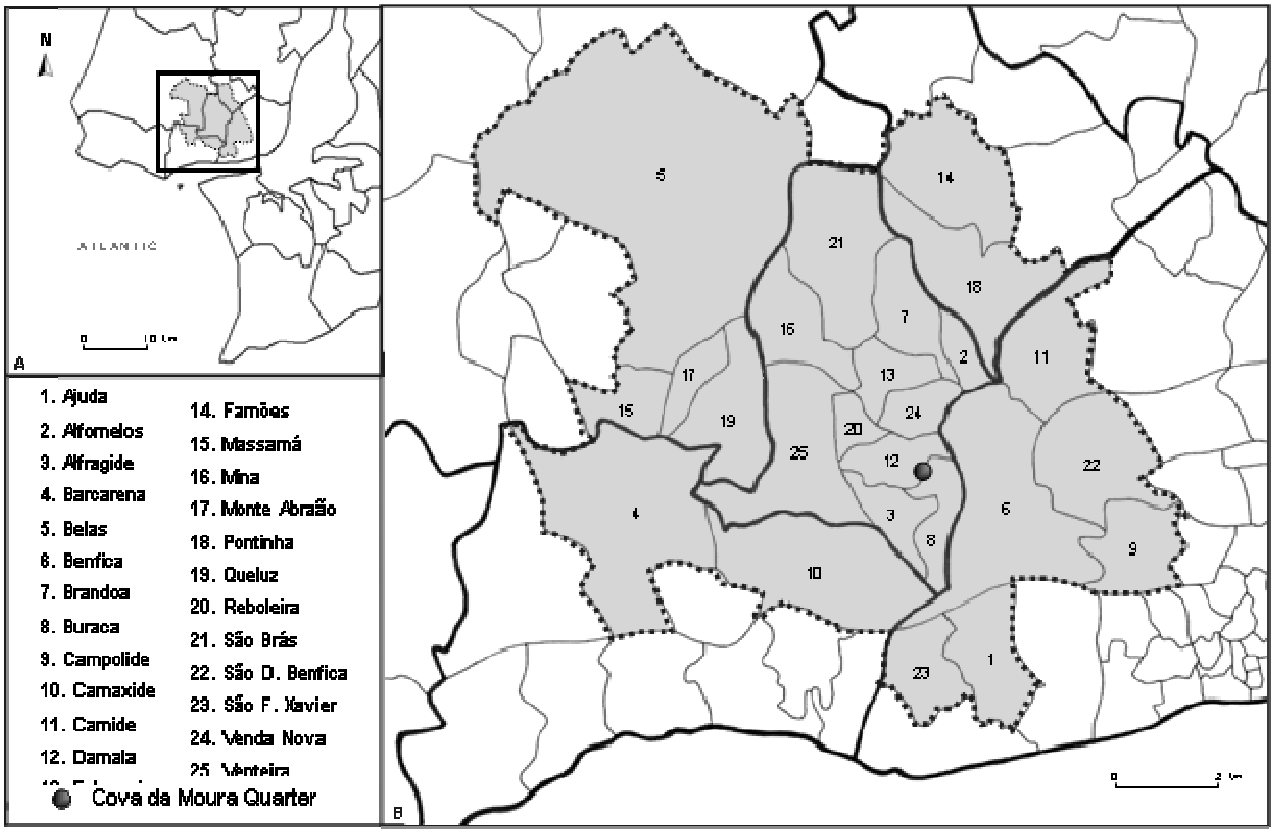

Figure 1 Geographical Locality of the Cova da Moura Quarter in the Lisbon Metropolitan Area (Source: Luís Mendes, May 2009)

Profissional Groups	%
Scientific, technical, artistic and like workers, managers/directors and higher administrative staff	3
Administrative staff and technicians	5
Retail staff and sales personnel	5
Personal and domestic staff and security personnel	33
Farm labourers and fishermen	1
Workers in the manufacturing industries and the building trade; fixed machine operators and transport drivers	40
No data	12

Figure 2 Resident Population in the Cova da Moura Quarter according to Professional Groups in 2001 (%) (Source: Characterisation and Diagnostic Study on the Cova da Moura Quarter, by Vasco da Cunha, Estudos e Projectos SA, 2001)

5 PUBLIC INTERVENTIONS TO REGENERATE URBAN AREAS IN CRISIS AND THE GOVERNMENT "INITIATIVE FOR THE QUALIFICATION AND URBAN RE-INSERTION OF CRITICAL NEIGHBOURHOODS"

The "Initiative for the Qualification and Urban Re-insertion of Critical Neighbourhoods" (commonly called the "Critical Neighbourhoods" Initiative), has helped towards making the present Government's strategic measure on City Policies operational. It is geared towards the integration of neighbourhoods displaying factors that indicate critical vulnerability into a social and urban framework. The goal is also to encourage and test institutional, procedural and technological solutions that are innovating, integrated and participative, as well try and achieve the concerted, optimised involvement of both the stakeholders and public action in integrated interventions. In launching this initiative, the Portuguese Government wants to test an experimental approach based on development methods and intervention, management and funding models of what may be called "Good Practices". Such practices might lead to the formation of a panel of interventionist methodologies, tools and models which are transferable and have a broader application in the near future. The Initiative is grounded in several principles seeking to conciliate initiatives and define priorities. Among them, the most important measures are the inclusion and active participation of Local Partnerships which define and draw up the Intervention Plans and develop public-public and public-private partnerships at different levels whether based on models of funding or project management models. The Action Plans and the Funding and Management Models therefore have become dependent on sharing out the work (for designing them up and carrying them out) among the representatives of the Ministries and Local Partnerships involved.

By referring to the experience gained in increased public participation in the "Critical neighbourhoods" Initiative, more specifically pertaining to the Cova de Moura Quarter situated in the Amadora Muncipiality in the Lisbon Metropolitan Area – we shall now be making a critical assessment of the underlying model of public management. We will then show how this model, which has borrowed from the entrepreneurial philosophy based on efficiency, has tended to forget the specific nature of the public services mainly in terms of the elected members' responsibilities and the powers invested in them, as well as the concept of citizenship itself. The dictates centred on economic factors, efficiency and efficacy – the central axis of the ideology underpinning neoliberalism – has neglected to take into account the values guiding public policies such as justice, equality, participation or redistribution which instead call for the redefinition of policy-making so that the concept of energetic citizenship is materialised as the active expression of the most underprivileged groups.

Regenerating the neighbourhood is at the top of the municipal agenda owing to the fact that the whole of the surrounding urban area has deteriorated and this fact has cast the municipality in an unfavourable light. Local government has gradually come to respect the guidelines of the Municipal Strategic Plans in effect since 1994, as well as other spatial planning and regeneration tools. In doing so, it runs programmes and carries out strategies that seek to best improve citizens' quality of life by solving housing shortages and strengthening and diversifying the basis of production. This up-grading is achieved by using its own resources, seeking central government backing or resorting to partnerships and EU funding. As regards EU funding, several projectes aimed at up-grading urban spaces are now being implemented, such as the URBAN II project (following on from URBAN I) and the PROQUAL project.

To this effect, the Amadora Municipal Council is carrying out a set of measures aimed at keeping the area from further deteriorating. Following the process to reconvert the neighbourhood, the AMC decided to run for the Polis Programme so as to reconvert and rehabilitate the Damaia and Buraca parishes – located in the extreme east of the municipality – with Cova da Moura in the heart of them. The project was budgeted at about 16 million Euros and launched with a view to obtaining Community funding to pay for the investments needed to start work on rehabilitating the neighbourhood and the two surrounding parishes.

Apart from this, an application was also made for the EU Urban II Programme aimed at regenerating the Damaia and Buraca parishes where Cova da Moura is located. The area of intervention covered by the URBAN programme includes the eastern-most section of these two parishes involving an area of 80 hectares. It is bounded to the North by the railway line, to the South by the IC 19 motorway, and to the East and the West by the respective administrative boundaries of the Damaia and Buraca parishes. Cova da Moura is in the centre and is the reason and focal point of the entire URBAN strategy. There are different targets to achieve: satisfying the housing shortage, urban up-grading, the full social integration of the resident population, fighting drug abuse more efficiently and making the socio-economic life of the quarter more dynamic. This is envisaged through encouraging the population to open up more economic activity and provide more services, set up more socio-cultural associations, valorise the African population's cultural heritage and encourage the professional training of human resources. The intervention measures now under way are the outcome of cooperation between the Amadora URBAN II Programme and other programmes and projects which have the aim of helping Cova da Moura to become fully and definitively integrated into urban city life, thereby breaking down the ghetto's physical and social barriers present in the neighbourhood's daily life. Among these various projects, the most important programme is the "Initiative for the Qualification and Urban Re-insertion of Critical Neighbourhoods" (Council of Ministers Resolution No. 143/2005 passed on 2 August 2005).

In order to ensure that the conditions for Participation, Partnership and Proximity are respected according to each neighbourhood's specific nature, the organisational model of this initiative is based on setting up Local Partnership Groups in each neighbourhood that bring together a wide range of stakeholders – ministries, local government, programmes and projects all with an interest in the terrain, organisations, associations and local leaders. The Local Partners Group is responsible for what sort of Intervention should be drawn up, and it receives the help and encouragement of multidisciplinary Technical Support Groups that are coordinated by the National Housing Institute. Partnership Agreements and the integrated management of the Action Plans – are previously worked out and agreed upon at the headquarters of the Local Partnership Group.

Participating in the initiative is based on choice and by applying a technique through which citizens have a say in what decisions interest them or what action the public authorities are willing to take in order to encourage citizens make suggestions and decisions. In the latter case, the citizens' shared involvement has to be organised which means having information collection and distribution mechanisms at hand as well as mechanisms enabling citizens to be consulted and hence involve them in co-decision making. All of this presupposes the existence of representative associations defending citizens, groups and interests (MOTA, 2005). Here, however, the already excluded weaker social urban movements which show up the contradictions inherent to collective consumption are silenced. Nevertheless, present policies acknowledge numerous advantages attached to shared participation: it helps the political system to include measures that will correct and integrate, and that will act as a means of facilitating consensus, promote stability and hence strengthen the status of the powers-that-be as well as the dominant interests of the capitalist State.

Without linking up the urban contradictions which drive the movement's activity and set in motion the remaining general social contradictions, organised participation will never be able to take the shape of a true urban struggle nor will it be able to become an urban social movement leading to social change. It will merely limit itself to being an instrument that participates within the confines of the general capitalist aims of the dominant powers. This is even more perverse if we take into account the present incentives being offered by the capitalist State through its planning strategy to participative urban governance that sets its sights on creating a system of participation in which the "good citizen" sits around the table with others and works out the details for applying general plans and rules, or attempts to support regulations/peace-keeping measures that control urban strife, thus accepting the social dominant order as inevitable (ARANTES et al., 2000; MATIAS FERREIRA, 2004).

In fact, the crusade for renewal which has accompanied proposals based on participation has given rise to serious reticence in the academic milieu and in alternative political circles particularly when considering the "generosity" allowed this participation. From a more radical point of view, the proposition of urban governance has tended to coincide with the neoliberal-inspired "Minimum State" which includes privatising the public sector, deregulating private activity and securing the hegemony of market forces in supplying public services (BRENNER, THEODORE, 2002; PECK, TICKELL, 2002; JESSOP, 2002; GOUGH, 2002).

6 FINAL CONSIDERATIONS: FALLACIES ABOUT PARTICIPATIVE CITIZENSHIP AND THE NEOLIBERAL OFFENSIVE

The "Initiative for the Qualification and Urban Re-insertion of Critical Neighbourhoods" (or the "Critical Neighbourhoods" Initiative), has helped towards making the present Government's strategic measure of City Policies operational in Portugal. Its working method is founded on participative citizenship as it has involved the participation of local partnerships to define the intervention plans needed for regenerating the critical neighbourhoods such as the one described in this paper, Cova da Moura situated in Amadora. Effectively speaking, in referring to the expression "participative", the process is immediately and automatically assumed to be "democratic" whereas in reality, the conditions in which these so-called citizen and local partnerships are only allowed a voice within the limited confines conditioning them have never been questioned. So-called social participation therefore becomes a democratic fallacy when its operational conditions and modes are nothing more than the political inversion of the very processes of socialising civic participation.

What in fact happens is that, owing to this supposed participation, the social stakeholders and the neighbourhood population legitimise the State's capitalist power to regulate (be it at Central or Local level) and they unwittingly accept large real-estate projects aimed at urban regeneration as well as the benefits bespoken in programmes that only serve to strengthen the most powerful entrepreneurial fabric, the strategic functions and relations of control, and the power over and the domination of the urban space. This is nearly always made at the expense of investment in local services needed for collective consumption and it ends up by expelling the most under-privileged part of the resident population in an urban area that, because of its extraordinary proximity to the centre of the city of Lisbon, presents an excellent opportunity for real-estate business and investment and for reproducing capital.

Departing from the preliminary deduction that capitalist society is governed by a series of laws that are necessarily bourgeois (under the control of the dominant class in social and economic terms), such laws exist to protect the interests of capital and not the social majority. The same may be said of the state which, even under a liberal guise officially geared (in the theoretical sense) to safeguarding the interests of the whole of society, represents the domination of the "bourgeois class" more in particular with regard to this mode of production. In other words it not only serves the interests of groups enjoying high social and economic status but also the interests of capital. Central power – through the supposed decentralisation that promotes the much-publicised rationale of public participation in urban regeneration projects launched by the "Critical Neighbourhoods" Initiative – ensures that the spatial stability of the system continues rock fast and indeed strengthens its ability to withstand social change. This is because the administration foments the hierarchy and encourages social demand by means of urban planning and urban regeneration policies. As a matter of fact, public interventions which seek to valorise the city trigger off a chain of contradictory mechanisms leading to expulsions and re-appropriation. The new urban policies in Portugal have taken a more accentuated swing towards the market and consumers in detriment to the most under-privileged classes. The selective nature of investments that are favourable to reproducing capital means that the "city of the majority" is voted to abandonment, neglect and less attention, and the situation is all the more serious in the neediest places where the most under-privileged are packed tightly together.

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Personal transport information, mobility behaviour and attitudes towards technology: target groups for advanced traveller information systems

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1 ABSTRACT

Advanced traveller information systems (ATIS) are online door-to-door trip planners that compare transport modes and routes under consideration of current and future traffic conditions. Sophisticated systems have been implemented in the last years, but focused rather on technological features than on barriers and preferences of specific target groups. Therefore, the modal shift from the car to other modes of transport anticipated by the provision of comprehensive travel information has not been proven yet.

Preliminary results of a recent survey of n=1300 people representative for the Austrian population show that few people are familiar with ATIS. Intentions for using ATIS are generally low, although slightly higher for non-routine trips. Younger persons and employed persons without a personal car currently use the internet and in-vehicle navigation devices more often for obtaining travel information and state higher willingness to use ATIS than other population groups. However, sociodemographics are only proxies for behavioural and psychological determinants of willingness to use ATIS. Among a scope of possible determinants, only attitudes towards information and communication technologies are relevant. Convergent, discriminant and external validity of the attitude measurement is established.

The personal experiences with the current transport system people acquire over many years are sufficient for their everyday mobility. Use of ATIS might rise if innovative, complex, inter-/multimodal transport services are introduced which require more effort in scheduling, which in turn demands more detailed traveller information. Additionally, increasing market penetration and acceptance of information and communication technologies could raise corresponding attitudes and thus willingness to use ATIS.

2 ENTWICKLUNGSSTAND

2.1 Technische Entwicklung und Umsetzung von ATIS

Multimodale, dynamische Verkehrsinformations-Systeme (Advanced Traveller Information Systems, ATIS) haben sich in den letzten Jahren technologisch rasant weiterentwickelt indem

- alle Verkehrsmittel berücksichtigt werden (zu Fuß, Fahrrad, Kfz, Park&Ride, Öffentlicher Verkehr etc.) und intermodale Wege von „Tür zu Tür“ beauskunftet werden,
- dynamische Daten zum Verkehrszustand zumindest des Kfz-Verkehrs aber teils auch des Öffentlichen Verkehrs zur Verfügung stehen und
- unterschiedliche Medien wie Internet, Smartphones etc. zur Vermittlung von Verkehrsinformationen pre-trip und on-trip genützt werden können und personalisierte Abfragen ermöglichen.

ATIS unterstützen die Verkehrsteilnehmer insbesondere bei der Wahl eines Verkehrsmittels, aber auch bei der Wahl des Abfahrtszeitpunktes und bei der Routen- und Verbindungswahl. Ziel ist es, durch verkehrsmittelübergreifende, objektive Informationen zu Reisezeiten mit Stau- und Verspätungs¬informationen, Umsteigevorgängen, Reisekosten, Umweltwirkungen etc., das Verkehrsverhalten der Nutzer zu optimieren und einen Umstieg vom Pkw auf Verkehrsmittel des Umweltverbundes zu fördern. Mittels Personalisierung ist darüber hinausgehend eine Berücksichtigung individueller Nutzerbedürfnisse möglich.

Die Umsetzung von ATIS erfolgte vielfach in Rahmen von Forschungs- und Entwicklungsprojekten. Aktuelle Praxisbeispiele, die sich durch eine hohe Datenqualität von Verkehrsinformation auszeichnen, sind – beispielhaft genannt – die Verkehrsinformations-Systeme (vgl. Haspel & Neugebauer 2009)

- „A nach B“ (www.AnachB.at) für die österreichischen Bundesländer Wien, Niederösterreich und Burgenland, betrieben von ITS Vienna Region,

- Bayerninfo (www.bayerninfo.de) für das deutsche Bundesland Bayern, organisiert als Public Private Partnership zwischen dem Bayerischen Staatsministerium des Inneren und und der VIB Verkehrsinformationsagentur Bayern sowie
- Transport Direct (www.transportdirect.info) für Großbritannien, organisiert als Public Private Partnership zwischen UK Department for Transport, Welsh Assembly Government und Scottish Government als staatliche Partner und einem privaten Konsortium.

Diese ATIS sind typischerweise von der öffentlichen Hand (ko-)finanziert und bewerben bestehende Verkehrsangebote. Ein privatwirtschaftlicher Business Case für ATIS zeichnet sich noch nicht ab.

2.2 Zielgruppen für ATIS

Änderungen des Mobilitätsverhaltens durch Verkehrsinformation gelingen nur, wenn die Verkehrsteilnehmer/-innen ATIS kennen, nutzen und letzlich deren Empfehlungen befolgen. Um die heterogenen Bedürfnisse der Verkehrteilnehmer zu beachten und dadurch die Nutzerakzeptanz zu steigern, ist eine Ausrichtung auf spezifische Zielgruppen sinnvoll. Bislang verwendete Ansätze zur Zielgruppenbestimmung mit dem Fokus Verkehrsinformation weisen folgende Eigenschaften auf:

- Einige ATIS berücksichtigen ansatzweise zielgruppenspezifische Bedürfnisse, indem Nutzer/-innen ein persönliches Informationsprofil definieren können: Dadurch erlangen einerseits die Nutzer spezifische Informationen und anderseits erhält der Anbieter aus den entstehenden Nutzerprofilen Hinweise für seine eigene Produkt- und Marketingstrategie (PTV 2003). Statt einer empirisch fundierten Zielgruppenbestimmung im Vorfeld wird lediglich von Nutzer- auf Zielgruppen rückgeschlossen. Potenzielle weitere Zielgruppen, die möglicherweise noch nicht als Nutzer/-innen angesprochen wurden, können so nicht eruiert werden.
- Wirkungsprognosen (z. B. OPTI-INFO, ZIS+P & HERRY Consult 2004) und Machbarkeits-analysen (BEST, FGM-AMOR 2001; BORIS, CURE 2004) für ATIS sind in ihrer methodischen Umsetzung unvollständig, da die Festlegung der Zielgruppen lediglich a-priori und nicht auf empirischer Datenbasis erfolgt.
- Meist werden soziodemografische Merkmale wie Geschlecht, Alter, Einkommen und Erwerbsstatus (Petrella & Lappin 2004) sowie die Nutzung moderner Informations- und Kommunikation¬stechnologien (Wittowsky 2008) als Nutzercharakteristika herangezogen, ohne dass zugrunde¬liegende psychologische Merkmale berücksichtigt werden.
- In einzelnen Studien gehen psychologische Merkmale, wie Einstellungen zu Verkehrsinformationen bzw. Verkehrsinformationsdiensten (Franken & Luley 2005) bzw. Technikaufgeschlossenheit und Innovationsaufgeschlossenheit (Schröder 2002), als Segmentierungskriterien in die Clusteranalyse ein. Eine Beschreibung der Cluster erfolgt dann anhand soziodemografischer Merkmale.

In einer stärkeren Berücksichtigung von Nutzerbedürfnissen liegen Potenziale zur Optimierung von ATIS. Anhand der bisherigen Forschungsarbeiten lässt sich schließen, dass Bedarf zur Weiterentwicklung von Zielgruppenansätzen besteht. Ansatzpunkte sind

- Eine Betrachtung, die sowohl alltägliche als auch außergewöhnliche Wege einbezieht, da ein größerer Nutzen von ATIS erst dann entsteht, wenn dieses Werkzeug in den Alltag integriert ist.
- Ein Untersuchungsfokus auf Österreich, da der Bevölkerung mit „A nach B“ ein hochqualitatives ATIS zur Verfügung steht.
- Eine stärkere Berücksichtigung psychologischer Merkmale, insbesondere des Konstrukts Technik¬affinität.

Wiederholt wird das Alter als kritisches Merkmal für die Nutzungsbereitschaft von ATIS angeführt. Junge Menschen interessieren sich im Gegensatz zu Älteren mehr für moderne Informations- und Kommunikationstechnologien, verfügen über mehr Erfahrungen und höhere Vertrautheit mit Computern, Smartphones, Handys etc. Alter steht aber nur stellvertretend für Aufgeschlossenheit, Interesse und Faszination gegenüber jenen Technologien, mit denen auf ATIS zugegriffen wird. Für eine präzise Zielgruppenbestimmung ist es besser, nicht den Stellvertreterindikator Alter, sondern direkt das psychologische Konstrukt Technikaffinität zu erfassen. Andernfalls würden jüngere Menschen, die nicht technikaffin sind, und ältere, aber technikaffine Menschen falsch zugeordnet werden. Technikaffinität und

ATIS werden bereits bei Schröder (2002), Eberhard (2005) und Franken & Luley (2005) diskutiert. Technikaffine Personen entsprechen den Gruppen der Innovators und der Early Adopters, die nach der Theorie der Diffusion von Innovationen von Rogers (2003) etwa 20% der Population ausmachen.

Die folgenden Ergebnisse zeigen, dass Technikaffinität deutlich besser als andere Personenmerkmale geeignet ist, um Zielgruppen von ATIS zu beschreiben.

3 METHODE

Datenbasis der hier vorgestellten Ergebnisse ist eine repräsentative Telefonumfrage unter n=1300 Personen im Zeitraum von Dezember 2009 bis Jänner 2010. Es wurde eine nach Bezirken geschichtete Zufalls¬stichprobe der österreichischen Gesamtbevölkerung ab 16 Jahren gezogen. Abweichungen zwischen der Stichproben- und Populationsverteilung nach Alter, Geschlecht und Bildungsstand wurden durch Gewichtung korrigiert; die Gewichtungsfaktoren betragen zwischen 0,20 und 3,12.

Die Befragung umfasste eine breite Palette an soziodemografischen Merkmalen sowie Fragen zu aktuellem Verkehrsverhalten, subjektiver Informiertheit, objektivem Wissensstand, Informationsbedürfnis, Informationsverhalten, Gewohnheiten, sowie Bekanntheit und Nutzung bestehender ATIS und Nutzungs- und Zahlungsbereitschaft für ATIS. Weiters wurden Technikaffinität, soziale Normen und technikbezogene Werthaltungen erhoben (siehe Kap. 5). Im vorliegenden Beitrag wird lediglich eine Auswahl der Ergebnisse diskutiert. Analysen zu den anderen erhobenen Inhalten werden im Endbericht des Forschungsprojekts INFO-EFFECT (voraussichtlich Ende 2010) und in zukünftigen Publikationen des Projektteams berichtet werden.

4 ZIELGRUPPEN VON ATIS

4.1 bestehende Zielgruppen

Die Bekanntheit bestehender ATIS – im Sinne dynamischer, multimodaler Verkehrsinformationssysteme –ist sehr niedrig, wie die empirischen Ergebnisse der repräsentativen Telefonumfrage zeigen: Nur 7,4% der österreichischen Bevölkerung kennen ein ATIS. In den meisten Fällen handelt es sich dabei um maps.google.at. Das jeweils genannte ATIS wird von 4,5% täglich, von 23,4% wöchentlich, von 33,1% monatlich und von 39,0% seltener oder nie genutzt. Wegen der geringen Größe der Substichprobe (n=95) kann diese Personengruppe nicht weiter differenziert werden.

Abb. 1 stellt die Nutzung moderner Medien für Verkehrsinformationen nach Lebenslage dar. Moderne Informationsmedien sind in dieser Untersuchung ausschließlich Internet und Navigationsgerät im Fahrzeug, wobei dem erstgenannten Medium eine wesentlich höhere Wertigkeit eingeräumt wird, da dieses auch multimodale Verkehrsinformationen zur Verfügung stellt. Die a-priori Typenbildung nach Lebenslage orientiert sich stark an bewährten Segmentierungen der Mobilitätsforschung (vgl. Berger 2004): Pkw-Besitz, Alter und Erwerbsstatus determinieren stark die individuelle Mobilität. Aus Abb. 1 ist ersichtlich, dass

- mit zunehmendem Alter der Lebenslagetypen die Nutzung moderner Medien rapide abnimmt und
- bei Lebenslagetypen ohne Pkw-Besitz unter 60 Jahre die Internetnutzung über- und die Nutzung Navigationsgerät unterdurchschnittlich ist.

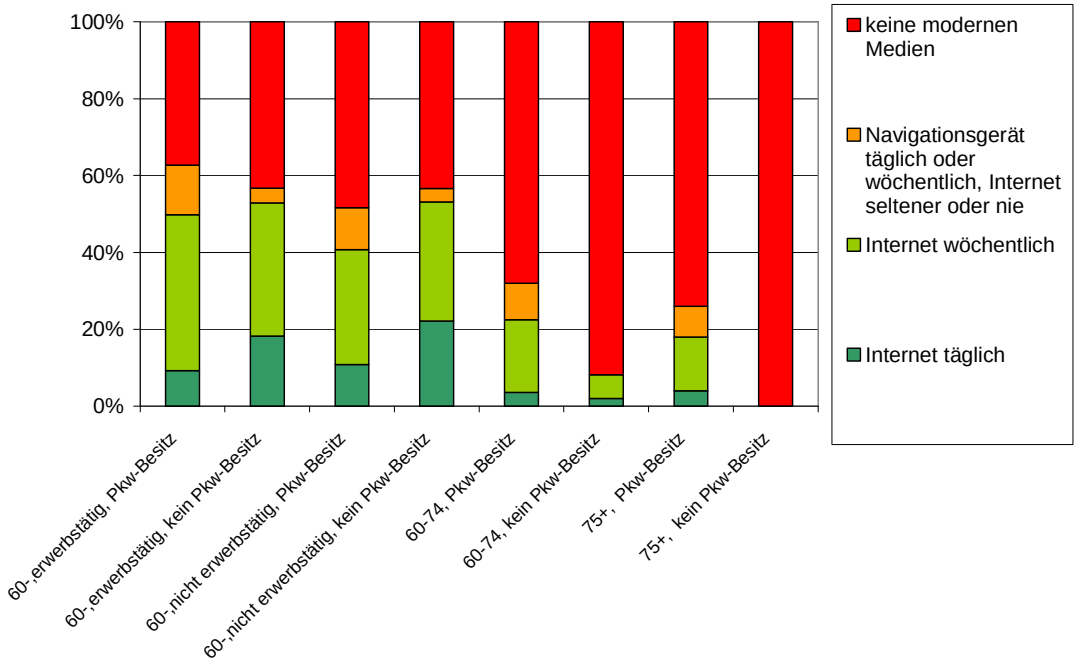


Abb. 1: Nutzung moderner Medien für Verkehrsinformation nach Lebenslage (□2= 201,2, df = 21, p<.00)

4.2 potenzielle Zielgruppen

Die hypothetische Nutzungsbereitschaft, ein ATIS auf alltäglichen Wegen bzw. auf außergewöhnlichen Wegen, die man seltener unternimmt, zu benützen, ist gering (siehe Abb. 2). Die arithmetischen Mittelwerte der Nutzungsbereitschaft liegen auf einem eher niedrigen Niveau; der arithmetische Mittelwert für die Nutzungsbereitschaft auf alltäglichen Wegen von 4,26 entspricht der verbalen Skalenstufe "selten", der Mittelwert für die Nutzungsbereitschaft auf außergewöhnlichen Wegen von 3,16 entspricht der verbalen Skalenstufe "manchmal"[1].

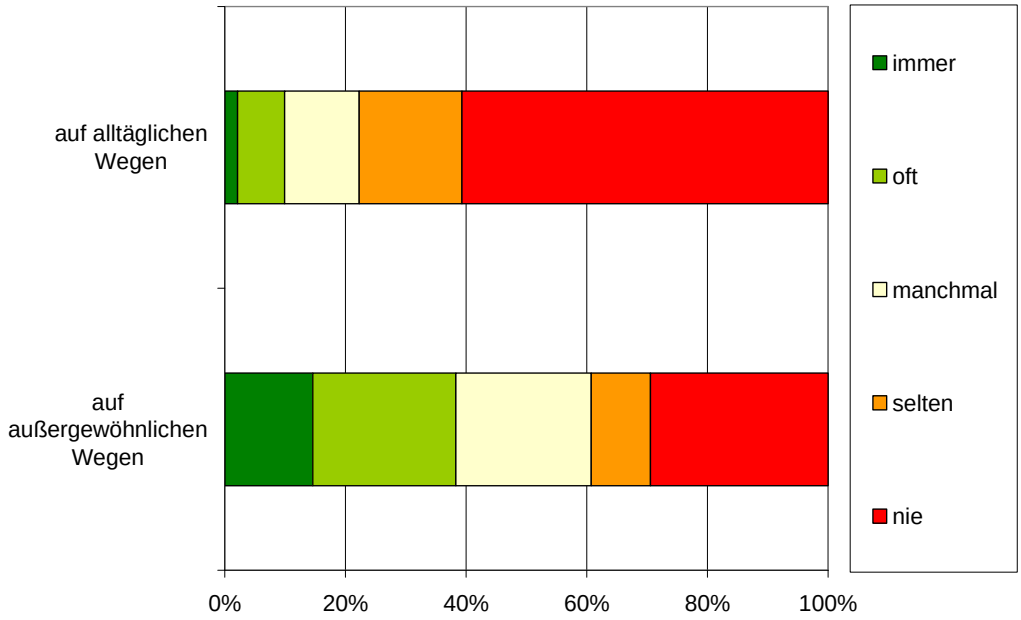


Abb. 2: Nutzungsbereitschaft von ATIS

Abbildung 3 fasst die hypothetische Nutzungshäufigkeit von ATIS auf alltäglichen oder außergewöhnlichen Wegen nach Lebenslagetypen zusammen. Es fällt auf dass,

[1] In den weiteren Analysen wird diese fünfstufige Ratingskala von 1="immer" bis 5="nie" als intervallskaliert behandelt (vgl. Bortz & Döring 2006).

- die hypothetische Nutzungshäufigkeit von ATIS bei alltäglichen Wegen generell äußerst gering ist, wohingegen sie bei außergewöhnlichen Wegen die Nutzungshäufigkeit deutlich höher ist.
- sich die Lebenslagetypen deutlich unterschieden: Erwerbstätige ohne Pkw weisen sowohl bei alltäglichen als auch außergewöhnlichen Wegen die größte Nutzungsaffinität auf, hingegen sind ATIS bei Personen 75+ nur von sehr geringer Bedeutung.

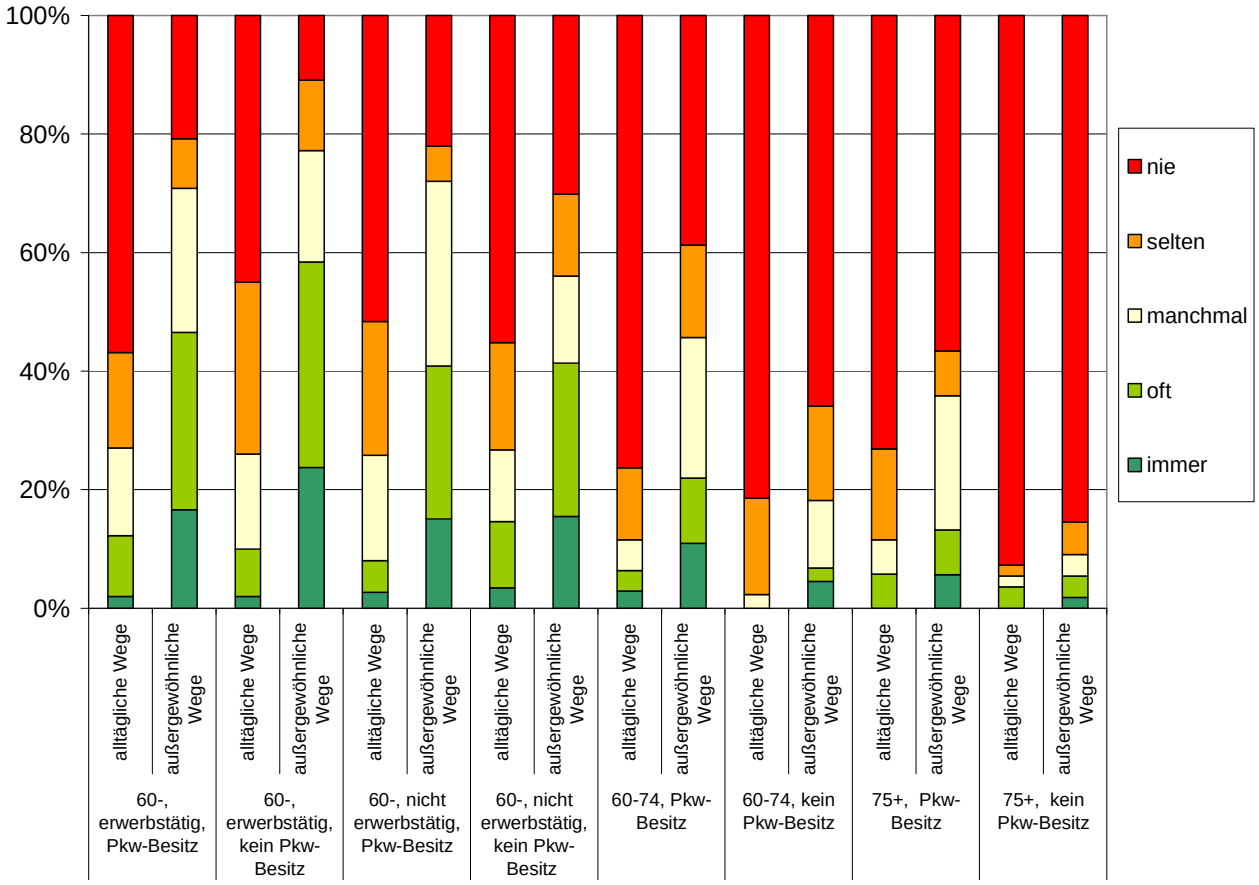


Abb. 3: Nutzungsbereitschaft von ATIS nach Lebenslage (alltägliche Wege: □2= 98,0, df =28, p<.00; außergewöhnliche Wege □2= 234,9, df =28, p<.00)

Die Nutzungsbereitschaft von ATIS auf außergewöhnlichen Wegen ist unter Personen, die ein ATIS kennen, signifikant höher (Mittelwert 2,49), als unter Personen, die kein ATIS kennen (Mittelwert 3,21; T-Test: T=-6,20, df=126,1, p<.00). Bei der Nutzungsbereitschaft auf alltäglichen Wegen liegt jedoch kein signifikanter Unterschied vor (Mittelwert 4,23 bei bekannt; 4,27 bei nicht bekannt; T-Test: T=-.33, df=1271, p=.74).

Neben Alter und der Bekanntheit bestehender ATIS sind eine Vielzahl anderer Merkmale denkbar, welche die Nutzungsbereitschaft von ATIS erklären könnten. Die Korrelationen dieser Merkmale mit der Nutzungsbereitschaft sind aber durchwegs gering.

Die Richtungen der Korrelationen sind wie erwartet: Die Nutzungsbereitschaft ist höher unter Personen, die jung sind, die ATIS kennen, die multimodal sind oder den Öffentlichen Verkehr oft nutzen, die eine großen Aktionsradius aufweisen und die bereits über ein Vorwissen zu Verkehrsangeboten verfügen. Auffällig ist, dass die Nutzungsbereitschaft niedriger ist, wenn eine Person häufig zu Fuß unterwegs ist. Die meisten Korrelationen sind aber nahe Null.

Allein das psychologische Merkmal Technikaffinität kann gut die Nutzungsbereitschaft erklären: Das einzige Merkmal, das ähnlich hoch mit der Nutzungsbereitschaft von ATIS korreliert, ist das Alter. Wie bereits erwähnt, steht das Alter aber nur als Stellvertreterindikator für die Technikaffinität einer Person.

			Nutzungsbereitschaft von ATIS	
			auf alltäglichen Wegen	auf außergewöhnlichen Wegen
	Alter		r=.22	r=.36
	ATIS sind bekannt*		r=-.01	r=-.13
Verkehrverhalten	Multimodalität bei verschiedenen Wegzwecken		r=-.05 bis r=.10	r=-.08 bis r=.07
	Multimodalität auf allen Wegen		r=-.02	r=-.07
	Monomodalität*	Kfz	r=-.04	r=-.13
		ÖV	r=-.11	r=-.01
		Rad	r=-.04	r=.00
		Fuß	r=.15	r=.16
	Benutzungshäufigkeit	Kfz	r=-.02	r=-.04
		ÖV	r=-.11	r=-.07
		Rad	r=.01	r=-.04
		Fuß	r=.12	r=.14
	Aktionsradius		r=-.14	r=-.14
Siedlungs	Bevölkerungsdichte des Wohnbezirks		r=-.04	r=.00
subjektive Informiertheit	Ich kenne gute Schleichwege, um Staus auf meinen alltäglichen Wegen zu umgehen.		r=.07	r=.11
	Ich kenne mich gut mit den Radrouten in meiner Gegend aus.		r=.00	r=.01
	Ich weiß über die Abfahrtszeiten der öffentlichen Verkehrsmittel in der näheren Umgebung meiner Wohnung gut Bescheid.		r=.06	r=-.04
	Ich weiß genau, mit welchen Linien des öffentlichen Verkehrs ich zu meinen alltäglichen Zielen komme.		r=.10	r=.03
	Index Technikaffinität		r=.25	r=.30

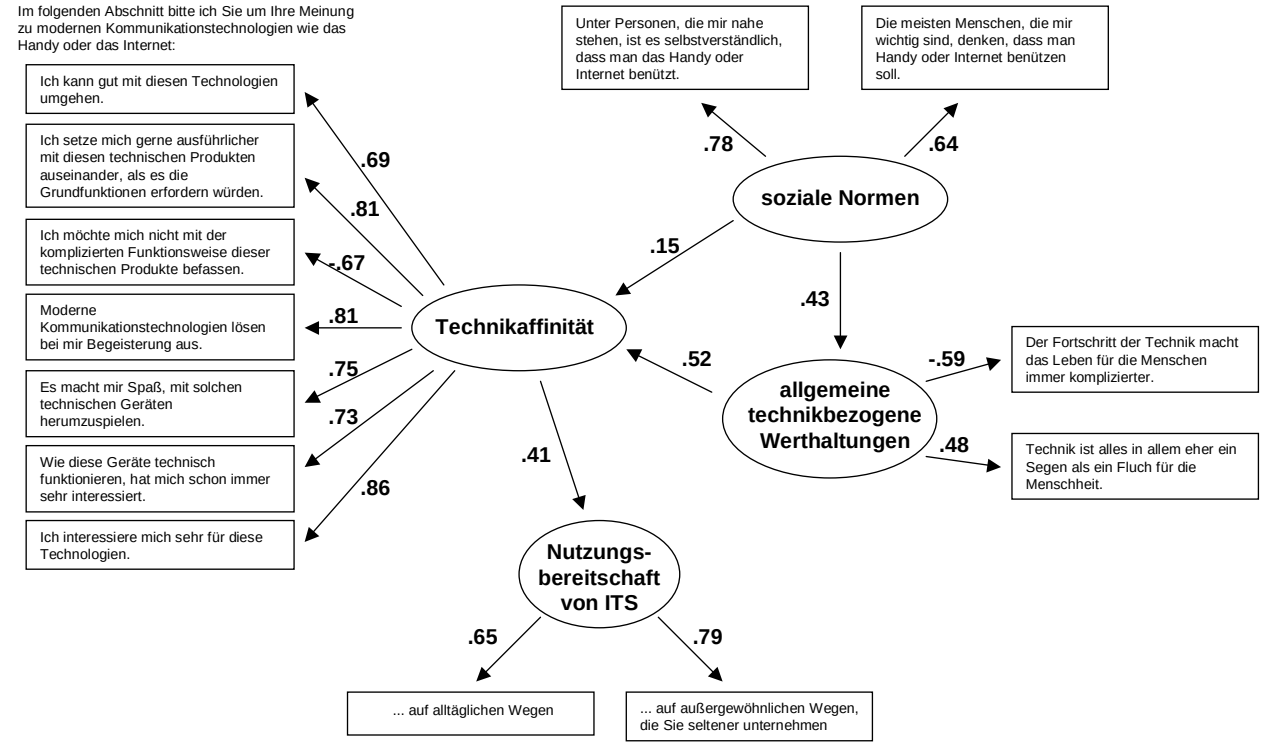
Angeführt sind Pearson- Korrelationen, bei Dummy-Variablen (*) punkt-biseriale Korrelationen.
Multimodalität: Je höher das Maß, desto mehr verschiedene Verkehrsmittel nutzt eine Person auf ihren Wegen.
Monomodalität: Ausschließliche Nutzung eines Verkehrsmittels auf allen Wegen.
Benutzungshäufigkeit: Mit der Weganzahl gewichtete Benutzungshäufigkeit eines Verkehrsmittels für die drei wichtigsten Wegezwecke in den letzten 7 Tagen.
Aktionsradius: Gesamtweglänge der Person für die drei wichtigsten Aktivitäten in den letzten 7 Tagen.
Antwortskala bei den Fragen zu subjektiver Informiertheit ist eine fünfstufige Ratingskala von 1="trifft völlig zu" bis 5="trifft überhaupt nicht zu".

Tab. 1: Erklärende Merkmale der Nutzungsbereitschaft von ATIS

5 TECHNIKAFFINITÄT ALS EINFLUSSFAKTOR AUF NUTZUNGSBEREITSCHAFT

Technikaffinität wird in dieser Untersuchung als Einstellung zu den spezifischen Technologien Mobiltelefon und Internet verstanden, mit emotionalen, kognitiven und behavioralen Elementen. Technikaffinität wurde mit sieben Fragen erhoben (siehe Abb. 4), welche diese Elemente wiederspiegeln. Konvergente Validität des Konstrukts Technikaffinität ist gegeben, wenn diesen Fragen ein gemeinsamer Faktor zugrunde liegt. Diskriminante Validität ist gegeben, wenn Technikaffinität moderat sowohl mit sozialen Normen zu Mobiltelefon und Internet als auch mit allgemeinen technikbezogenen Werthaltungen (im Sinne eines Technik- und Fortschrittsglaubens, vgl. Fuchs 1987; Zwick & Renn 1998) zusammenhängt, die jeweiligen Fragen zur Erfassung dieser Konstrukte aber klar voneinander abgrenzbar sind. Zur Gewährleistung der externen Validität wird überprüft, ob Männer, jüngere sowie höher gebildete Personen eine höhere Technikaffinität aufweisen.

Als Analyseverfahren werden Strukturgleichungsmodelle eingesetzt, die zunehmend in verkehrswissenschaftlichen Untersuchungen Verwendung finden (Golob 2003). Durch sie kann die Gültigkeit vorab angenommener Faktoren- und Kausalstrukturen überprüft werden. Die Zuordnung der Fragen zu den Faktoren Technikaffinität, soziale Normen und technikbezogene Werthaltungen wurde in dieser Form in der Erhebungskonzeption vorgesehen. Durch einen Internalisierungsprozess übernimmt das Individuum soziale Normen, adaptiert sie und integriert sie in das eigene Wertesystem (Fuhrer 1995). Folglich ist eine kausale Richtung von sozialen Normen auf Technikaffinität und technikbezogene Werthaltungen anzunehmen. Schließlich ist zu folgern, dass allgemeine technikbezogene Werthaltungen die spezifische Einstellung Technikaffinität beeinflussen und nicht umgekehrt.



Alle Koeffizienten sind standardisierte Faktorladungen bzw. Pfadkoeffizienten und statistisch signifikant. Antwortskala bei allen Fragen ist eine fünfstufige Ratingskala: bei Technikaffinität, sozialen Normen und Werthaltungen von 1="trifft völlig zu" bis 5="trifft überhaupt nicht zu", bei Nutzungsbereitschaft von 1="immer" bis 5="nie“. Negative Faktorladungen kommen durch negativ gepolte Fragen zustande. Schätzverfahren: Maximum Likelihood. Fit-Indizes: Chi²=471, df=61, AGFI=.92, CFI=.94, NFI=.93, RMSEA=.07. Erklärte Varianz in Nutzungsbereitschaft: 16,6%.

Abb. 4: Strukturgleichungsmodell von Technikaffinität und Nutzungsbereitschaft von ATIS

Die Höhe der Fit-Indizes spricht für einen passablen Modell-Fit. Die Faktorladungen der einzelnen Fragen auf die Faktoren sind durchwegs hoch. Die Pfade zwischen Technikaffinität, sozialen Normen und technikbezogenen Werthaltungen weisen erwartungsgemäß eine moderate Einflussstärke auf. Der Einfluss von Technikaffinität auf Nutzungsbereitschaft ist mit ß=.41 relativ hoch.

Für die deskriptive Analyse wurden die sieben Indikatoren von Technikaffinität zu einem Index zusammengefasst[2]. Nach Geschlecht, Alterskategorien und Bildungsstand bestehen statistisch signifikante Unterschiede:

Männer sind technikaffiner als Frauen. Beim Alter zeigt sich eine klare Richtung, dass mit steigendem Alter die Technikaffinität sinkt. Höher gebildete Personen weisen eine höhere Technikaffinität auf als Personen mit niedrigerem Bildungsstand, allerdings ist dieser Zusammenhang weniger deutlich als bei den anderen soziodemografischen Variablen.

[2] Mittelwert der Antworten jeder befragten Person bei den sieben Fragen aus Abb. 4. Die negativ formulierte Frage "Ich möchte mich nicht mit der komplizierten Funktionsweise dieser technischen Produkte befassen." wurde umgepolt. Die Skala des Indizes entspricht der fünfstufigen Ratingskala von 1="trifft völlig zu" bis 5="trifft überhaupt nicht zu", die für die einzelnen Fragen verwendet wurde; niedrige Werte entsprechen einen höheren Technikaffinität. Alle Trennschärfen rit>.60, Cronbach's Alpha=.90.

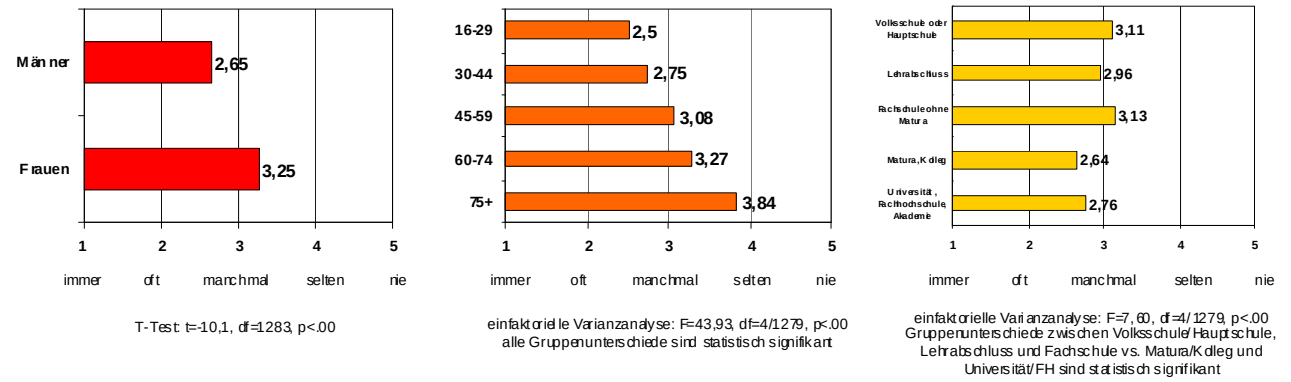


Abb. 5: Technikaffinität nach Geschlecht, Alterskategorien und Bildungsstand

Um Zusammenhänge mit der Nutzungsbereitschaft von ATIS aufzuzeigen, wurde der Index Technikaffinität in Terzile unterteilt: Damit ergeben sich drei Gruppen von hoch technikaffinen, mittel technikaffinen und niedrig technikaffinen Personen. Abb. 6 stellt die Nutzungsbereitschaft von ATIS auf alltäglichen und auf außergewöhnlichen Wegen in Abhängigkeit von der Technikaffinität dar:

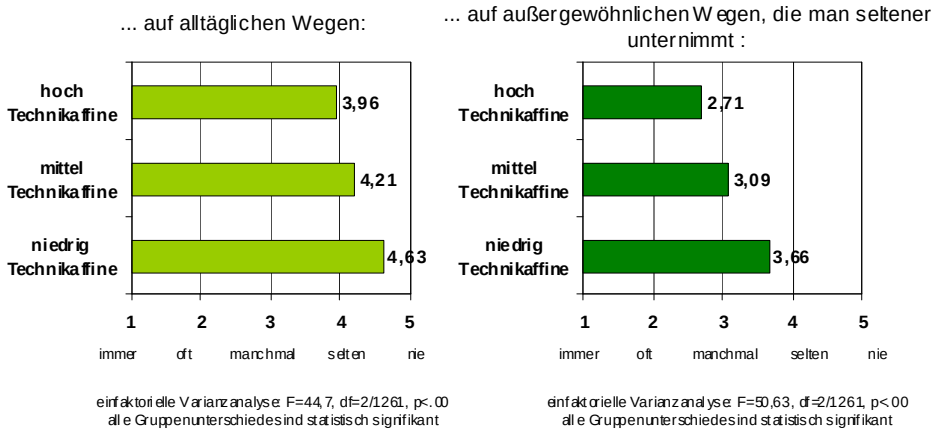


Abb. 6: Nutzungsbereitschaft nach Technikaffinität

Durchgehend führt eine höhere Technikaffinität zu einer höheren Nutzungsbereitschaft. Dieses Ergebnis repliziert auf der Ebene der Mittelwertsvergleiche den positiven Pfadkoeffizienten von ß=.41 im Strukturgleichungsmodell von Abb. 4.

6 DISKUSSION

Die technologische Entwicklung und Umsetzung von ATIS ist weit fortgeschritten. Mittlerweile steht den Verkehrsteilnehmer/-innen vielfach ein leistungsfähiges ATIS zur Verfügung, das teils dynamische und, verkehrsträgerübergreifende Verkehrsinformationen bereit stellt. ATIS werden derzeit weiterentwickelt, so dass die Qualität von Verkehrsinformation immer aktueller und räumlich präziser wird. Bislang nicht in ausreichendem Maße geklärt ist hingegen die Frage, wer welche Verkehrsinformation in welchem Reisekontext braucht.

Dass derzeit noch kein nennenswertes Marktpotenzial für ATIS auf alltäglichen Wegen existiert, ist ein wesentliches Ergebnis der vorliegenden Untersuchung. Offensichtlich sind die Verkehrsteil-nehmer/-innen im Alltag aus langjährigen Erfahrungen mit Verkehrssituationen zu bestimmten Zeiten, günstigen Routen und optimalen Verkehrsmitteln gut vertraut, so dass keine weitergehenden Verkehrsinformationen benötigt werden. Die ATIS Nutzung im Alltag könnten dann zunehmen, wenn

- neue, komplexe, inter-/multimodale Verkehrsangebote an Relevanz für Nutzer gewinnen, so dass die eigene Mobilität mehr Organisationsaufwand erfordert,
- zukünftig der Anteil technikaffiner Personen aufgrund des Kohorteneffektes und dem allgemeinen Techniklernprozess in der Bevölkerung steigt,

- die Verbreitung von Smartphones, als mobile Endgeräte mit Internetzugang, in der Bevölkerung zunimmt, so dass Verkehrsinformation leichter zugänglich wird und
- ATIS als Werkzeug im individualisiertem Mobilitäts-Marketing eingesetzt werden; während oder unmittelbar nach der persönlichen Mobilitätsberatung kann ATIS Einstiegserfahrungen zur Nutzung des Umweltverbund erleichtern.

Die Nutzung von ATIS allein gewährleistet aber noch nicht, dass es zu einer Änderung im Verkehrsmittelwahlverhalten weg vom Pkw hin zu Verkehrsmitteln des Umweltverbundes kommt. Neben Verkehrsinformationen sind dafür mutmaßlich weitere technologische, infrastrukturelle, finanzielle und soziale Anreize erforderlich.

Weites zeigt sich aus methodischer Sicht, dass beim Segmentierungsprozess in aussagekräftige Nutzertypologien von ATIS ein Verzicht auf soziodemografische Stellvertreterindikatoren Vorteile bietet. Stattdessen sollte die Technikaffinät als psychologisches Merkmal einfließen. Technikaffinität differenziert klar die Nutzungsbereitschaft von ATIS und ist ein relevantes Zielgruppenmerkmal. Als Resultat dieser Untersuchung liegt eine Skala von sieben Fragen vor, mit der Technikaffinität zuverlässig gemessen werden kann und die leicht in andere Marktforschungsstudien integriert werden kann. Als praktischer Ausblick zur Gestaltung von ATIS lässt sich folgern, dass deren Benutzeroberflächen personalisierbar sein sollten (etwa bei Suchmasken, bei Darstellung der Routenvorschläge). An einem Design, das sich an Nutzerfreundlichkeit für alle Bevölkerungsgruppen orientiert und entsprechend einfach gestaltet ist, würden Technikaffine mangels Herausforderung schnell das Interesse verlieren.

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Das Projekt INFO-EFFECT wird finanziert in der Programmlinie „ways2go“ vom Bundesministerium für Verkehr, Innovation und Technologie.

Pilotprojekt „Zu Fuß im St.-Andrä-Viertel“ Qualitäten für Fußgänger/-innen - Fußgängeraudit für einen ganzen Stadtteil; Salzburg (Austria)

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1 ABSTRACT

Passend zum Thema der Corp 2010, wird das Fußgänger/-innenprojekt erstmals einem internationalen Publikum präsentiert – der Hauptfokus dabei: Stadtplanung/Nahmobilität/Lebenswerte Fußgängernetze für gesunde, und prosperierende Stadtregionen.

WalkSpace Mobilität konnte im Jahr 2009 ein in Österreich erstmals durchgeführtes Pilotprojekt zum Fußgängerverkehr in der Stadt Salzburg durchführen – mit den wichtigsten „Bausteinen“:

- Qualitätsverbesserungen für Fußgänger/-innen für einen ganzen Stadtteil – Audits mit Senioren/-innen/Kindern & Jugendlichen,
- Fußgänger/-innenchecks, Beobachtungen, Befragungen über einen längeren Zeitraum/zu unterschiedlichen Uhrzeiten und Wetterlagen
- Qualitäts- und Komfortgegebenheiten (Stolpersteine und Wohlfühlorte - Aufenthaltsqualität, Qualität des Straßenraumes, Freiraumqualitäten, Gehsteige/Breiten, Fußgängerwunschlinien, Orientierung, Begreifbarkeit, Sichtverhältnisse, Geschwindigkeiten,...)
- Das Thema Verbesserung der Aufenthaltsqualität sowie Konfliktsituationen, Unfallhäufungspunkte (FG) und Schnittstelle zu Fuß/öffentlicher Verkehr spielten bei diesem Projekt eine besondere Rolle.

Projektziel war die Förderung des Fußgängerverkehrs im Projektgebiet „St.-Andrä-Viertel“ mit Hilfe eines umsetzungsorientierten Maßnahmenpakets, welches den „modal split“ für das Zu-Fuß-Gehen in den nächsten Jahren verbessern soll (gemäß REK-Zielsetzung).

Analysiert wurden Themen wie Aufenthaltsqualität, Querungen (Wartebereiche/Platzangebot, Sicht, Wartezeiten bei Ampeln, Akzeptanz der Grünzeiten, Gefahrenpotenziale/Konflikte) sowie Konfliktsituationen, Unfall-häufungspunkte (FG) und Schnittstellen zu Fuß/öffentlicher Verkehr.

Im Rahmen von Fußgängeraudits wurden in einem begleitenden Prozess Fußgängerhauptrouten erfasst und Verbesserungsvorschläge im Fußwegenetz (Stolpersteine, Orte de Wohlfühlens) aufgezeigt. Weitere Methoden waren Beobachtungen, Zählungen, Fragebogen, Dialog (Gesprächsleitfaden).

Die Ergebnisse des maßnahmenorientierten Projekts (kurz-, mittel-, langfristig) befinden sich derzeit in der Umsetzungsphase der Stadtplanung/Verkehrsplanung des Magistrats der Stadt Salzburg..

2 HINTERGRUND

Während in den vergangenen Jahren in der Stadt Salzburg der Radverkehr stark gefördert wurde, setzt die Stadt nunmehr auf den Fußverkehr.

Abb.1: Eindrücke aus dem St.-Andrä-Viertel

Gemeinsam mit Vertretern/-innen der Bereiche Stadt- und Verkehrsplanung, Handel, Tourismus, öffentlicher Verkehr, Polizei, Jugend, Senioren/-innen etc. sowie mit Bewohnern/-innen wurden daher die Stärken und Schwächen des Fußgängernetzes im Andräviertel ermittelt.

Ziel war Vorschläge für Qualitätsverbesserungen zu finden – im Mittelpunkt der Analysen standen daher Qualitäts- und Komfortgegebenheiten des Fußgängernetzes.

Aufgrund der im Gebiet befindlichen Einrichtungen, der Fußgängerziele und auch quellen (Bahnhof, Schulen, Markt, öffentliche Einrichtungen, Geschäfte etc.) und der touristischen Sehenswürdigkeiten (Mirabellgarten, Mozarteum, etc.) als auch der städtebaulichen Dichte bot das Gebiet gute Voraussetzungen ein Fußgängerpilotprojekt.

WalkSpace Mobilität konnte daher im Jahr 2009 ein in Österreich erstmals durchgeführtes Pilotprojekt zum Fußgängerverkehr in Kooperation mit der Stadt Salzburg (DI SebastianTschinder) durchführen:

3 AUSFÜHRUNG

Neben mehreren Multiplikatorengesprächen umfasste das Projekt auch verschiedene Workshops in den jeweiligen Projektphasen, ein Audit mit internationalen Experten/-innen, Beobachtungen, Begehungen, Scoping (Wetter, Tag/ Nacht/Wochenende, Verhalten), Zählungen, Messungen (Geschwindigkeit, FG) und Analysen von Fußgänger/-innen-Strömen. Um auch die Erfahrungen und Wünsche der Gruppe der Senioren/-innen und Schülern/-innen einzubeziehen, wurden mit diesen Zielgruppen fokussierte Audits abgehalten.

Gemeinsam mit Vertretern/-innen der Bereiche Stadtplanung, Handel, Tourismus, öffentlicher Verkehr, Polizei, Jugend und Senioren, etc. wurden die Stärken und Schwächen im Andräviertel aus der Sicht der Fußgänger/-innen ermittelt. Das Ziel war, Qualitäten für Fußgänger/-innen zu verbessern, wodurch gleichzeitig der öffentliche Raum aufgewertet wird:

Ziele:

- „Qualitäten vor der Haustüre“ finden
- als Grundlage für urbanes Leben
- Komfort/Wohlfühlfaktoren der Stadtbewohner/-innen im Stadtteil
- gut für den Handel/die Geschäftsleute
- Zu Fuß: sicher und mit Komfort!

Abb.2: Seniorenaudit

Analysiert wurden u.a. Querungen, Konfliktsituationen, Fußgänger-Unfallhäufungspunkte, Schnittstellen zwischen Fußgängerverkehr und öffentlichem Verkehr. Hauptaugenmerk lag jedoch bei den Qualitäts- und Komfortgegebenheiten des Fußgängernetzes wie:

- Stolpersteine und Wohlfühlorte,
- Aufenthaltsqualität,
- Qualität des Straßenraumes,
- Freiraumqualitäten,
- Gehsteige/-breiten,
- Fußgängerwunschlinien,

- Orientierung,
- Begreifbarkeit,
- Sichtverhältnisse,
- Geschwindigkeiten,…

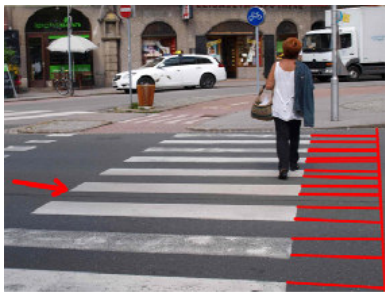

Abb.3: Wunschgehlinie

Der Prozess:

Neben mehreren Multiplikatorengesprächen umfasste das Projekt auch verschiedene Workshops in den jeweiligen Projektphasen, ein Audit mit internationalen Experten/-innen, Beobachtungen, Begehungen, Scoping (Wetter, Tag/ Nacht/Wochenende, Verhalten), Zählungen, Messungen (Geschwindigkeit, FG) und Analysen von Fußgängerströmen. Um auch die Erfahrungen und Wünsche der Gruppe der Senioren/-innen und Schüler/-innen einzubeziehen, wurden mit diesen Zielgruppen fokussierte Audits abgehalten.

Abb.4: Fokusgebiet Analyse und Maßnahmen: nach dem Schweizer Modell „Koexistenzbereich Mirabellplatz“

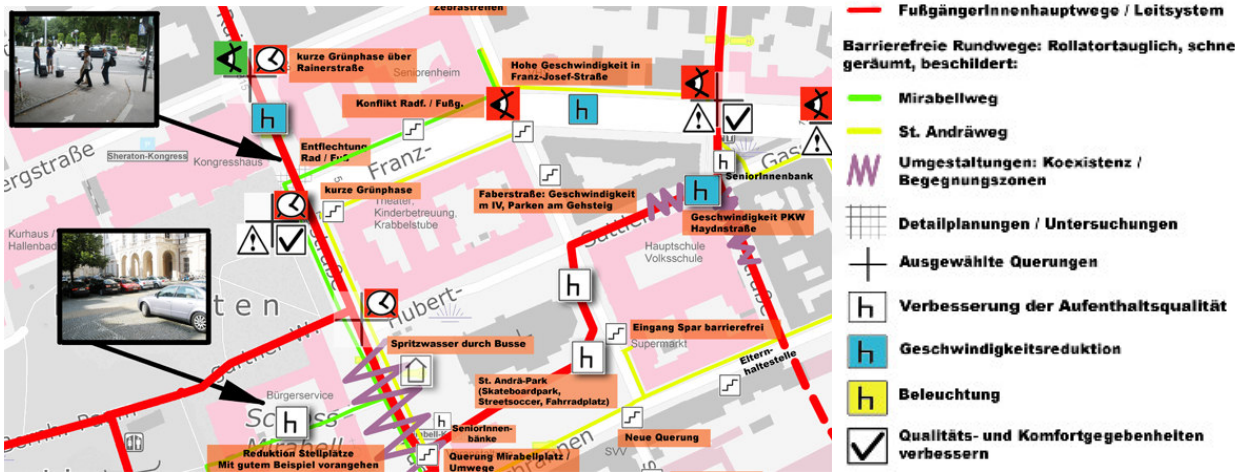

Abb.5: Ausschnitt Maßnahmenplan/Ausschnitt Legende

4 ERGEBNISSE

Die aus der Analyse, Audits, Zählungen und Beobachtungen resultierenden Projektmaßnahmen reichen von:

- massiven Verbesserungen im Fußgängernetz, neue „Begegnungszonen“

- Orientierungs- und Leitsysteme, „Rollator“-Rundweg: „Mirabell“ – „St.-Andrä-Rundweg“ für Senioren/-innen, Beschilderung und Seniorenbänke
- St.-Andrä-Park für die Kids
- Kampagnen und Öffentlichkeitsarbeit
- Netzverbesserung (Fußgänger/-innen/Radfahrer/-innen)
- Querungsverbesserungen
- Entflechtung lokal: Rainerstraße/Franz-Josef-Straße: (Detailkonzept) – „Boulevard Rainerstraße“
- Leitsystem: mit Tourismus auf Alltagsbedürfnisse abgestimmt – neuer Ausgang Bahnhof!
- Umgestaltungen Schulbereich: Begegnungszonen/FUZO Faberstraße!
- Mirabellplatz (bis Franz-Josef-Straße) als „Flagship“ Umgestaltung /
- Aufenthaltqualitätsverbesserungen als „Koexistenz/Begegnungszone“
- Beleuchtung verbessern/„Zebrastreifen“ ausreichende Breit

Abb.6: Boulevard Rainerstraße

Die Ergebnisse werden in einem kurz-, mittel- und langfristigen Umsetzungsphase realisiert:

Neben einer Vielzahl an kleinere Maßnahmen, wie

- rund um die St.-Andrä-Schule/Ampelschaltungen
- findet ein Umgestaltungsworkshop „Mirabellplatz nach dem Koexistenzprinzip/Shared Space“ statt.

Andere werden in Realisierungsfolgeprojekte intergriert wie

- „Boulevard Rainerstraße“,
- „Neuer Ausgang Bahnhof Salzburg“ oder
- das Projekt zur Rückeroberung des öffentlichen Raumes: „street4all“.

Das Leitsystem für Fußgänger/-innen – das derzeitige Projekt ist primär auf den Tourismus zielend – soll hinkünftig auf die Alltagsbedürfnisse abstimmt werden

Abb. 7: Alltagstaugliches Leitsystem

http://www.walkspace.at/Projekte/Andraeviertel.pdf

Plan4all – State of the Art in the Harmonisation of Spatial Planning Data

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1 ABSTRACT

The European project Plan4all focuses on the interoperability and harmonisation of spatial planning data according to the INSPIRE Directive, the European initiative for a common spatial data infrastructure. An important issue of the project is the state of the art in spatial planning data harmonisation in Europe including the collection, description and analysis of the different European planning systems, already existing spatial data infrastructures (SDI), best practise projects, technological aspects, the INSPIRE requirements as well as user requirements. The state of the art analysis identifies the project's challenges and provides important information for the further proposal, testing and implementation of common procedures and standards for spatial planning data harmonisation. The aim of Plan4all is to support holistic planning, the building of a European network of public and private actors from different levels and the establishment of an SDI. The whole spatial planning sector should profit from the availability of understandable and more transparent planning information throughout Europe.

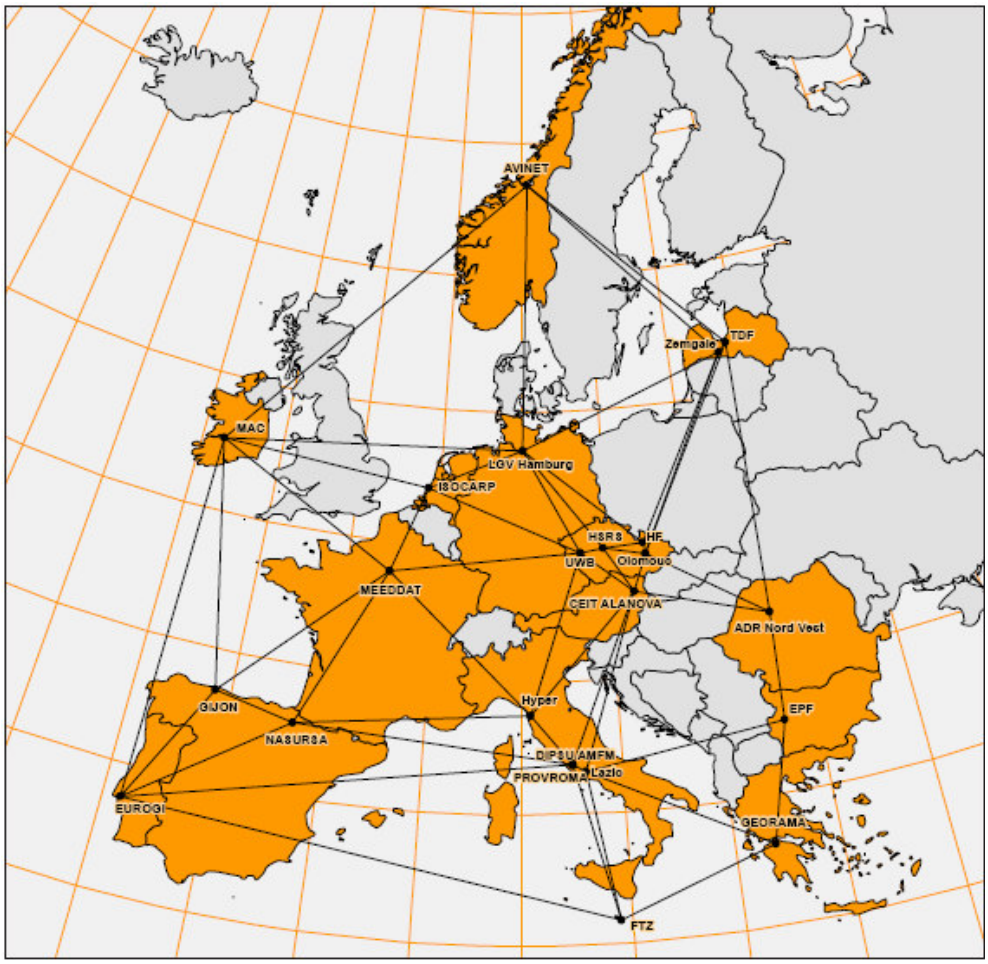
2 THE OVERALL IDEA OF PLAN4ALL

2.1 Trends and challenges in Spatial Planning in Europe

Today's planning practise is facing major challenges such as decentralisation – following regionalisation on the one hand and globalisation on the other hand, cross-border and transnational planning, vertical and horizontal integration, bottom-up approaches and involvement of multiple actors on different levels with different interests and intentions. Nevertheless, these ideas and concepts are difficult to apply because the legal situation in Europe is rather fragmented and planning laws are disjointed. Even experts from one country might have problems to understand the planning regulations of the neighbouring country. Especially for investors and decision makers it is almost impossible to compare planning regulations across Europe. Heterogeneity of datasets and sources, gaps in availability, lack of harmonisation between datasets in different scales, duplication of information as well as loss of time and resources in searching for needed data are characterising for the European situation in spatial planning.

2.2 Harmonisation of Spatial Planning Data and Spatial Data Infrastructure (SDI) building

Plan4all is a European project which is co-financed by the eContentplus programme of the European Commission and focuses on interoperability and harmonisation of spatial planning data in Europe to support holistic spatial planning activities. Data harmonisation means that all member states use a common set of coordinate reference systems, data models, classification schemes, portrayal rules, etc. Interoperability is understood as providing access to spatial datasets through network services, independent from whether the existing dataset is actually changed (harmonised) or just transformed by a service for publication (EUROGI and AMFM, 2009). The aim of Plan4all is to support the development of a European spatial data infrastructure (ESDI) and a European network of public and private actors from different levels, i. e. local, regional and national public bodies, stakeholders, ICT industry, organisations dealing with planning issues and regional development, universities and international organisations (see fig. 1). The main objectives are to define the rules for European spatial planning data interoperability, to find consensus about harmonisation of spatial planning data, and to establish an SDI. Plan4all is based on existing European best practises, the results of current research projects, the INSPIRE directive and the requirements of the users. Therefore these aspects are described and analysed into more detail in the state of the art analysis.



CZ	**UWB** University of West Bohemia in Pilsen	NL	**ISOCARP** International Society of City and Regional Planners
CZ	**Olomouc** - Statutární město Olomouc	LV	**TDF** Technology Development Forum
CZ	**HSRS** Help service remote sensing s.r.o.	DE	**LGV Hamburg** Landesbetrieb Geoinformation und Vermessung Hamburg
NL	**EUROGI** Stichting EUROGI	LV	**ZPR** Zemgale Planning Region
IT	**PROVROMA** - Provincia di Roma	MT	**FTZ** - Fondazzjoni Temi Zammit
GR	**GEORAMA**	ES	**NAVARA** - Navarra de Suelo Residencial S.A.
IT	**Hyper** Hyperborea S.r.l.	IE	**MAC** The National Microelectronics Applications Centre Ltd
AT	**CEIT ALANOVA** gemeinnützige GmbH	NO	**AVINET** Asplan Viak Internet as
ES	**GIJON** - AYUNTAMIENTO DE GIJON	BG	**EPF** - Euro Perspectives Foundation
CZ	**HF** - Help forest s.r.o.	RO	**ADR Nord Vest** - Agentia de Dezvoltare Regionala Nord-Vest
IT	**AMFM GIS ITALIA**	IT	**Lazio** - Regione Lazio - Direzione Regionale Territorio e Urbanistica
IT	**DIPSU** - Dipartimento di Studi Urbani - Università degli Studi di Roma Tre	FR	**MEEDDAT** - Ministry of Ecology, Energy, Sustainable Development and Town and Country Planning

Fig. 1: Partners in Plan4all SDI building (Source: Plan4all newsletter)

3 STATE OF THE ART

The state of the art analysis is a detailed description of the current status of the spatial data harmonisation process in Europe. The methodology chosen is to carry out standardised questionnaires which were answered by the project partners and describe each national situation in spatial planning, data harmonisation and SDI building. Furthermore, there are a collection and analysis of best practise projects, research projects and existing INSPIRE documents. In addition Plan4all profits from the experience of some partners who have already been involved in related activities. Knowledge transfer and exchange of experience are provided through interactive events, i. e. workshops and conferences as well as the Plan4all web portal.

3.1 Fragemented structure of Spatial Planning Systems

The state of the art analysis provides a comparable collection, description and analysis of best practise SDIs in relation to each spatial planning system. The results show the fragmented spatial planning systems in Europe but also that the aims of data harmonisation and SDI building become more and more present. The biggest challenge in SDI building is the complexity of the planning system itself because of fragmented

legislations of the planning systems which in some cases even vary within one country. Examples for decentralised planning systems are Germany and Austria that have different legislation on the level of each state (16 and 9). In this case the role of the national level in spatial planning is limited as there is no competence of spatial planning. In general the inconsistent terminology in spatial planning reflects the fragmented planning system. One term can mean something different depending on the state which might lead to misunderstandings and the need for introducing a glossary of spatial planning terms. Also the high number of actors which are involved in the planning process and which have different interests and intentions make holistic planning challenging. Spatial plans have different legal definitions, different binding aspects, they are established in different scales, on different administrative levels, their updates vary and they have different representations. Whereas plans are more schematic in France they are very precise in Germany. In addition not all regions/municipalities in Europa do have plans. Although there are still big gaps in spatial planning data harmonisation and SDI building, SDIs become more and more present in spatial planning procedures on the national, regional and local level. Altogether more than 40 best practises in the field of SDI could be identified and described in Europe. The majority are cross-border EU-initiatives. With 24 partners from 15 different countries Plan4all is one of the biggest networks and transnational projects in this field. For each state within the Plan4all project there is a structogram that demonstrates the relation of spatial planning instruments and SDI (the Austrian example see fig. 2). (cp. Rubitzki/Vancutsem, 2009)

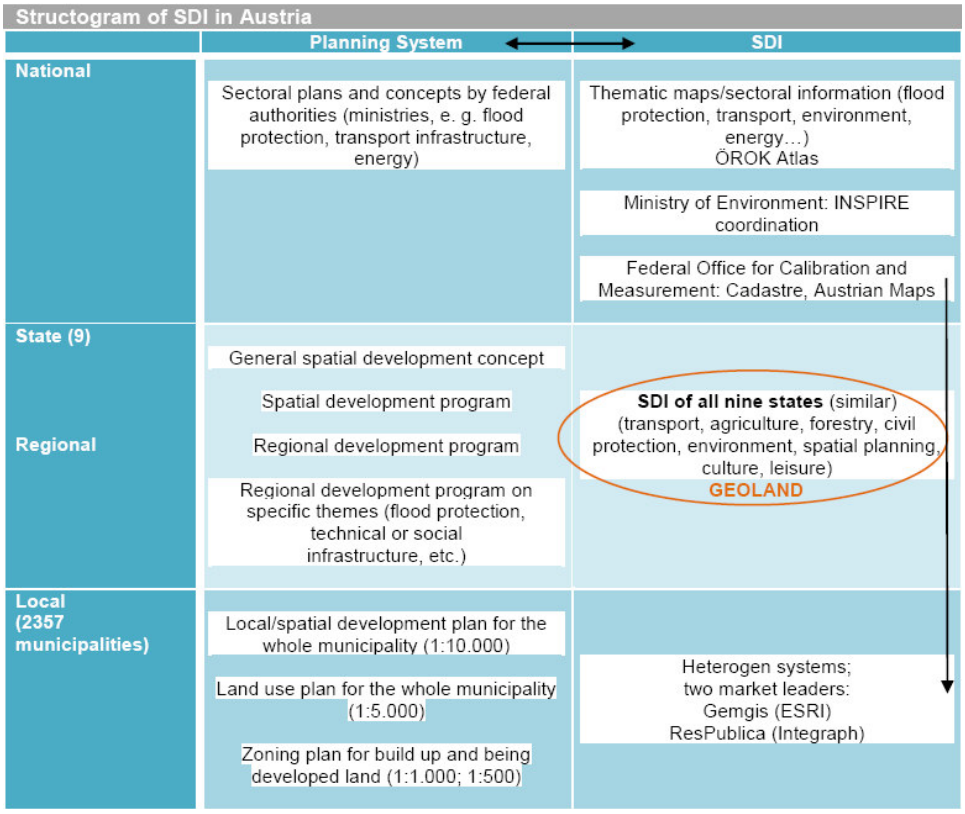


Fig. 2: Structogram of SDI in Austria in comparison with the planning system (Source: Rubitzki/Vancutsem, 2009)

3.2 Technological aspects and data quality

The detailed examination of more than 40 existing European best practise projects in SDI implementation identifies used technologies and innovative challenges in data harmonisation. Relevant software and services for SDI building are collected, described and classified in a standardised way. The first step is to establish a framework for classifying existing technologies with focus on technology convergence and the emergence of applications. Collected services and products were classified according to the used standard, technology (client-side, server-side, services, protocols and functionality), interactivity (simple web mapping, real web mapping, semi-interactive, fully interactive) and approach (graphic viewer, web cartography, web mapping, web GIS, routing, etc.). There is a wide range of available software, either commercial or open source products which make SDI building feasible but also challenging in terms of compatibility. Moreover, the focus is on data evaluation and quality criteria. Data quality consists of various aspects: accuracy (in both geometric and attributive terms), completeness, consistency, system currency (meaning the time frame from

when the real world changes to when the information system state is updated), timelines, volatility, accessibility, and interpretability. The framework should work as a reference for the further development in the project, so all user groups can rely on the quality of Plan4all data or rather measure data quality. However, data is only as good as its metadata[1] and the current situation is not always satisfying. Whereas some regions do have metadata which is collected according to international standards, others do not use any standards for their metadata collection and others do not collect any metadata at all. Therefore Plan4all underlines the importance of metadata collection. (Beyer/Wasserburger et al., 2009)

3.3 INSPIRE as the regulatory framework

Plan4all focuses on the definition of common procedures and methods for spatial planning data sharing according to the INSPIRE directive[2]. For that reason several INSPIRE documents were analysed, their requirements listed and an INSPIRE-oriented set of recommendations was provided. Altogether 23 documents – originated by INSPIRE, INSPIRE-related projects and projects related to spatial planning – were analysed with a format composed of descriptive items and a SWOT[3] table. INSPIRE sets standards regarding availability, quality, organisation, accessibility and sharing of spatial information. The INSPIRE directive applies for the development of spatial planning data models and metadata profiles. INSPIRE requirements claim for the definition of metadata elements on dataset level for all the data and services related to the seven selected data themes (INSPIRE annexes II and III[4]) in addition to the mandatory metadata elements set of the INSPIRE metadata regulation[5]. Also Plan4all issues data modelling and application schemas according to the INSPIRE documents "Generic Conceptual Model (GCM)" and "Methodology for the development of data specifications". All in all it should be possible for spatial data sets to be combined and for services to interact without repetitive manual intervention in a way that the result is coherent and the added value of the data sets and services is enhanced. The directive does not require the collection of new spatial data and it does not establish new infrastructures, moreover it is based on already existing data and infrastructures created by member states that should be made compatible by common implementing rules (IRs) to guarantee usability in the community and transboundary context. The analysis of the INSPIRE requirements has produced the following general recommendations for the project: Interoperability of spatial planning data can only be achieved with consistent efforts on all levels. Especially interoperability on terminology as well as on base and thematic data has to be achieved as planning is a holistic activity. It is recommended to explicitly express topological relationships, e. g. administrative units at the same level of hierarchy must not overlap, gaps between administrative units are in principle not allowed and boundaries of neighbouring administrative units must have the same set of coordinates. (cp. EUROGI/AMFM, 2009)

3.4 Multiple user requirements

The analysis of user requirements focuses on basic procedures and processes in spatial planning, spatial planning data, standards and regulatory framework, technical possibilities and alternative infrastructures, requirements on data and metadata models, used intellectual property rights (IPR) models and user involvement in decision processes. The requirements were defined by the following user groups: spatial planning authorities, other civil service authorities, owners of transport and technical infrastructure, planning engineers and city planners, firms, NGOs, investors and real estate owners, real estate agents, public, researchers and students. Because of the big differences between individual countries in spatial planning systems, also the user requirements vary by country as well as by actor. To sum up, some common requirements for all partners could be defined. Required for data harmonisation are the vertical and

[1] Metadata is "data about data (...)", for example the title, subject, author, date, etc. of the data. (http://www.yourdictionary.com/computer/metadata, retrieved on March 2010)

[2] The acronym INSPIRE refers to the Directive 2007/2/EC of the European parliament and the Council of 14 March 2007 with the aim to establish an Infrastructure for Spatial Information in the European Community. The directive entered into force on 15 May 2007 and will be fully implemented in 2019.

[3] SWOT – Strenghts, Weaknesses, Opportunities, Threats

[4] The seven selected INSPIRE themes are: land cover, land use, utility and government services, production and industrial facilities, agriculture and aquaculture facilities, area management/restriction/regulation zones and reporting units as well as natural risk zones.

[5] The INSPIRE Metadata Regulation is mandatory for all spatial data themes of the INSPIRE Directive Annexes. The INSPIRE document Technical Guidelines based on EN ISO 19115 and EN ISO 19119 (revised edition) provides technical guidelines for the implementation of the INSPIRE Metadata Regulation on the base of ISO 19115 and ISO 19119.

horizontal interoperability of tools and methods, the implementation of web services as well as the possibility to publish own data and to use web map services from other data providers, the definition of a spatial data legend for data presentation, INSPIRE compliance, the possibility of metadata profile extension, free access to spatial planning data, the possibility to make physical data accessible in electronic format together with ensuring of digital right management and the use of UML for data model description. In addition the following issues should be covered: implementation of an explanatory dictionary for spatial planning (glossary), a multilingual thesaurus for spatial planning, a referential geographical system and projection, a description of the data transformation process and tools for data transformation. (HF et al., 2009)

4 OUTLOOK

The state of the art analysis provides an important base for further development in data harmonisation and SDI building. The development of a metadata standard, the development of data models for the seven selected themes and the implementation of networking standards according to the INSPIRE Directive and the user's needs are currently in progress. In a next step the implementation of these standards will be tested on a large-scale testbed with the aim to demonstrate the technical feasibility of the designed models. The publishing of data will respect IPRs which will be agreed between data holder and project team. Output will be a Plan4all geoportal consisting of harmonised spatial planning data from the Plan4all partners with the aim to further extend the network with affiliated partners. On long term the data harmonisation process is open for future extensions to other themes such as transport, energy, etc. Plan4all is a testbed for INSPIRE and supports the distribution of the INSPIRE idea which is the development of a European spatial data infrastructure as well as the support of holistic planning.

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Public Private Partnership as an urban regeneration tool for the inner city, large-scale public space projects in Poland

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1 ABSTRACT

Regeneration of inner city areas in conjunction with the development of public open spaces is a complex enterprise in Poland in terms of the managerial, financial and legal aspects of this process. Public spaces are not of prime importance for private sector actors. Due to limited funding available, Polish municipal governments are often unable to finance large public space projects on their own. One of the available tools, enabling them to implement regeneration projects is the Public Private Partnership Act of 28th June 2005. In the context of public space design PPP can be considered a hybrid between the public tasks and private capital that operates in the domain traditionally associated with public sector. Therefore in the Polish context PPP can be considered an excellent development mechanism for difficult inner city regeneration projects.

The paper focuses on two recent case studies presenting the use of PPP in inner city regeneration projects in Poland. Projects in Sopot and Bielsko-Biala will illustrate the benefits and drawbacks associated with use of this tool. The paper will also focus on differences between the Polish PPP's more normative character as opposed to the more functional approaches defined by other definitions (European Commission, EBI, Standard & Poor, etc).

2 THE REGENERATION OF PUBLIC SPACE BY USING THE PPP MODEL

2.1 Regeneration of the inner city, large-scale public space in Poland

Problems connected with regeneration of public spaces in Poland based on Public Private Partnership are an important research problem. Polish cities lacking funds for public investment, and contemporary urban planning in Poland is full of spatial, economical and social problems when preparing the projects of regeneration of the inner city, large-scale public space.

2.2 The PPP model in Polish perspective

Within the context of public space design, Public Private Partnership can be considered a hybrid between the public tasks and private capital that operates in the domain traditionally associated with public sector. Therefore within the Polish context, PPP can be considered an excellent developmental mechanism for difficult inner city regeneration projects.

2.2.1 Public Private Partnership Act of 28th June 2005 in relation to other definitions

One of the available tools, enabling the implementation of regeneration projects in Poland is the Public Private Partnership Act of 28th June 2005. This Polish PPP Act is based on an agreement of cooperation between the public and private sectors that leads to achievement of a public task. The matter of agreement is the fully paid realization of a specific investment by a private actor for the benefit of a public partner. The private actor is obliged to bear the costs as a whole or in part. Public Private Partnership, in the understanding of the Act, essentially leads to more predominant benefits for the public sector than other possibilities for realization of the investment. The particular benefits for the public sector are savings in the public actor's expenses, as well as raising the standard of services and lowering the negative impact of the surroundings that need investment.

The meaning of public private partnership can be defined in diffrerent ways. According to EBI (European Investment Bank), PPP means using capital and experience of the private sector in order to afford public tasks. The European Commission's definition emphasizes the variety of formal cooperation between two partners (public and private) that results in an enlargment of public sector services. However, according to Standard & Poor, PPP is first of all a long-term agreement between two partners that share the risk and benefits adequate for abilities, financial potencial and experience. All the above mentioned definitions have got a functional character while the Polish definition has got a normative character, stating the required conditions for use of the PPP model.

The Polish definition is a written legal record and can be seen as evidence of the different cultures of law and economy in Poland and a lower level of trust for market development and privatization of public tasks. It also speaks to the lack of readiness of the Polish society and politicians to accept the privatization of processes in the realization of public tasks. Unfortunately, without the Polish Act, using the PPP model in Poland would be very difficult.

2.2.2 Benefits and risks of the PPP model

Differences between the traditional model and the public private partnership model in the realization of investment are highlighted in the table below:

TRADITIONAL MODEL	PUBLIC PRIVATE PARTNERSHIP MODEL
Concentration on the single step	Concentration on the whole cycle of the project
Public actor is assuring the financial needs	Private actor is assuring the financial needs partly or as a whole
Constant financial encumbrance	Financial encumbrance for the public actor grows in different forms. The mechanism depends on the level of efficiency and quality of investment
All risks are on the public sector side	Investment risk is shared between public and private actors

Tab. 1: Comparison of the traditional model and the PPP model in the realisation of investment. Source: PPP as a realization's method of the public tasks, Ministerstwo Gospodarki i Pracy, Warsaw 2005

When applying the Public Private Partnership model there are risks as well as specific benefits. The main risk of the PPP model is related to the higher cost of capital gained on the market and difficulties in the preparation and financing of the projects. Deprivation of opportunity in direct project management and the lengthiness and thus political sensitivity of the deals should also be considered as potential areas of risk.

Benefits connected with the PPP model are the possibilities of accomplishment the projects from public sector in spite of the lack of public sector's funds. Further benefits include the division of risk between public and private partner based on each partner's abilities and possibilities of management and concentration of the whole cycle of the project. The other important reason for applying PPP is the correct assignment of appropriate tasks to appropriate partners with respect to their qualifications. The public partner is responsible for effectiveness in providing services and the private partner is responsible for the effective investment of capital.

2.3 PPP as an urban regeneration tool for the inner city, large-scale public space projects

The modern understanding of revitalization of degraded public space assumes its multi-dimensional understanding, in terms of its spatial, economic and social dimensions.

The projects in Sopot and Bielsko-Biala are two recent case studies where we can observe the use of PPP in Polish inner city regeneration projects. These case studies illustrate the benefits and the drawbacks associated with use of this tool.

3 CASE STUDIES CONCERNING THE REGENERATION OF PUBLIC SPACE IN POLAND BASED ON THE PPP MODEL

3.1 Regeneration of the City Centre in Bielsko-Biała

Local authorities initiated the regeneration of the city centre in Bielsko-Biała. This project named „ The regeneration programme for Bielsko-Biała City Centre" started in 2004, and its establishments were partly included in the„Regeneration Programme of Bielsko-Biała from the year 2005.

The city centre in Bielsko-Biała is located on the hill in the city centre and its area is about 10 hectares. It consists of two integrated areas. The first one is a „medieval city" covering an area of approx. 6 hectares and whose arrangement dates to the XIII century. Its central part is a market built with frontages facing the four directions of west, east, south and north. The second area also known as „ring" includes housing and retail quarters, the original city walls, two sacral buildings and Sułkowski's castle. Due to its historical meaning, the city centre's building structure has been physically preserved, but the majority of buildings required a technical, functional and aesthetic improvement. 118 objects have been listed as a cataloguing result, where 71 buildings were under protection. The degradation processes of buildings has resulted from the many

years‘ lapse in repair that eventually led to the tenement-house building (Rynek 4-5 Street) collapse in 1998. The technical state of infrastructure was very poor due to a high level of corrosion, and the great damage to the infrastructure system led to environmental pollution. This situation ultimately affected social processes. There was a great migration of the young and educated inhabitants from the degraded areas and the city centre. Moreover, the neglected City Centre of Bielsko-Biała provided no office spaces for professionals, lawyers, doctors, or architects. Small and medium-size enterprises were not attracted to invest. Therefore, the revitalization of this part of the city was necessary.

Within the regeneration project territorial developments of the water pipe network, heat distribution network, power network, gas grid, sewer systems and teletechnical network were modernized. The condition of Celna, Piwowarska, Kościelna, Cieszyńska and Rynek streets was improved. Another element of the project was the complex repair of the market‘s surface. The archeological exposition called „ Waga Miejska“ related to the history of the Bielsko-Biala City Centre was opened to the public as well as the Neptun fountain at its historical well. A clock and watercourse were built and the Saint Jan Nepomucen figure was reconstructed. The multi-dimensional regeneration of the City Centre has resulted in the increase of its attractiveness as a place for investments and economic and entrepreneurial activity.

A complicated financing model was characteristic for the regeneration project of Bielsko-Biała city centre. At the moment of submission of the application related to co-financing of the project from ERDF (European Regional Development Fund) in 2004, there were no legal principles in Poland for PPP models and no act regulating the rules of co-operation between private and public sectors. The new Public Private Partnership Act was passed on 28th of June 2005. Therefore during the planning process and before officially submitting the ZPORR proposal, the city had made several business agreements with commercial companies, which participated in the cost of realization of the project. Companies that were responsible for modernization of the infrastructure networks became official network managers. The city also has made several arrangements between these institutions in order to solve problems that may arise during the regeneration project.

PARTICIPATING PROJECT PARTNERS	PARTNER CONTRIBUTION	PARTNER BENEFITS
1. AQUA S.A.	Partner is financing 30% of costs connected with the water –pipe network and sewage.	Partner is forced to bear 100% investment expenditures. After the finishing the project, a partner become a network manager.
2. Therma Sp. z o.o.	Partner is financing 30% of the expenditures connected with the heat distribution network.	Partner is not forced to bear 100% investment expenditures. After the finishing the project, a partner become a network manager.
3. Energetyka Beskidzka S.A.	Partner exchanges the power network in the project’s area and bears all the expenditures.	The saving on expenditures is related to the complex character of investment.
4. Górnośląska Spółka Gazownictwa Sp. z o.o.	Partner is making gas grid in the area and bears all the expenditures.	The saving on expenditures is related to the complex character of investment.
4. Telekomunikacja Polska S.A.	Partner is making the teletechnical network and bears all the expenditures.	The saving on expenditures is related to complex character of investment.

Tab.2 : The Bielsko-Biała Project: partner participation in the project, partner contribution and their benefits. Source: www.zmp.poznan.pl

The multiple aspects of regeneration in Bielsko-Biała City Centre combined have increased the attractivness of investment for private investors. City life has returned to the old City Centre in Bielsko-Biała and inhabitants and tourists are spending time more willingly there. Many of the private tenement-house owners have started renovation of their buildings. The city itself is helping private owners in their activities and is showing the possibilities of financing such activities.

3.2 Realisation of Haffner Centre in Sopot based on the PPP model

Sopot, one of the most beautiful, Polish, maritime tourist cities, together with Gdańsk and Gdynia form a tri-city agglomeration of millions of inhabitants. Sopot was first established as a health resort in 1997 and then received its county status in 1999.

One of the main goals of the city is to lengthen the seasonal periods of activity. During the year, Sopot attracts most visitors in summertime. The construction of a new Hotel & Conference Centre should help to change that. As the largest of Sopot's investments, the center is being built with huge impetus and consists of a hotel, "bathhouse", housing estate, business park and underground tunnel for cars. All the mentioned buildings are architecturally cohesive, modern and functional. The heart of new Sopot's centre is the Bathhouse.

The investment in first steps was about 70 milion dollars (approx.280mln PLN) and the city budget for the year 2006 was- 200 mln PLN. It was obvious that without a private partner, the city of Sopot will not be able to finance the investment. PPP in Sopot gave an extra opportunity for periodical investment without nessecity for single expenditure.

After two years of passed act, the Tender Commission gave the priority to NDI S.A. as a developer of the project. This company offered the most attractive way of realisation the regeneration of the city centre project. NDI S.A. was also responsible for choosing the cooperative companies. It was one of the main differences between PPP model and the classical one, where private developer, not local authority was responsible for choosing the cooperative company.

The city of Sopot has agreed to give the land for investment. The land was 19 760m2 in size and worth 28 937 500 zł (1464,45 zł/m2). The city also declared to give the sum of 17 500 zł as an extra contribution to the project.

The City of Sopot initiated the investment in order to promote and develop the region.

According to the initial calculations of the city office, The Haffner Centre would provide employment for 400 people. Important elements of Sopot's investment are the built tunnel and general improvement of the technical infrastructure in the city centre. Although it is too early to measure the effects of the investment, the building of the Haffner Centre could improve the image of the city of Sopot in the region and could attract not only rich tourists but also conference guests during the whole year.

4 CONCLUSION

Analysis of the above mentioned matters reveals that the issue of revitalisation, as a research problem, is at the initial rather than final stage of its examination. Research should be continued and intensified with special account being taken of the conditions and opportunities offered by the Public Private Partnership model for regeneration of inner city, public spaces. This is particularly important as regards Polish cities, which make up, as it were, a laboratory in which the tools of operational urban planning are being tested.

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Public Space Design as a Stimulator for Movement of Pedestrians. Case Study: Municipality of Vracar, City of Belgrade

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1 ABSTRACT

Contemporary trends in urban design and shaping of public spaces are set in domains defined by the principles of sustainable development. One of the propensities relates to ever-increasing presence and implementation of spatial and programmatic concepts and projects in areas that foresee usage and affirmation of environmentally acceptable modalities of traffic such as pedestrian movement, cycling, usage of electrically powered vehicles, etc. With respect to that, pedestrian movement, as a basic and natural form of human movement has become a subject of research of multidisciplinary teams of experts and organisations on the global level, especially in the last two decades[1].

This paper will demonstrate correlative actions of the quality of pedestrian environment and infrastructure directed towards pedestrians' motivation for movement along street ways that connect city centres. The research was conducted on the polygon of the Municipality of Vracar, City of Belgrade, encompassing local centres and links between them. Data has been collected by using methods of direct field research and the method of surveying the local inhabitants. By systematising and comparing the collected data this paper determines relations of the subject of research. Special care was dedicated to pedestrian environment along the observed ways, which includes arrangement and activities in the ground floors of the buildings, which define the street ways, equipment in street ways and conflicts with other participants in the traffic. The research has demonstrated that the frequency of pedestrian movement is not only proportional to equipment and surrounding of street ways, but to diversity and continuity of contents in the ground floors of the buildings, while being oppositely proportional to the number and frequency of motor vehicles.

Main result of this paper and the aim of this research is defining suggestions for improving and equipping pedestrian ways and environments, which are to motivate people to opt for pedestrian movement in areas which are characterised as surmountable by pedestrians according to their dimensions and criteria. By creating such areas, the cities could be defined as a system of zones with predominantly pedestrian movements.

Key words: pedestrian movement, quality of pedestrian ways and surroundings, improvement of pedestrian side walks, polycentricity, Vracar, Belgrade.

2 THEORTICAL FRAMEWORK OF THE RESEARCH

With an aim of enhancing spatial connections and forming the new city centre, so as to avoid monocentricity and uneven development, this paper establishes an analytical tool in order to explore a variety of physical and functional characteristics of urban space. The analytical procedure was applied in the study of specific polygons in the territory of Municipality of Vracar, City of Belgrade. The results of the research provided for mapping of potentials and problems of the subject polygon that prevent or encourage the development of the observed local centres, paths that represent their connections, and diversity in usage of public space. The focus of this paper is to identify paths/directions that directly link important local centres, determine their specificities and actual intensity of pedestrian movement, mark problems which lead towards discontinuity in usage of entire route by pedestrians and define recommendations for avoiding the spotted problems. The research is based on the premise that the usage of local centres will be enhanced through intensification of pedestrian movement along paths that connect them.

The research is centred on theoretical framework within the domain of urban design with the spotlight on pedestrian movement and quality of pedestrian environment. Especially important in the given context are the works of three authors Kevin Lynch, Bill Hillier and Jan Gehl, because they take into consideration perception and orientation of users while moving through public space and reasons why people use specific public space and spend time within it. In his work The Image of the City, Kevin Lynch defines legibility of the city and urban environment by determining five basic structural elements (paths, edges, districts, nodes

[1] Actual COST project Action 358 Pedestrian Quality Needs, WALCLYNG, PROMPT and organisations such as WALK21

and landmarks). Hillier puts forward a general theory of how people relate to space in built environments in populated areas and considers various aspects of space and ways this space functions in his The Social Logic of Space and Space is the Machine. Gehl, in his Life between Buildings, Public Spaces-Public Life and New Urban Spaces, presents the results of intensive research on the topic of social usage of public space and experiences and thoughts of people related to a specific open public space. Besides the stated, Gehl portrays the method of evaluation of quality of cities, discusses the ways in which human sensory abilities direct the usage of public space and sets design recommendations techniques which can encourage active use of outdoor space. Also important for the aims of this paper is the article „Close Encounters between Buildings", in which Gehl, taking into consideration characteristics of human perceptual apparatus, defines framework for direct experience of space and elements of the built environment, which are perceived during pedestrian movement, while moving 5 kilometres per hour. In this context, Gehl recognises the perceptual frame – urban scene – in which he notices the following key elements: scale and rhythm, transparency, appeal to multiple senses, texture, diversity of activities and vertical rhythm of façades.

2.1 Phases of Research

Theoretical framework mentioned above enabled for determination of specific analytical methods, which allowed for identification of concrete spaces within the observed territory which are a part of this research, and for which this paper, at the later phase of research will define recommendations with an aim to intensify pedestrian movement along the observed paths. Each of the formatted analytical methods is used at a certain phase of research so as to obtain as many relevant data for argumentation for further steps and recommendations.

The first part of the research was realised at the Faculty of Architecture, University of Belgrade, within the Master course UrbanLab, led by Assistant Professor Aleksandra Djukic and the undergraduate course Design of Public Space led by Professor Dragana Bazik. The second part of research was realised in cooperation with non-governmental organization "5km/h" from Belgrade.

There were two steps within the first phase of the research. The first one referred to research of the wider location, which encompassed the space defined by territorial framework of the Municipality of Vracar. The aim of this part of research was to identify spaces which are of importance for the investigated area and which hold capacity to become a local city centre, and connections among them used most often by the local inhabitants. This was achieved by using the method of direct surveying the users of space in the Municipality of Vracar. Besides the mentioned, the respondents were asked to define some of the basic characteristics of the investigated paths. The formulation of questionnaires was based on Lynch's theoretical framework. The results that relate to paths as an element of urban image were of particular relevance. The second phase of was conducted in order to determine the users' direct experience of identified paths, based on the criteria of quality of open public spaces (Bazik 2006). The analysis was carried out on the entire territory of the Municipality of Vracar. Within this phase, the research analysed only direct paths that connect the local centres.

The second part of the research was aimed to reveal the correlations between intensity of pedestrian movement along identified paths and characteristics of the pedestrian environment. The used analytical procedure was based on the method of space syntax and analysis of characteristics of pedestrian environment, according to Gehl's criteria. Systematisation of results enabled for mapping of problems that lead towards discontinuity in pedestrian movement along identified paths and formulating recommendations for avoiding them.

3 CHARACTERISTICS OF KEY PATHS IN THE MUNICIPALITY OF VRACAR

The questionnaire formed based on Lynch's theoretical framework was used in order to identify key paths in the investigated territory. The purpose of this part of research was to recognise the structural elements that formulate the image of the Municipality of Vracar and are in accordance with paths, edges, districts, nodes and landmarks.

3.1 Path Identification

Key spots, public spaces of local importance and paths that connect them were identified through direct surveying of local inhabitants, users of the open public spaces. The results demonstrated the necessity for

forming the network of pedestrian movement and thus connecting the separate public spaces of local importance (Cvetni Square, Kalenic Market and plateau in front of the Belgrade Drama Theatre) with an intention to intensify their usage.

By summarising the results of surveying the research has defined the following paths: the streets of Njegoseva, Milesevska, Maksima Gorkog and Cara Nikolaja II. The Njegoseva Street directly connects Cvetni Square and Kalenic Market. Paths along the streets of Milesevska, Maksima Gorkog and Cara Nikolaja II connect the Kalenic Market and plateau in front of the Belgrade Drama Theatre. Conducted poll enabled for definition of concrete polygons, paths that were a subject of further research of the quality of pedestrian environment. The results are displayed in the diagram (Figure 1).

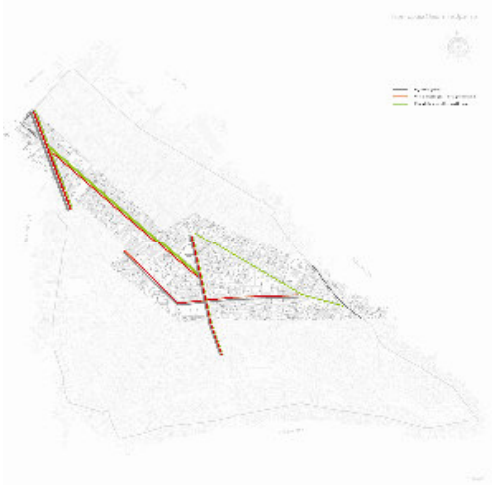

Figure 1: Paths that connect local centres

Besides extracting paths that were a subject of further research, the respondents had the opportunity to determine their features related to modes of use of the identified streets. Based on these results, Njegoseva Street was characterised as one in which the respondents would prefer to spend time and one which is used most frequently. Maksima Gorkog and Cara Nikolaja II streets were characterised as busiest, in terms of non-pedestrian traffic, but also frequented by pedestrians. Milesevska Street was characterised as one in which the respondents would prefer to spend time.

3.2 Quality Evaluation of Identified Paths

Further research was founded on analysis of quality of open public spaces, based on the determined criteria: safety, accessibility, legibility, comfort, attractiveness and liveliness (Bazik 2006). The hierarchy was established among the set criteria; this meant that if basic criteria are not fulfilled, above all safety and accessibility, it would not be possible to accomplish other characteristics which contribute to liveability of certain space. Each of the set criteria was taken into account separately and it points towards direct experience of users related to the observed characteristic of the open public space. The respondents were asked to indicate spaces that can be characterised as positive or negative, with respect to the observed criterion and give short explanation.

Result summarization of surveying according to the set criteria determined the general attitude that the local inhabitants were more critical of basic criteria, which focused on safety, accessibility and legibility. Hence identified paths were mentioned as both positively and negatively characterised. With respect to other criteria, the results were more balanced; either positive or negative (Figure 2).

Based on the set criteria, from the aspect of safety Milesevska St. was characterised most positively, while Maksima Gorkog St. most negatively; from the aspect of accessibility Njegoseva St. was characterised most positively, while Cara Nikolaja II St. was characterised most negatively; from the aspect of legibility Njegoseva St. was characterised most positively (no negative comments), while Cara Nikolaja II St. was characterised most negatively; from the aspect of attractiveness Njegoseva St. was characterised most positively (no negative comments), while Maksima Gorkog St. was characterised most negatively (no positive comments); from the aspect of liveliness Njegoseva St. was characterised most positively (no negative comments), while Cara Nikolaja II St. was characterised most negatively (no positive comments). It

is assumed that the basis for such results is the recent reconstruction of Njegoseva St, which provided for wider sidewalks, less frequency of vehicle transport, activation of contents in buildings' ground floors. On the other side, Maksima Gorkog and Cara Nikolaja II Sts. are extremely frequented by vehicle transport, with narrow sidewalks, intense pollution, discontinued sections of street frontages, both vertically and horizontally.

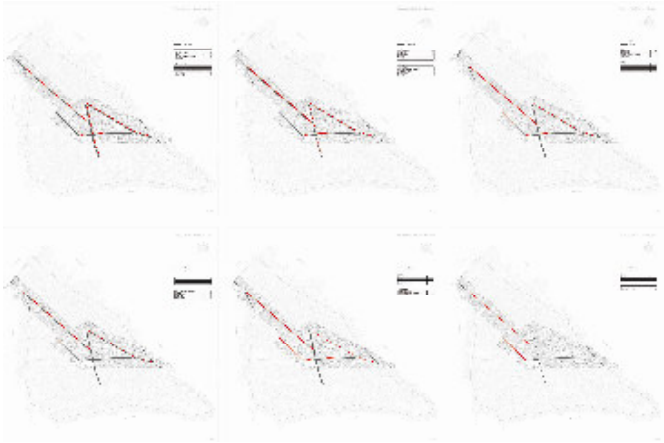

Figure 2: Results of quality evaluation analysis

3.3 Intensity of Pedestrian Movement and Characteristics of Direct Pedestrian Environment

The following part of research had an aim to determine actual usage of identified paths through analysis of frequency of pedestrian movement on daily basis. This analysis was conducted by using the method of Space Syntax. The results of this research revealed certain unevenness in frequency of pedestrian movement, both with respect to different time at which the measurements were conducted, and with respect to concrete part of the identified path (Figure 3).

Figure 3: Results of the path analysis using the method of Space Syntax

The measurements were conducted on workdays, four times a day. In the morning period from 8 to 9 hours, when local inhabitants perform activities such as going to work or school or grocery supply; from 11 to 12 hours, which coincide with end of school hours for elementary school students, breaks for high school students and lunch break for the employed (this period also coincides with the start of working hours for cafes and restaurants); in the afternoon, from 16 to 17 hours, when local inhabitants come back from work; and from 19 to 20 hours, in the so-called evening hours.

The results demonstrate that from 16 to 17 hours the pedestrian movement is most frequent, if we observe the entire polygon where the measurements were conducted. On the other side, from 19 to 20 hours there was least pedestrian presence. What was also concluded is that there are differences along paths in intensity of pedestrian movement or the phenomenon of discontinuity.

The continuation of research led towards determination of correlation between pedestrian movement and characteristics of pedestrian environment (Figure 4). Therefore, further investigation encompassed the analysis of activities in buildings' ground floors in the observed path, with the focus on diversity of activities, their density on certain parts of the path, and characteristics of shop fronts and entrances, i.e. transparency. These characteristics were taken into account because the current urban regulative allows for potential interventions in buildings' ground floors. This relates to transformation of housing space along street frontages for other purposes.

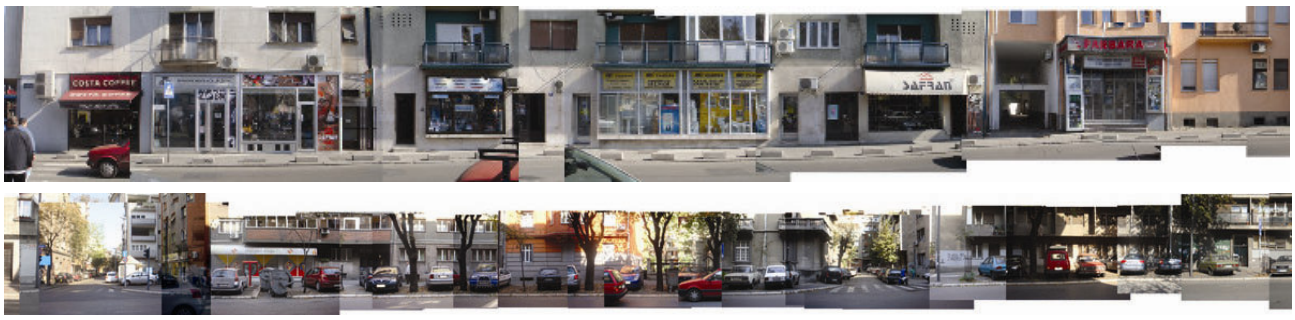

Figure 4: Segment of street frontages in Maksima Gorkog and Milesevska steets

Content analysis provided for certain correlation between frequency of pedestrian movement in the observed period, content attractiveness and its disposition along the paths. The analysis demonstrated that the frequency of pedestrian movement is proportionate to number activities, i.e. their density and diversity in specific segments of the investigated streets. Besides, a greater frequency is observed during afternoon, from 16 to 17 hours. This period is considered as most frequent, when the employed come back from work, while other inhabitants spend their time in the open. Important differences with respect to certain segments of the paths are observed in the early morning and evening hours. This is especially so in the areas which are characterised by density of cafes and restaurants on one side, and zones with contents which are closed in the evening hours on the other. From 11 to 12 hours there is more frequency of pedestrian movement in areas close to schools.

The continuation of this activity concerned the analysis of shop windows and entrances, i.e. transparency and direct linkage between content in buildings' ground floors and open public space. Same as above, the intensity of pedestrian movement is more frequent along frontages in which shop windows are less distant and occupy larger surface. This is particularly visible during evening hours, when the transparency of protective curtains was observed.

4 GENERAL RECOMMENDATIONS

The conclusion of up-to-date research comes down to a set of recommendations related to improvement of pedestrian environment. Concrete interventions, which can come out of these recommendations, could influence the intensification of pedestrian movement along identified paths. Recommendations are related to the following type of interventions: determination of new street regulation along paths that have been characterised as unsafe and inaccessible by citizens; establishment of continuity with respect to vertical and horizontal regulation along the identified paths; anticipation of measures for stimulation of attractive activities and their even arrangement along the paths, which would allow for proportional usage of space at all period of the day; enlargement of the window shop surfaces in order to achieve greater contact between the activities in objects and open public spaces, and provide for new and more transparent types of protective curtains so as to stimulate pedestrian movement during evening hours. Besides these general recommendations, this project will carry on in the direction of determining exact indicators that will additionally embed attitudes provided through direct observation and compare results of various analyses.

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"Revision of urban spaces to make it accessible for disabled people in order to achieve the aim of "city for all "

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1 ABSTRACT

In these recent decades the sociologists find out that one society can't achieve its goals unless the governments encourage people to participate in the process of decision making. This participation can ensure the society's growth and development. But there is a question here, if this participation limited to a special group, e.g. educated people or the ones who belong to the specific race and social level? It should be considered that one of the great items in the improvement of societies is that every person, in every age, sex, race and range of ability, must have equal rights. If we know city as a little society this theory can include it either. In this process the meaning of "equality" is that a society, we can call it a city, belongs to everyone .So a good city for every one is a city which all the facilities and opportunities for the better life are accessible to everyone.

According to the United Nation convention on the Rights of Persons with disabilities, around 10 per cent of the world's population, or 650 million people, live with a disability and they are the world's largest minority.

Michael Bednar in 1977 noted that the functional capability of all people is usually enhanced when environmental barriers are removed and reply to all users environmental needs. People with disability should not be placed in one specific group .It will cause solitude and segregation. They should work, act, walk and do their daily work among normal people. The city doesn`t belong to one, it is like a body and every people are its cells. If every cell does its best, then they can create a healthy body.

About Eighty percent of persons with disabilities live in developing countries. In addition to the problems that caused disability, such as age, or sickness, Iran as a developing country was faced to a serious problem. During 8 year war between Iran and Iraq (1980-1988) many people injured and the rate of disability rose sharply. There are two problems they are faced to at the same time, first, their disability suffering and second the problems they have in public spaces so it will decrease their public appearance gradually. Most of the streets and generally urban spaces design need to be revised since as a public space it should have the potential to gather all the people with every ability but it doesn`t. After twenty years from the end of war and many lows sanction about the disabled, they still have their difficulties.

In this article, we want find a definition for "City for All", and then point out the disables, not only the handicapped, problems in Tehran, Iran. One of Tehran's districts has been selected for case study. Its urban space will be analyzed and then some Urban design methods will be suggested in order to increase the disabled appearance in public spaces.

Keywords : disability , Public space , Urban Design , equality , facilities

2 DISABILITY

Disability is a comparative term (an obstacle to human's activities to be done in a natural way). The word handicap was mostly used rather than the word disability until 1980. (kamali, 2003, 97). The main reason for the definition of disability comes from the lack of merit and independence in daily activities, occupation, education and life of the disabled one. Sometimes disability and handicap are defined according to the functional restrictions too. These restrictions are described as significant decreases in daily activities compared to previous level of activity one had before. (Mirkhani, 1999).

In 1980 World Health Organization defined disability and handicap in a specific process according to their studies and researches. In this classification three concepts of deficiency, disability and handicap have been used. Deficiency is defined as any loss or abnormality in the body or functions of a person physically and mentally. (babaie ahari, 1993).

Along with that, disability is defined as any restrictions in activities done by normal people. (Mirkhani, 1378). Handicap is related to privations a person experiences as a result of disorders and disabilities. Therefore handicap reflexes one's adaptation and interaction towards his/her environment (Salehi, 1993).

Header 2According to the definition of United Nations "handicap" is an obstacle in the way of participating the social life in a level like most people do in the society, therefore differentiating this group of people who cannot gain urban gifts and suffer from being inappropriate with the frame of urban spaces due to their own privations, from others is essential and this necessity makes the weaker groups of the society such as people with poor physical disabilities a priority. Because the restriction of opportunities leads to lack of participation and happiness in those who are being discriminated and it can be an obstacle itself toward a prime and full of varieties city.

3 SOCIAL JUSTICE IN URBAN LIFE

"The fact of equal rights for disabled people means that all the need of the members of the society has equal importance and it is the meeting these needs that must make up the foundation of the society." (Act 25 of the 37th UN's general meeting,1994)

The concept of providing justice in urban life is focused on modification to the benefit of groups of people who on the same circumstances of time and place with others have more limited opportunity of gaining the facilities. Handicap as a biological and social phenomenon, it is a reality which all societies, apart from the degrees of development, including industrial and non-industrial countries have to face it. The phenomenon of being handicapped appears according to its reasons and kinds and the meaning that society gives to. So that social events such as wars and revolutions cause handicap and on the other hand, occurrence of handicap, has lots of social consequences. (Adam and the colleagues, 2006-7).

Equalization opportunities can be defined as a process by which the general system of society such as physical and cultural environment, residence and transportation, social and health services, sport facilities and entertainments can be provided for everyone. Not only it is necessary that a disabled person be adapted with the environment but also general organization of the society should be adapted with such people (Iravani and Tajbakhsh 2004-5).

From the theoretical point of view, everyone has a right of gaining the urban spaces according to the law of justice and by the radicals of creed, individual rights and the human possession in order to interact and restore equilibrium in the society.

Noticing the circumstances and need of the physically disabled people in urban public areas, and considering those needs in developed countries after World War II and in our country after the imposed war has risen up. And since then the engineers and researchers and city planners take this issue into account that in drawing urban areas they have to consider disabled people needs and requirements as part of the society. (24, 2003, Nasabadi)

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4 LIMITATION AND PROBLEMS IN URBAN SPACE

As Oliver (1990) notes, disabled people have been perceived as dependents, or individuals with a specific problem which marks them out as different from the rest of the 'normal' population. An important part of disabled people's lives relates to their ability to gain access to particular places. However, various features of contemporary cities—including physical design, institutional policies and mobility systems— have prevented disabled people from participating in the mainstreams of urban social life. Evidence suggests that the physical construction of urban space -including both macro land use patterns and the internal design of buildings- often (re)produces distinctive spatial ties of exclusion for people with a range of physical and/or mental impairments, and it serves to reinforce their 'incomplete citizenship' (Imrie, 2000; Imrie and Hall, 2001).

According to Gleeson (2001: 256), the 'disability discrimination' takes the form of:

- (1) physical barriers to movement for disabled people, including broken surfaces on thoroughfares streets, guttering, paving) which reduce or annul the effectiveness of mobility aids (such as wheelchairs, walking frames);
- (2) building architecture that excludes the entry of anyone unable to use stairs and hand opened doors;
- (3) public transport modes which assume that passengers have a common level of ambulance.

In addition to the problem of inaccessibility within public urban spaces, disabled people also experience barriers to choice in their preferred living and working environments. Disabled people are often denied employment opportunities because of inaccessible workplaces (Imrie and Hall, 2001). Considering all of these dimensions it can be concluded that, inaccessibility and exclusion define a city of enclosurement, a social space marked by institutional and physical barriers that separate disabled people from the mainstreams of social and economic life (Gleeson,2001).

Suiting urban areas is a major base for reaching equal opportunities for all the people and citizens to transport and move across the city and providing access for everyone to every urban area and public space – which is a requirement for growth and development of the society (9, 2005, Taghvaee & Moradi).

Movement limitations, city and architecture obstacles are factors that affects disabled people's social participation in the society. This will lead to separating the link between this group and the society. In general the relation between the human-disabled and normal -and his environment does not only state his place of residence (Oliver, 1975, 22). And also in cities it is not limited to a specific group of people. But it is indicating the spiritual matters, thoughts and beliefs, common ceremonies, urban planning and emotions of all the people of the society. (Moeeis, 1968, 9-10). The significance of this science is realized when the human requirements gets physical- spatial aspects and its goal is to achieve an environment which suits the human needs (ghaem, 1997, 14)

In this part one of the Tehran districts will be analysised. This district has been located in the west of Tehran. Its dwellers have moderate income and about half of them are more than 50 years old. Most of them are old men and women that go shopping for their daily demands every day and every afternoon gather near the shopping centre while chatting to the neighbours or walking slowly in the park with their grandchild. Although the elderly are the majority inhabitants of this place, but its urban design is not appropriate for them. These pictures below show some of these deficiencies:

Figure 1 and 2

Figure 1-The Street has a gentle slope. So we are faced to many levels which are connected to each other by something like stair, instead of using ramps. These platforms for both children and elderly are not suitable.

Figure 2-Two sides of street are not in the same level. Same as mentioned above, it must to use ramp. Since it is not applicable for wheelchairs .more over the white lines which show the pedestrian way, can not be recognized by a people who suffer from sight illness. It must be made by some specific materials which can be found easily be blinds white cane. Also it can be equipped to a sensor which reflects as soon as white cane knocks it.

Figure 3 and 4

Figure 3 -As it is shown in the picture, the bus station is located on a platform, and there is no ramp or another way for people who use wheelchairs. However it would better if the front of station covered with a specific material that can be found by blinds people.

Figure 4- The junction point between pavement and street should have a gently slope. It can make the elderly and disables walking easier.

Figure 5 and 6 (All photos have been Taken by Author,Tehran,March2010)

Most of the shops in this street are locate in a higher level than pavement . Mothers with prom, elderly people , someone who uses Wheelchair can not enter. The important point is,there is a channel under the street,so it can be one of the reason why all the shops are located higher.but this solution have caused another problem !

Today's life needs of a disabled citizen, requires him to travel every corner of the city. Encountering the city and architecture obstacles across the city, is itself a burden to his physical disabilities and finally will make him a reserved and introvert person. But they do not have any intention to become such a person (Meyghani, 1994, 1-5).

In Phen Berner's view (1979) human's interaction with the environment will lead to his growth (sHallaji, 1386, 5). Today the most important discussion regarding the suiting urban areas for disabled people; is to remove the obstacles in the pavements and roads for these people.

Rafieian and Mrs. Seyfaee in their article named "public urban areas; a qualitative revision and examination" reached the conclusion that the major factors in examining public urban areas' quality in citizen's view (specially disabled people) are : 1- cleanness 2- access to urban areas 3- attractiveness 4- relaxing 5-integrity

(universality) 6- being active and dynamic 7- performance 8- distinction 9- safety and security 10- power and health. (Rafeian & Seyfaee. 1384,40).

Miller & et al. in 2009 conducted a research titled measuring the amount of satisfaction of people in relation to disabled people. First they categorized disabled people (both mental and physical) in degree and severity. Findings show that the disabled people with lower degrees and with greater contact, people had meaningful satisfaction of their actions; in a way that they made a friendly and intimate relationship. But disabled with less contacts suffered depression and mental and physical disorders (Miller & et al, 2009).

Rafia Hanniff and Rabia Kheder in an article named "women with disabilities in Canadian urban areas" concluded that women with disabilities are important members of the society and cultures of the Canada. And with inappropriate urban areas they will not be absorbed to the society and will be pushed to the margins of the urban economy and will suffer a sort of multiple personality in the inappropriate urban area.

They found out that access to city facilities is under constant change by factors like disability, sex, urbanism level, culture and heritage, age, economic conditions, and social position. So a complete care must be taken for them in social and economic issues by designing and making suitable urban areas in order to allow them participate in social activities effectively. (Khede and Hanniff , 2007, 4-1)

Valerz (1986) calls 'urban areas' as places that strangers share. Lycnch (1960) calls the 'street' – an element of urban area – as a public, social fact. Kaleen (1976) points out: stresses out the people life in the streets. Jicobes (1961) people enjoy the urban areas by looking and moving around them. Dosciyadis (1976) believes: the first human need, is the freedom to move (Habibi, 2006, 2-4).

Ghaem in a research has concluded that the part of the society with physical disabilities have lost access of urban areas, search the reason in "being disable themselves" not "city being disabled" and abandon those areas. (Ghaem, 1997, 1)

5 CONCLUSION

According on the points which was mentioned above, Disable people doesn't suffer their disability as much as their solitude. All the urban facilities should be accessible for everyone. If urban mangers want to achieve the aim of „city for all", should not neglect the minority. This minority, itself, divided to many groups such as women ,low income people, migrants and disables. As Laurence Halprine describes the concept of the city: city as a base for human activities is a living being in interaction with itself and the people in the society.

In this article we tried to consider the disables problems and re say all the rules which are approved in many international committees. Also it is not deniable that in many countries, urban designers try hard to create an urban space which can be used for everyone and by some

Connivance they are really successful in it. the pictures that were shown are just some little instances from Tehran ,Iran Capital city ,streets. In 2006 the number of disabled people in Iran was estimated to be 1012222 persons.

It seems that accessibility to urban areas, association or being in the society, being active and dynamic, and safety were very important for the disabled people. Considering the fact that disabled people has a share in their cities past memories, for reasons like unsuitable urban areas, have rare opportunities to be present in urban areas. This fact reflects the urgency of fitting and arranging urban areas that act as a base for creativities and capabilities of people with disabilities to develop.

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ROdEM: Modellierung einer optimalen Raumnutzungsverteilung zur Minimierung von Kfz-Emissionen

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1 ABSTRACT

ROdEM stellt ein Simulationsmodell zur Optimierung der Raumnutzungsverteilung bei minimalen Kfz-Emissionen dar. Das Modell umfasst die Raumstrukturgegebenheiten eines Gebietes, die gesamte Verkehrsnachfrage- und Angebotsmodellierung im Personen- und Güterverkehr, die Emissions- und Immissionsberechnung und einen übergeordneten Optimierungsalgorithmus. Damit steht ein flexibles Werkzeug für eine integrierte Raum- und Verkehrsplanung inklusive Wirkungsermittlung zur Verfügung, bei dem die Reduktion von Energieverbrauch (klimarelevant) und Schadstoffbelastungen (lokale Luftgüte) oberste Priorität hat.

2 ALLGEMEINES

2.1 Hintergründe

Die Raum- und Verkehrsplanung ist ein wesentliches Instrument um die Verkehrsnachfrage und damit auch Energieverbrauch, Treibhausgas-, Schadstoff- und Lärmemissionen langfristig zu beeinflussen. Dem entsprechend ist in Österreich eine optimierte Raumplanung in nahezu allen umweltpolitischen Programmen der Bundesregierung als Maßnahme niedergeschrieben und teilweise auch in der Gesetzgebung zu finden (zB ROG 1974). Die Bedürfnisse an die Infrastruktur sind allerdings sehr komplex, was sich auch in den unterschiedlichen, teilweise gegenläufigen Zielen für die Raumplanung widerspiegelt. Zu den Zielen gehört beispielsweise bestmögliche Erreichbarkeit und Gewährleistung einer hohen Mobilität für alle Menschen, minimale Verkehrserzeugung mit minimalen Schadstoff- und Treibhausgasemissionen, Verlagerung unvermeidbarer Schadstoff- und Lärmemissionen in unkritische Gebiete und das bei möglichst geringen Infrastrukturkosten.

Eine wesentliche Verbesserung auf dem Weg zu einer nachhaltigen Raumentwicklung wäre die frühe und intensive Auseinandersetzung mit den Wirkungen der geplanten Raumnutzungen sowie die Analyse der Wechselwirkungen zwischen Raum-, Verkehrs- und Umweltplanung. Dabei sollte das Ziel eine voll integrierte Raum- und Verkehrsplanung sein, bei der die gegenseitigen Wechselwirkungen zwischen räumlicher Nutzungsverteilung und vorhandenem Verkehrsangebot als ein komplexes System begriffen werden. Dafür fehlt ein praxisnahes Planungstool, das die Zusammenhänge von Raumnutzungsänderungen, Verkehrsentwicklung und damit zusammenhängenden Umweltauswirkungen als sich gegenseitig beeinflussende Variablen begreift und diese vor allem im erforderlichen Planungsmaßstab der örtlichen Raumplanung zu modellieren im Stande ist.

2.2 Ziele für ROdEM

Mit ROdEM soll ein Planungstool zur Optimierung der Raumnutzung für minimale Verkehrsemissionen geschaffen werden, das in der Optimierung bestimmte Randbedingungen und Einschränkungen aus Sicht der bestehenden Raumnutzung und auch der Schadstoffimmissionen berücksichtigt. Das angestrebte Modell für emissionsseitige Optimierungsprozesse in der Raumplanung soll auf bestehende Modelle aus mehreren Fachbereichen aufbauen, diese kompatibel entwickeln und sie dann mit einer Optimierungsroutine und Benutzeroberfläche ergänzen.

Darüber hinaus werden mit ROdEM vor allem folgende wissenschaftliche Ziele verfolgt:

- Gestaltung einer langfristig tragfähigen Raumnutzungs- und Verkehrsentwicklung mit Fokus auf die Minimierung von negativen Umweltwirkungen des Kfz-Verkehrs.
- Erfassen des Problembereiches der suboptimalen Raumnutzungsverteilung und des damit verbundenen Verkehrs sowie die Möglichkeiten darauf einzuwirken.

- Bereitstellung eines neuartigen Planungswerkzeuges mit dem Potenzial, eine wesentliche Verbesserung in der Planung und Beratung im Bereich der Raum-, Verkehrs- und Umweltplanung zu bewirken.
- Beeinflussung der örtlichen Raumplanung als wesentliche Entscheidungsebene, wobei der Ansatz grundsätzlich auf allen Entscheidungsebenen, namentlich auch auf Landes- oder Bundesebene, anwendbar sein soll.
- Berücksichtigung aller Verkehrsteilnehmer (MIV, ÖV, Rad, Fuß) im Modellzyklus und Darstellung des tatsächlichen Potenzials von Veränderungen in der Raumnutzungsverteilung in Hinblick auf eine Verlagerung auf umweltfreundlichere Verkehrsmittel durch intelligente Raumplanung.
- Integration der Wirkungsmodellierung von Kfz-Schadstoffemissionen in einen durchgängigen Modellzyklus zur Abbildung und zum besseren Verständnis der komplexen Wechselwirkungen zwischen Raumnutzungsverteilung, Verkehrsnachfrage, Verkehrsangebot und damit verbundenen Umweltwirkungen für die österreichische Fahrzeugflotte.
- Verwendung von Raumstrukturgrößen wie beispielsweise Anzahl von Einwohnern und Arbeitsplätzen als endogene Variable im Modell, womit eine Entwicklung der Raumnutzungsverteilung modelliert werden kann.
- Kombination verschiedener Zielgrößen zur Optimierung der Raumnutzungsverteilung: Dadurch wird die Möglichkeit geschaffen, für ganz bestimmte Flächenwidmungen (zB Einkaufszentren) als Verkehrserreger eines typischen Verkehrsbildes (Wegzweck Einkaufsverkehr, Pkw-Fahrzeugmix, typische zeitliche Verteilung) konkrete Aussagen beispielsweise über die Ideallage von Neuentwicklungen zu treffen.
- Prüfung der zeitlich differenzierten Modellierung der Verkehrsnachfrage in Form von Stundenzeitscheiben zur besseren Berücksichtigung von Stauerscheinungen. Dabei sollen die Möglichkeiten und das Potenzial in Hinblick auf die Emissions- und Immissionsberechnung ausgelotet werden.
- Optimierung der räumlichen Auflösung des Kaltstartmodells in dem Netzwerk-Emissionsmodell NEMO für eine realistische Ermittlung der Emissionsänderungen auf kleinräumigen Straßensegmenten. Bestimmung der typischen Kat- und Kühlwasser-Temperaturverteilungen der Kfz-Flotte für die unterschiedlichen Raumnutzungsarten aus der Verteilung der Parkzeiten und der Weglängenverteilung als Funktion der Umgebungstemperatur.
- Mit Hilfe der Modellierung in ROdEM soll die Möglichkeit geschaffen werden, ortsbezogen konkret die Überschreitungsbereiche beispielsweise in einem Luftgütesanierungsgebiet gemäß Immissionsschutzgesetz-Luft (IG-L) auszuweisen und somit die zulässigen Emissions- und Immissionszuwächse zu definieren und im Optimierungsablauf zu berücksichtigen.

3 DER MODELLANSATZ

3.1 Grundlage

Ein geeigneter Ansatz für die integrierte Raumnutzungs- und Verkehrsmodellierung auf Ebene der örtlichen Raumplanung wurde von Schiller (2007) an der TU Dresden entwickelt. Dabei werden die Wechselwirkungen zwischen quantitativer Raumnutzung, deren Lagegunst sowie Verkehrsnachfrage und Angebot modelliert. Schiller lässt eine die normative Raumplanung unterstützende Modelltheorie entstehen, in der vorhandene Freiheitsgrade (Grenzen und Freiräume) der Raumnutzung verwendet werden, um mögliche Strukturgrößen (Einwohner, Arbeitsplätze, Verkaufsflächen) innerhalb dieser Freiheitsgrade aus verkehrsplanerischer Sicht zu optimieren.

Für ROdEM lag die wissenschaftliche Hersausforderung in der Erweiterung des Ansatzes von Schiller (2007) zur Integration der Emissionsmodellierung mit verschiedenen Zielgrößen wie Treibhausgasemissionen, NOx, NO2, PM, HC und CO oder auch gewichtete Kombinationen dieser Komponenten. Als nicht variable Randbedingungen können darüber hinaus in jeder Raumeinheit des Modells maximale Emissionszunahmen definiert werden, die aus der Randbedingung der lokalen Einhaltung der Luftgütegrenzwerte sowie der Existenz von Luftgütesanierungsgebieten abgeleitet werden.

3.2 Modellprinzip

Die nachfolgende Grafik zeigt das Modellprinzip mit den Teilmodellen, deren Verknüpfung sowie die wesentlichen Modellinputs und Outputs in stark vereinfachter Form.

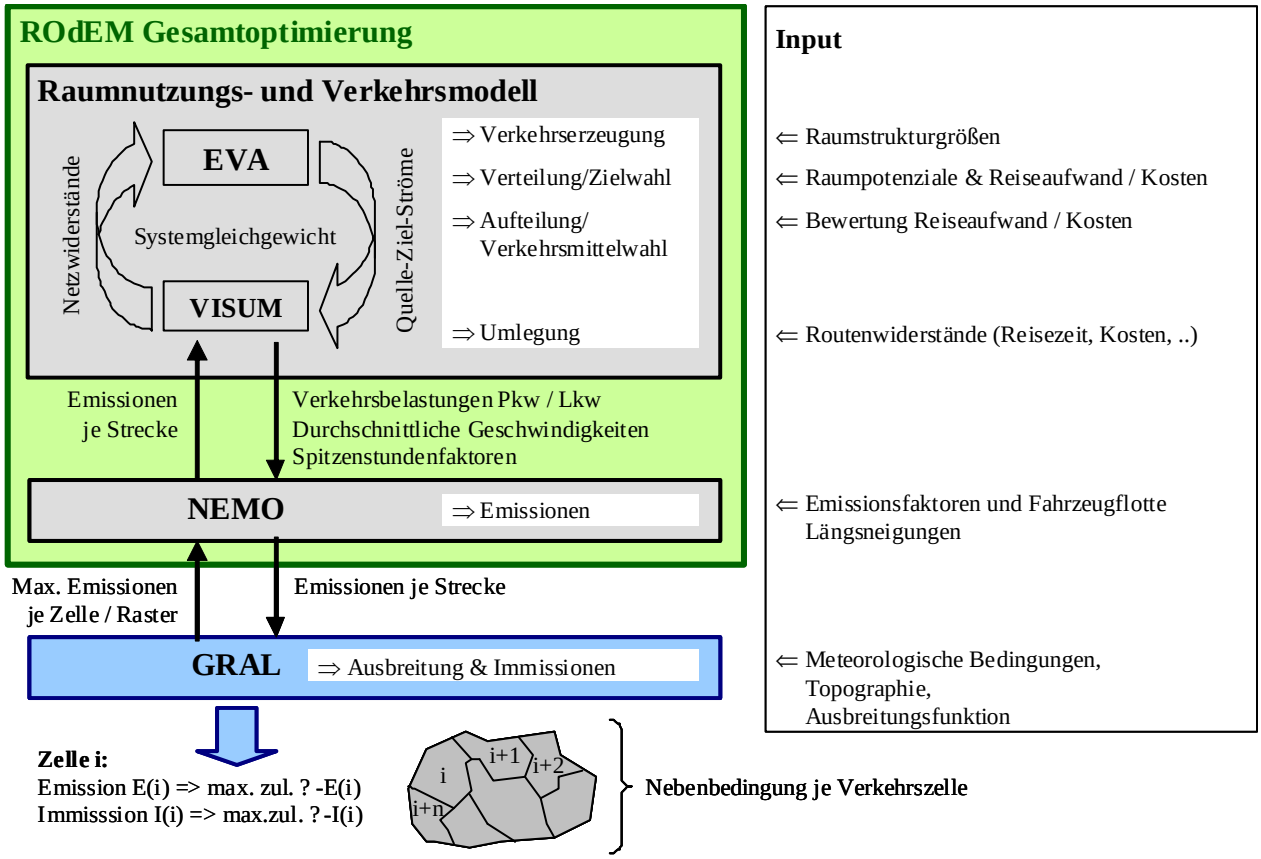

Fig. 1: Modellprinzip ROdEM

Kern von ROdEM ist ein makroskopisches Verkehrsnachfrage- und Angebotsmodell bei dem die Raumstruktur mittels einzelner Flächeneinheiten als Ausgangs- und Zielort von Verkehrsströmen modelliert wird. Dabei bildet das simultane Verkehrsnachfragemodell EVA (entwickelt an der TU Dresden, http://www.theoretische-verkehrsplanung.de) die Schritte Verkehrserzeugung, Verteilung/Zielwahl und Aufteilung/Verkehrsmittelwahl ab. In Kombination mit dem Routenwahl- und Umlegungsmodell VISUM (entwickelt von der PTV AG, Karlsruhe, http://www.ptv.de/) steht ein durchgängig konsistenter Modellansatz zur Ermittlung von Netzbelastungen für alle gängigen Landverkehrsmittel zur Verfügung. Wesentlich bei der Modellierung ist, dass durch den iterativen Vorgang von der Verkehrserzeugung über die Verteilung, Aufteilung sowie Routenwahl und Umlegungen ein Systemgleichgewicht zwischen Verkehrsangebot und Nachfrage ermittelt wird. In ROdEM werden über den Ansatz von Schiller (2007) die Raumstrukturgrößen (zB Einwohner, Arbeitsplätze, Verkaufsflächen) nicht mehr als fix vorgegebene Größen sondern als endogene, innerhalb festgelegter Grenzen variable Einflussgrößen modelliert. Für die Verteilung dieser Raumstrukturgrößen im Untersuchungsgebiet werden in ROdEM als Zielfunktion die Minimierung von Emissionen wie beispeislweise CO2, NO, NO2, PM, HC und CO oder auch gewichtete Kombinationen dieser Komponenten herangezogen. Zur Modellierung der Emissionen dient das Netzwerkemissionsmodell NEMO (Network Emission Model, Rexeis 2007), wobei in ROdEM einerseits eine voll durchgängige Modellkoppelung zwischen Verkehrsmodell und Emissionemodell entwickelt wird. Andererseits erfolgt die Integration der Modellergebnisse aus NEMO, namentlich die streckenbezogenen Schadstoffemissionen, in den Otpimierungsalgorithmus des Gesamtmodells.

Eine weitere wesentliche Neuerung von ROdEM ist die Berücksichtigung von Immissionen im Untersuchungsgebiet als Nebenbedingung der Systemoptimierung. Dabei wird zunächst einmal zur Ermittlung der Immissionen für den Initialisierungszustand auf Basis der vorhandenen Verkehrsbelastungen und der daraus ableitbaren Emissionen das Ausbreitungsmodell GRAL verwendet (Öttl et. al. 2001). Über die vorherrschenden Ausbreitungsbedingungen und einer Verknüpfung zwischen Netzabschnitten (Strecken

mit Verkehrsbelastungen) und betroffenen Immissionsrastern (Flächen mit schädlichen Emissionen) können über die Festlegung von Grenzwerten maximal zulässige Emissionsmengen definiert werden. Die nachfolgende Abbildung zeigt schematisch die iterative Optimierung in Richtung minimaler Emissionen im Untersuchungsgebiet, wobei in jeder Iterationsschleife jene Zellen mit lokalen Grenzwertüberschreitungen ausgewiesen werden. Für die Gesamtoptimierung wird dann jener Zustand gesucht, der bei Einhaltung aller Nebenbedingungen (Immissionsgrenzwerte je Verkehrszelle) möglichst nahe am Systemoptimum (zB minimale CO2-Emissionen im Untersuchungsgebiet) liegt.

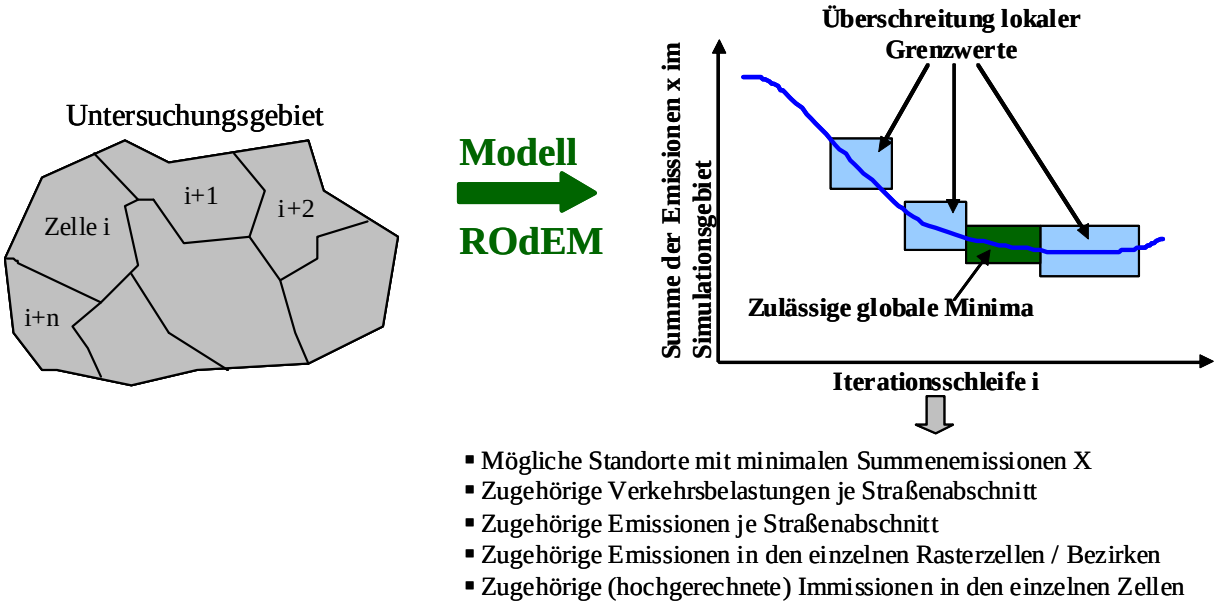

Fig. 2: Prinzip der Optimierung mit ROdEM bei Einhaltung der Nebenbedingungen lokaler Immissionsgrenzwerte

Damit ist es möglich, die Auswirkungen der globalen Optimierung im Untersuchungsgebiet möglichen lokalen Grenzwertüberschreitungen gegenüber zu stellen. Mit der freien Wählbarkeit der Grenzwerte sowie der Zielgrößen für die Optimierung ist eine hohe Flexibilität bezüglich unterschiedlicher Anwendungsfälle für ROdEM gegeben.

4 DEMONSTRATIONSBEISPIEL UND ZWISCHENERGEBNISSE

Neben den theoretischen Entwicklungen für ROdEM wurde ein Demonstrationsbeispiel zu Testzwecken aufgebaut. Ziel ist es, in einem überschaubaren und gut abgegrenzten Untersuchungsgebiet über umfangreichen Testrechnungen das Poenzial der Modellierung auszuloten und gleichzeitig mögliche Fehlerquellen zu minimieren. Auf Grund der vorhandenen Datengrundlagen bezüglich der tatsächlichen Verkehrsverhältnisse und in Bezug auf ein vorhandenes Ausbreitungsmodell der TU Graz wurde der Bezirk Hartberg in der Steiermark für das Demonstrationsbeispiel ausgewählt. Nachfolgende Abbildung zeigt die räumliche Unterteilung des Untersuchungsgebiets in Verkehrszellen und die der Modellierung zu Grunde liegenden Flächenwidmungen (Basisflächen der Raumnutzung).

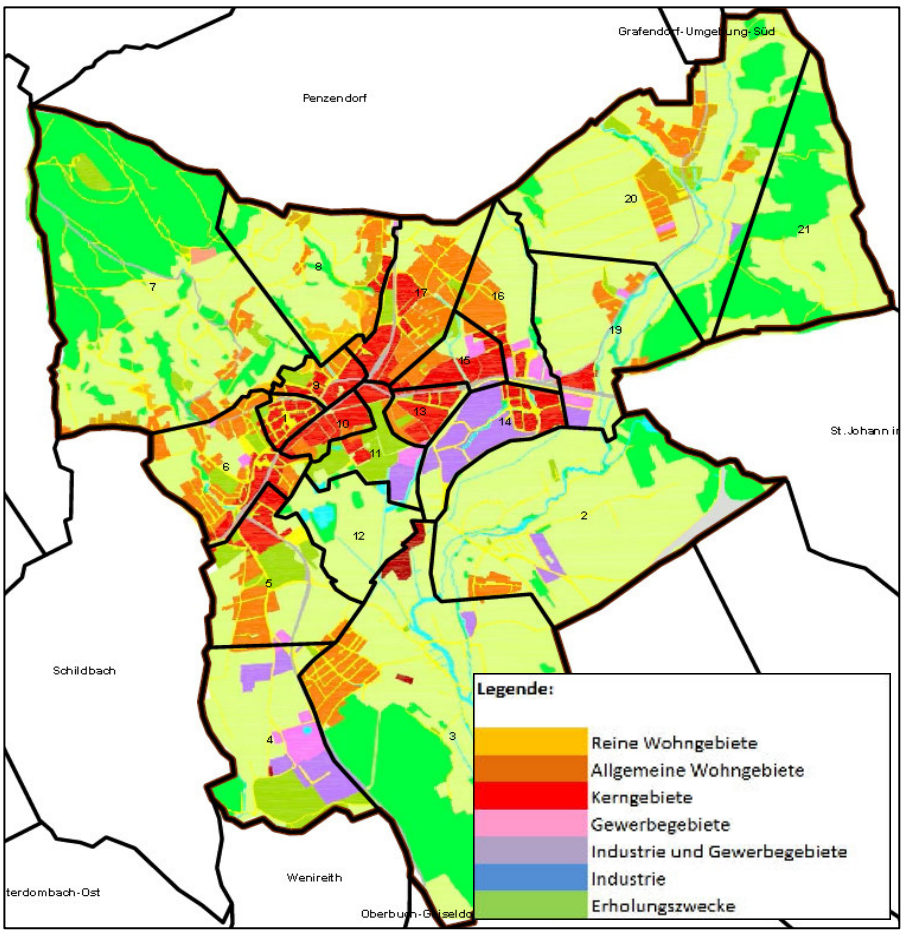

Fig. 3: Flächenwidmung und Verkehrszellen des Demonstrationsbeispieles Hartberg

Das Gesamtmodell ROdEM befindet sich zum gegenwärtigen Zeitpunkt gerade in der ersten Testphase, wodurch an dieser Stelle keine weiteren Erläuterungen und Ergebnisse zur Modellierung präsentiert werden können. Allerdings kann kurz auf ein Zwischenergebnis der Testrechnungen mit NEMO bezüglich einer besseren Abbildung von Stauerscheinungen im Tagesverlauf eingegangen werden. Dabei wurde die Hypothese aufgestellt, dass bei einer Modellierung von Stundenzeitscheiben mit Stundenverkehrsstärken gegenüber der gängigen Modellierung mit Tagesverkehrsstärken eine erheblich schärfere Abbildung von staubedingten erhöhten Emissionen möglich ist. Mit den Ergebnissen aus einer umfangreichen statistischen Analyse von Verkehrsdaten auf bestimmten Straßentypen (Neuhold, 2010) erfolgte die Auflösung der im Verkehrsmodell abgebildeten Tagesverkehrsstärken und entsprechenden mittleren Geschwindigkeiten auf 24 Stundenwerte. Über Testfahrten im Untersuchungsgebiet konnten außerdem die ermittelten Modell-Geschwindigkeiten verifiziert werden. Dann erfolgten Vergleichsrechnungen mit NEMO. Die nachfolgende Tabelle zeigt die relativen Differenzen zwischen den beiden Berechnungsvorgängen für einen stark befahrenen Streckenabschnitt in Hartberg im Istzustand.

CO2	NOx	HC	CO	Partikel (motorisch)
+2%	+4%	+14%	+12%	+2%

Tabelle 1: Differenzen der Berechnungsergebnisse für einen stark befahrenen Streckenabschnitt mit NEMO für Stunden- versus Tageswerte

Im Vergleich zur Emissionsmodellierung mit Verkehrsbelastungen auf Tagesbasis zeigen sich bei der stundenfeinen Modellierung um rd. 2-4% höhere Emissionen für die Emissionskomponenten NOx, motorische Partikel sowie CO2. Die immissionsseitig als weniger kritisch einzustufenden HC und CO-Emissionen werden auf dem stark befahrenen Streckenabschnitt anhand von Tagesdurchschnittswerten um 10-15% unterschätzt. Bezogen auf die Gesamtsumme der Emissionen eines Tages im Untersuchungsgebiet liegt dieser Fehler jedoch für alle Emissionskomponenten deutlich unter 2%. Dieses Ergebnis bestätigt grundsätzlich die im Voraus angenommene Hypothese der Unterschätzung von Emissionen bei

Berechnungen auf Tagesbasis. Für den erheblichen Mehraufwand bei der Modellierung und vor allem in Hinblick auf die Unsicherheiten durch die vielen Annahmen und Vereinfachungen über den gesamten Modellierungszyklus hinweg erscheinen die Differenzen jedoch relativ gering zu sein. Es liegt daher nahe, für zukünftige Modellierungen weiterhin Tageswerte zu verwenden.

5 CONCLUSIO UND AUSBLICK

Obwohl die Modellentwicklung gegenwärtig noch nicht abgeschlossen ist, stimmen die ersten Testläufe optimistisch, dass die gesetzten Ziele erreicht werden können. Mit ROdEM wird erstmals ein Planungswerkzeug für eine integrierte Raum-, Verkehrs- und Umweltplanung bis zur Entscheidungsebene der örtlichen Raumplanung zur Verfügung stehen. Nachfolgend seien beispielhaft mögliche Anwendungen bzw. Anwendungspotenziale für ROdEM skizziert:

- Unterstützung einer umweltschonenden, intelligenten Raumplanung durch die Möglichkeit, raumstrukturelle Entwicklungen bis hin zu einzelnen Standortentscheidungen durchgängig zu modellieren und umweltrelevant zu bewerten.
- Umfassende Analyse verschiedener geplanter Raumnutzungskonzepte (Flächenwidmungspläne, Raumordnungskonzepte, usw.) sowohl auf der Ebene der örtlichen Raumplanung als auch auf Landes- oder Bundesebene.
- Durchgängige Wirkungsmodellierung von Maßnahmen, die sowohl direkt als auch indirekt die Flächennutzungen beeinflussen. Beispielsweise könnte die raumstrukturelle Entwicklung durch eine neue ÖV-Linie gegenüber einer Straßenverkehrslösung modelliert und die umweltrelevanten Wirkungen in einem direkten Vergleich aufgezeigt werden. Ein anderes Beispiel wäre die Modellierung möglicher Raumstruktureffekte durch die Einführung von Umweltzonen (dafür müsste zusätzlich auf der Verkehrsnachfrageseite eine Segmentierung der Kfz-Flotte nach Umweltklassen erfolgen).
- Evaluierung von Flächenwidmungsmaßnahmen für Sanierungsgebiete gemäß Immissionsschutzgesetz-Luft (IG-L, BGBl. I Nr. 115/1997).

Abschließend bleibt festzuhalten, dass mit einer möglichen Anwendung des Modellierungsansatzes auf ein größeres Untersuchungsgebiet als im Demonstrationsbeispiel auch die Gestaltungs- und Optimierungsmöglichkeiten zunehmen würden. Dann erst könnte das ganze Potenzial eines integrierten Raum-, Verkehrs- und Umweltplanungswerkzeuges mit dem Ziel der umweltschonenden raumstrukturellen Entwicklung sichtbar gemacht werden.

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Russian Urban Planning: modern ideas (Legislative Base, Spatial Planning, Transport and Ecology, GIS Technology)

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1 ABSTRACT

In the early 21st century Russia once again became a site for dramatic transformatoions in urban planning. The 2004 Urban Planning Code completely changed the traditional urban planning system. The initiative in developing General City Plans was handed over from the State to the local administration. The main task of urban planning was shifted to providing for the interests of the new land owners, who made their appearance in the 1990ies- 2000s, in the process of real estate privatization and land market restoration. The review considers the positive and negative aspects of this new stage of attitudes in urban planning in Russia. The aspects considered as achievements include giving a start to the new urban planning school, large-scale mastering of geo-informational technologies as applied to urban planning and territorial development control, as well as envolvement of the population into urban planning activities. At the same time, we happened to lose the traditional values characteristic of urban planning, those of ordered public space. The priority task in the coming decade is believed to be restoration of mechanisms controlling public space development and urban social and transport infrastructure, as well as revival of the theory and methods in urban planning in the new social and economic context.

2 RUSLAND AS SITE FOR URBAN PLANNING EXPERIMENTS

2.1 St Petersburg and others cities in the 18th -19th centuries

During the recent three decades Russia has been a sort of a testing site for experiments in urban planning. In the early 18th century Peter I founded Saint-Petersburg, and the plan of the city was based on the idea of regularity. In the second half of the 18th century, the regular planning methods were spread to many cities of the Russian Empire. They were used both in building new cities and reconstructing old ones. During the reign of Catherine II, more then 160 (!) cities received "standard plans". The attitude to the city space was undergoing radical changes; this spave was strting to be formed by "street facades", rather than by auxiliary buildings bordering the estates [1].

Fig. 1: St.Petersburg, 1737

Both new construction and re-planning violated existing land use boundaries and required pulling down buildings which had been put up earlier. In the first part of the 19th century urban planning became even stricter when the Building Code was approved, which was active until the Revolution of 1917. Regularizing process was dramatic enough, and now we perceive the space of a regularly built city as the most valuable,

human-compatible, ready to incorporate new functions and new transport flows. It is the planning structure of St.Petersburg that has become the main object of protection by UNESCO in the city.

2.2 "Garden cities" and "Le'Corbusie urban space" in the 20th century

Fig. 2: The sample of micro-district space organisation: Moskovsky prospect, Leningrad, 1930s

Search for new urban planning solutions which had started in the 19th century Europe was also spreading to Russia. Many projects of "garden-cities" appeared, "cities for workers", which were partly implemented. However, the main obstacle for their implementation was private property on land. Land nationalization in 1918 made it possible to conduct large-scope experiments in this direction. The sample to follow was Le'Corbusie's type of design, with freely spaced buildings standing in green areas between motorways. The sample was reconsidered, and the intra-motorway area began to be viewed as a relatively enclosed social space, "a micro-district". In the 1950s-1960s the micro-district became the main method of urban space development in the USSR. Strict national rules were established for siting social infrastructure in such micro-districts, including schools, kindergartens, shops, health care institutions and sports grounds. Two generations of urban planners, up until 1991, were drawing, calculating, discussing and looking for optimal decisions for organizing micro-district space.

Also characteristic of the Soviet urban planning period were projects of large administrative areas and spacious park zones incorporating sports facilities. Figure 2 shows the layout diagram and as build drawing of Moskovsky Prospect in Leningrad accomplished in the 1930s. The design combines a pompous administrative area and micro-district housing, as well as a park zone. It was implemented and is now one of the most prestigeous residential areas in the city.

2.3 "Perestroika time" – late 20th and early 21st centuries

When the subsidies for housing construction were cut and private property on land restored in the 1990s, uban planning based on the former standards came to an abrupt standstill. Attempts made by civil architects of the "Soviet" school to work with new customers using old traditions failed completely. The new customers needed, first, to register their right to land ownership and, second, get authorization for site development. The social infrastructure, ecological requirements and space organization were looked upon as obstacles to new socio-economic relations and investment flows. Figure 3 shows the results of land

privitazation in the micro-district area that took shape in the 1960s as a single space and territory. The areas are outlined in a way that makes it possible to calculate the cost of land ownership, but this contradicts the existing system of passages and exits and ruins themeaningdulness of the space as a place of communal use. Such privatization is characteristic of nearly all Russian cities and towns.

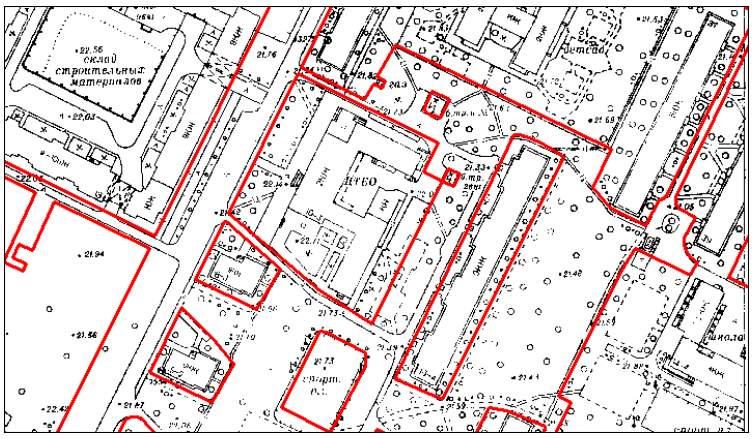

Fig. 3 Modern subdivision system for a “micro-district”. St. Petersburg, 2009.

The positive experience from this period can be seen as follows: city shaping stopped being the prerogative of the selected few – the city administration and architects – and was taken over by a larger number of actors: individuals, families, financial and construction companies. It is these actors that K.Linch calls the “true urban planners” [2].

One can say that modern urban planning is more than ever directed to accounting for the interests of different social strata, of those in power, of investors and common residents. Modern land development is more variable than in the previous period.

3 MODERN WINS AND FALLS

3.1 Legislative Base

Reconsideration of relations in urban panning resulted in the Urban Planning Code of the Russian Federation adopted in 2004. году [3]. It passed on the initiative in General Plans development to the municipal bodies (until 2004 the planning documentation of the lower level could only be based on those of the upper level). The General Plans of city districts and settlements became the main basis for developing a new type of document: The Rules of Land Use and Development. These Rules are a law developed by the local administration and are functionally very close to the European and North American Zoning Plans . The General Plans and Rules are the basis for developing Planning design and Land Surveying Projects of a particular area. A boost to the development of General Plans, Planning Designs and Land surveying Projects was given when they were included into the obligatory document package for getting construction permit.

The Urban Planning Code of 2004 was innovative in that it specified the titles, purpose and content of the documents dealing with territorial planning at the national level. Instead of a single document – the Population Distribution Scheme of the Russian Federation – it envisages development of a large number of Territorial Planning Schemes by branch.

3.2 Spatial Planning

3.2.1 Functional map as a main document of General Plans

The main point in present-day General Plans is functional territory zoning. As a rule, the following set of functional zones is used: 1) the residential zone, separated into low-rise, medium-rose and high-rise housing; 2) business zone; 3) industrial zone, graded according to the sanitary class; 4) recreational zone; 5) engineering and transport structure zones; 6) special purpose zone. The number of zones varies from city to city, depending on the local conditions.

The type of functional zone is established mainly based on the demands and supply on the part of developers. Customers often think of General Plans as a sum of various plans superimposed over each other on the same

map. However, the “summing up” operation serves to elucidate the contradictions among the designs previously made. The zones are revealed, where development is restricted by the natural processes taking place there. Preservation zones of historical monuments become manifest. The motorway diagram is adjusted. All of this makes the planners look for a compromise, and urban planning results are very different from a simple sum of designs.

Notably, the main requirement to the new General Plans is the observation of the public hearing procedure.

After 2004, the General Plan began to be treated as a standard document, where all elements of the drawing came to be considered as “precise”, including the zone borderlines and motorway axes, all on 1:10000 scale map. On the one hand, it was an advantage, because the planners were now forced to study the land use system as it is. On the other hand, it was a disadvantage, because it became impossible to adjust the borderlines and axes for 1:2000 and 1:500 scales.

At present, proposals are being developed to update the 2004 Urban Planning Code.

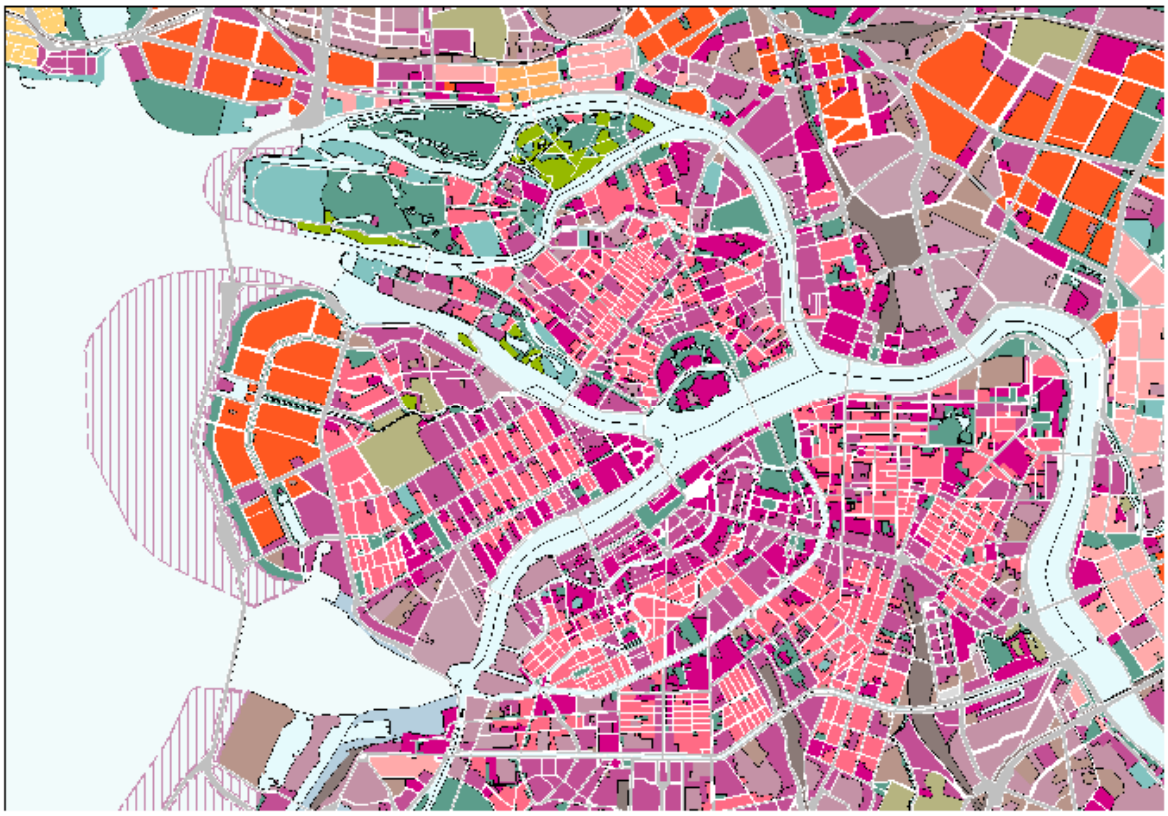

Fig. 4 Functional Map as a part of St. Petersburg City Genplan, 2005.

For example, in Functional Map - a part of St. Petersburg City Genplan (adopted 2005), there are 30 tipes of zones.

3.2.2 Historical heritage

There are over 400 cities and towns in Russia that have the Historical City status. Historical area often includes wooden or low-rise housing, which does not seem to meet modern urban concepts and hampers investment. There are now two competing viewpoints in Russia concerning the development and transformation of historical centers. “The American way” involves pulling down old houses and putting up new buildings instead. “The European way” implies preserving old housing and its further use in a new function.

The uniqueness and indiviuality of each place is not formed by the separate monuments only, but by the remaining historical environment: whole streets, quarters, ensembles. Separate monuments can only exist in their historical cointext. At present, striving for unified living standard lead to unification of the cities and uran environment. In this context, of much importance is the problem of preserving each town’s special appeal.

With the procedure of public hearing on any urban planning document approval in place, the public opinion on the issue of historical monuments preservation has acquired some weight.

Fig. 5. Example of successful approach to preserving historical heritage. The project for central district of Rostov-na-Donu city.

3.2.3 Suburbanization

Suburbanization, unregulated spread of the cities, is a very familiar problem for Russia. The demand for low-rise, individual housing is growing. So far Russia has not been faced by the task of restraining this type of housing. During the recent 5-8 years, indidual housing amounted to 50-70% among other housing types. In fact, all the territories around large cities, which had previously been used for agricultural purposes, has been taken over by new owners, who are engaged in individual housing.

While such plans are developed, little care is taken of ecological issues, preserving plantation and open space, which is essential for any city. Attempts to regulate such construction by urban planning do not find any understanding on the part of the land owners and local administration. Uncontrolled suburbanization results in economically unjustified withdrawal of land from agricultural use.

3.2.4 Densified development

In the recnt years, the term “densified development” has come into use. This term is used for the prcess of building up open spaces in already existing residential areas. This densifying is carried out at the expense of the green plants and objects of social infrastructure, which are necessary for providing adequate living conditions. Thus the positive experience of the Soviet period is rejected of creating the adequate infrastructure. Protection of green plants and open spaces has become the target for many grass-root organizations.

3.3 Transport

The situation with transport in modern Russian cities reminds of that in the European cities some 30 years ago:

- Motorization of the population has peaked: in large cities during the recent 20 years it has increased 5 to 6 times and reached 300-350 cars per 1000 residents;

- Traffic jams in all large cities have become the order of the day;
- Public rail transport is stagnating: trams are cut, underground construction has slowed down. In Petersburg, underground stations are designed to open in 2010-2012, which have been started in the 1980s.

It should be noted that by now we have lost the civil institutions that were able to manage the public transport systems, study the population's mobility and passenger flows, and plan the development of urban motor road density and design elements of urban transport system. According to H. Mayer [4], the same process was taking place in the European cities some 25-30 years ago. The requirements to street planning parameters, the consistent road network planning system developed in the Soviet period seemed an obstacle in the way of the new market relations. The Urban Planning Code (2004) did not even include the main principles of the urban transport infrastructure.

Behind the external, uncouth aspect of the transport system in Russian cities we should see the dramatic internal changes that have occurred:

- cities have become independent economic entities and are now associating their development with involvement in international and national transport ways;
- streets and roads, as well as public transport objects are distributed among owners, and the system of property management is being set up;
- state support for public transport has been replaced by self-financing, involving local and regional budgets;
- in providing transport services, competitive environment has been formed;
- public transport has become attuned to working with new flow directions and new passenger categories.

At the same time, we still do not have a general strategy of reforming urban transport systems. There are some cities that focus on large-scale high-class motorways, with state-of-the-art interchanges to facilitate the traffic. If the tram tracks are in the way, they are removed. This is the strategy chosen by Moscow, partly St.Petersburg and some others. However, practical implementation of these tasks takes years, and by the time a bridge or motorway section is completed, the problems far outstrip the advantages.

The second solution, which can be expected to produce quick pay-off, is creating intellectual transport systems including both road traffic and satellite monitoring of traffic flow, etc. However, work in this direction is hampered by the lack of experience at the local administration level and the opposition on the part of the State Traffic Safety Inspectorate.

The third way is to restore the effective work of the public transport. This would require much funding, but is quite promising in the long run, as the foreign experience shows us.

Notably, all the three options require revitalizing the civil institutions responsible for monitoring urban transport infrastructure [5].

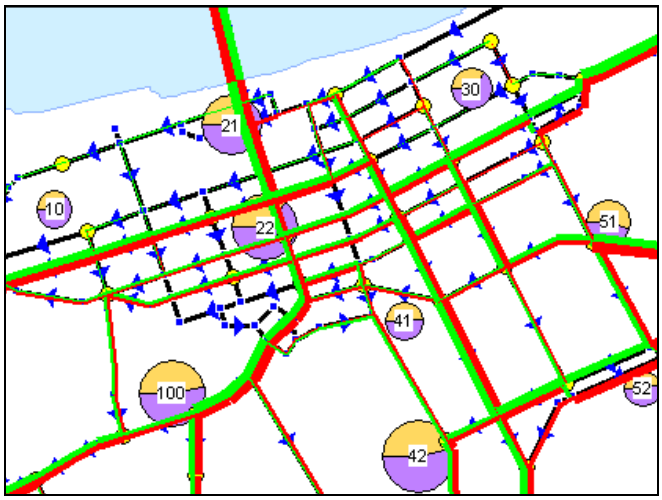

Fig. 6. Scheme of transport flows – the result of researching with transport model. Perm city, 2008.

We expect the new territorial and transport planning technologies to be widely introduced in the nearest future, based on mathematical modeling of transport flows. We used to have rich experience in such modeling in many scientific centers in the USSR, and it still survives in St.Petersburg, Moscow, Yekaterinburg and Irkutsk. The companies are developing fast which are using new software products [6].

New research will focus on the social psychology of urban communities, developing "network cities", living within the transport, informational and engineering communication networks and "the problems concerned with the interaction of large-scale global structure objects with the delicate tissue of historical cities"[7].

3.4 Ecology

In the context of demographic slump, the main condition for effective long-term territorial development in the country is ensuring high-quality living environment, as well as formation of favorable ecological and environmental conditions for life activity in the territory. The territory is becoming the source of budgetary income, and its quality (natural and environmental conditions, ecological status and infrastructural adequacy) plays a large role in determining the prospects of the residential settlements there.

Notwithstanding the practical elimination of the institute of state ecological expertise for the documents concerned with territorial planning, ecological issues are key points at all planning stages.

Current state policy in regional development is oriented to working out new approaches to territorial planning, aimed at ensuring ecological safety for the population and preservation of natural complexes.

3.5 GIS Technology

GIS Technology began to be introduced into the Russian urban planning practices at the turn of 1980s and 1990s. At present, in 2010, 200 design organizations are using GIS Technology in developing urban planner documentation. New technologies turned out to be a sort of "driving engine" for planning activities. They helped to attract young specialists into the field and contributed to developing new design technologies. Young private companies, when trying to establish their business, have relied on technological innovations as their competitive edge. They set themselves a large-scale business task of developing planning documentation in digital mode, rather than in traditional form. Discussion of various aspects of GIS-Product application resulted in formation of the expert community. In 1994 GIS Association was formed, which is a public organization of professionals in the field of development and application of digital spatial data. The Association discusses issues concerned with GIS application at its conferences and publishes a quarterly edition called "Management of Territorial Development", as well as manages a site for urban planners in the Internet and organizes foreign business trips.

The Urban Planning Code adopted in 2004 gave impetus to setting up municipal information systems on urban planning. In many municipal bodies, such information systems are based on GIS.

According to yearly 2010 estimates, GIS technology is used in 50-100 organizations engaged in urban planning. The number of municipal information systems using GIS technology is estimated at 250 for the whole of Russia.

Of the problems that hamper wide GIS introduction, the following should be mentioned:

- lack of the standards in the Urban Planning Code envisaging obligatory introduction of digital databases for entities subject to urban planning control;
- excess secrecy concerning precise geographic co-ordinates when describing spatial objects, which has remained from the Soviet times;
- lack of spatial data infrastructure in the RF, which could provide for more efficient use of existing maps, probing data and digital modeling.

In 2006, the Government of the RF approved the Concept of Development of Spatial Data Infrastructure in this country; however, the chain of structural transformations in the Federal bodies that followed is still in the way of the actual implementation of the Concept.

At present, GIS Association sees its main tasks in legal confirmation of compulsory digital base availability, which would be consistent with the planning documentation on the level of the Federal, sub-federal and local levels.

4 CONCLUSION

The new period in urban planning development in Russia is exciting to research. One can easily imagine being taken back into the 16th-17th centuries, when urban planning awareness was just starting to revive. This is a great period for renovating old ideas and testing them out in the new economic conditions. We look at urban planning as synthetic art, close to the art of healing. To develop new "healing practices", we would like to use the best domestic urban planning examples, as well as consider the European experience and the Asian culture of space development. Much effort is needed to work out new design and space management methodologies, as well as to train a new generation of customers and urban documentation developers.

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SDI of the Free and Hanseatic City of Hamburg and the Hamburg Metropolitan Region in the context of the Community programme eContentplus co-funded project Plan4all and in the context of INSPIRE

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1 ABSTRACT

The harmonisation of spatial planning data according to the INSPIRE Directive based on the existing best practices in EU regions and municipalities and the results of current research projects is the main focus of the eContentplus project, Plan4all. The project involves detailed description and summarising of the current situation and standards, proposal, testing and implementation of spatial planning metadata profile, common data model and harmonisation procedures. Plan4all will focus on implementation of the INSPIRE Directive into spatial planning processes, mainly based on building spatial planning data models for selected Themes and implementing recommendations of INSPIRE Drafting Teams for Metadata and Network services. The objective of Plan4all is to build a network of local, regional and national public bodies, stakeholders, ICT industry, organisations dealing with planning issues and regional development, universities and international organisations to find consensus about harmonisation of Spatial Data Infrastructure (SDI) for spatial planning according to the INSPIRE Directive and also to contribute to standardisation of related Spatial Data Themes from the INSPIRE Annexes.

SDI of the Free and Hanseatic City of Hamburg and the Hamburg Metropolitan Region (SDI-MRH) is part of the Plan4all network. Hamburg Metropolitan Region represents the cooperation between 14 districts in Schleswig-Holstein and Lower Saxony and the Hanseatic City of Hamburg. SDI-MRH brings datasets from the three federal states Hamburg, Lower Saxony (partly) and Schleswig Holstein (partly) together in one map client. The project mainly focuses on comprehensive regional planning at federal state and county level, urban land-use planning, protected sites, tourism, education and commercial areas related datasets. Datasets from different servers are shown together in one web mapping application. Data layout and data classification are harmonised so that datasets become comparable (e.g. harmonisation of spatial planning based on XPlanung data models and data-exchange format (XPlanGML)).

2 SDI IN GERMANY

2.1 INSPIRE

INSPIRE is a Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing the Infrastructure for Spatial Information in the European Community. INSPIRE addresses mainly such policy and activities that have direct or indirect impact on environment. There are also implications and overlap with other activities, policies and initiatives with complementary objectives. Infrastructure for spatial information means metadata supply, supply of spatial data sets and spatial data services made available on network services and technologies. The INSPIRE Directive applies to spatial data sets and services held by or on behalf of public authorities and used in conformance of their public tasks. Data must be in electronic format and must relate to one or more of the themes listed in Annexes I; II or III of the INSPIRE Directive. The INSPIRE Directive does not require collection of new spatial data. The juridical implementation of the INSPIRE directive in Germany means – by reason of the federal structure - a juridical implementation at level of the federal republic as well as within 16 federal states. The law about the access to digital geodata (Geodatenzugangsgesetz – GeoZG) at level of the federal republic came into force already on the 13th of February 2009, since 30.12.2009 the Free and Hanseatic City of Hamburg has the legal mandate for transposition of the INSPIRE directive by adopting a law about geospatial data infrastructure.

2.2 SDI in Germany

The structure of government in Germany has three distinct levels, including some 14,000 local authorities, 16 states, and the federal government, all of which are generators and holders of public information. This

structure has an influence on the development of the German SDI. The national SDI in Germany (SDI-DE) is a public infrastructure coordinated by a common steering committee (LG SDI-DE) comprising members from the federal government, the federal states and the communal head associations. In Germany, each of the 16 federal states is responsible for its own topographic and cadastral service, environmental and statistical data collection, and in general for data policies. The federal states of the Federal Republic of Germany have already implemented or are in the process of implementing geoportals featuring a wide range of commonly used services. The GeoPortal.Bund (http://www.geoportal.bund.de) will be functioning as a central point of entry for GI in Germany, provided by the German Federal administration. It will be linked to the geoportals of the federal states, as well as to thematic databases and services. It shall also provide facilities for publishing data and metadata, and act as a node of the INSPIRE infrastructure. In 2004, the Geodatenkatalog was established as a part of GeoPortal.Bund. It is an online metainformation broker and central entrance point to the metadata catalogues of the emerging German NSDI. As an interdisciplinary search engine on distributed metadata Geodatenkatalog can be the main interface for the enquiry of core thematic metadata in Germany. Geodatenkatalog has also access to all UDK catalogues (Environmental Data Catalogues) in Germany via PortalU® catalogue interface (http://www.portalU.de).

In 2007 the guidelines for the implementation of SDI-DE Architecture V 1.0 were published (V 2.0 is actually in discussion). The document is available for the public (www.gdi-de.org). It describes goals, preconditions, technical issues and a roadmap (masterplan) for establishing the GDI-DE. It is seen as the common guideline for all public institutions dealing and using geoinformation. Technically it follows the service orientated architecture and describes in details the key necessary components like discovery-, view- and download-Services.The guidelines identify three groups of functionalities depending on the level of maturity of available specifications and products, with varying levels of obligation for public administrations: GDI-DE Essential, GDI-DE Optional, and GDI-DE Future (JRC 2009).

2.3 SDI on regional level

Beneath international SDI initiatives like the Infrastructure for Spatial Information in Europe (INSPIRE) or national initiatives like the spatial data infrastructure germany (SDI-DE) Hamburg works directly on SDIs on the regional level like the spatial data infrastructure of the Metropolitan Region Hamburg (SDI-MRH). Through cross border projects like the SDI-MRH there is an intensive exchange with Hamburgs neighbouring federal states for bringing their SDIs together. In the dynamic growth regions of Europe, national borders are rapidly losing their significance.

Fig. 1: Hamburg Metropolitan Region

Those who want to assert themselves internationally in the globalized age need to think and act on a grander scale. The metropolitan regions in Germany are the eleven largest and most densely populated areas in the Federal Republic of Germany. They comprise the major German cities and their surrounding metropolitan areas and form the political, commercial and cultural centers of the country. The Hamburg Metropolitan Region is the compilation of 8 districts in the German federal state of Lower Saxony, 6 districts in the federal state of Schleswig-Holstein and the city-state of Hamburg in northern Germany. This area covers an area of

ca 19000 km² with more than 800 cities, towns or municipalitie and is home to 4,266 million inhabitants. (MRH)

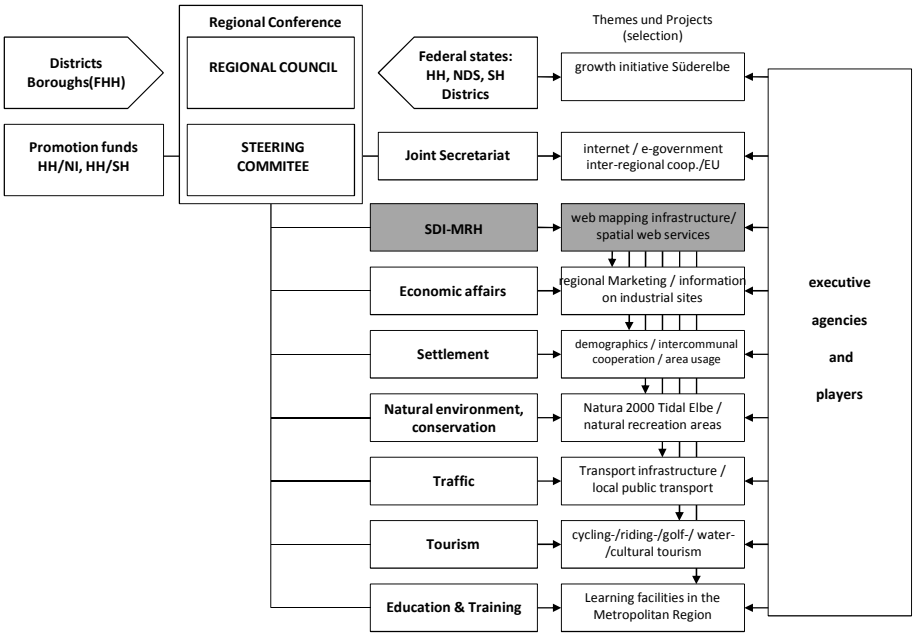

Fig. 2: Organization of regional cooperation in the Hamburg Metropolitan Region

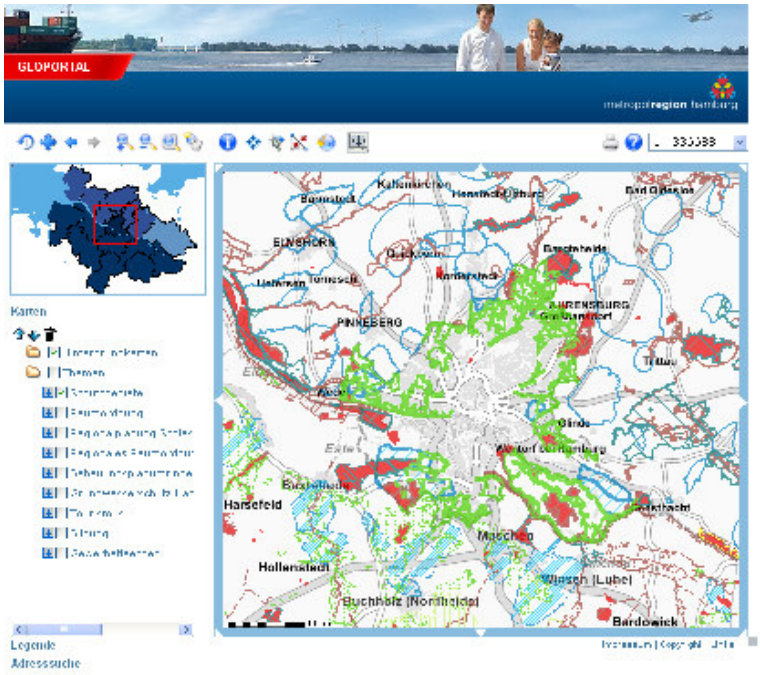

Fig. 3: SDI-MRH Web Map Client visualizing protected sites in the Hamburg Metropolitan Region

Spatial information does not end at state borders. Therefore neighbouring states are co-operating with Hamburg in establishing and running a WebGIS to offer spatial data and services to the public and the private sector for the metropolitan area of Hamburg. The Portal of the Spatial Data Infrastructure of the Hamburg Metropolitan Region (SDI-MRH) should realize the uniform access to basic and specific spatial data over federal state borders for the three states Hamburg, Schleswig-Holstein and Lower Saxony http://www.geoportal.metropolregion.hamburg.de). SDI-MRH mainly focuses on making available comprehensive regional planning at federal state and county level, urban land-use planning, protected sites, tourism, education and commercial areas related datasets. Datasets from different servers are shown together

in one web mapping application. The work on this WebGIS differs in a technical and a content regarding part. The technical part (based on SDI-DE Architecture V 1.0) of the realisation includes the definition of standards for web services and the definition of functionalities of the WebGIS. The implementation of functionalities and the administration of the WebGIS is made by the State Enterprise Geoinformation and Surveying of the Free and Hanseatic City of Hamburg (LGV). The technical working group in this SDI project has written a system of rules for all participants who want to take a part with their spatial data. The content regarding part includes the definition of themes and on the semantic and visual harmonization of spatial data from different federal states. It is additionally required to define uniform styles and legends for the specific data types: e.g. the color and the attributes of nature protection areas. Therefore working groups with members from three diferent federal states on different administrational levels discuss and develope styling rules in a time-consuming process for the different themes visualized in the portal (e.g. styling rules for visualizing protected sites).

To visualize one theme from three different state servers as one is it necessary to cascade the web map services. The LGV administers not only the WebGIS, it also merges a multiplicity of WMS from the three states to build uniform datasets for the user.

Alongside the visualization there is the informational part. To show all information of the different WMS in a uniform way is it necessary to transport the WMS GetFeatureInfo-Request through the cascade. This is often a difficult concern because of the heterogeneous GetFeatureInfo-Result formats of the different WMS software. LGV realised it by using XSLT, which is a language for transforming XML documents into other XML documents. Incoming GetFeatureInfo results in XML from different WMS are parsed through a specific XSLT document and transformed into a standard GML and HTML result. The Portal of the Spatial Data Infrastructure of the Metropolitan Area of Hamburg shows how a uniform visualization over state and administration border could be realized in a SDI. It also shows that this process is accompanied by a lot of organisational and communicational work (Tegtmeyer 2009).

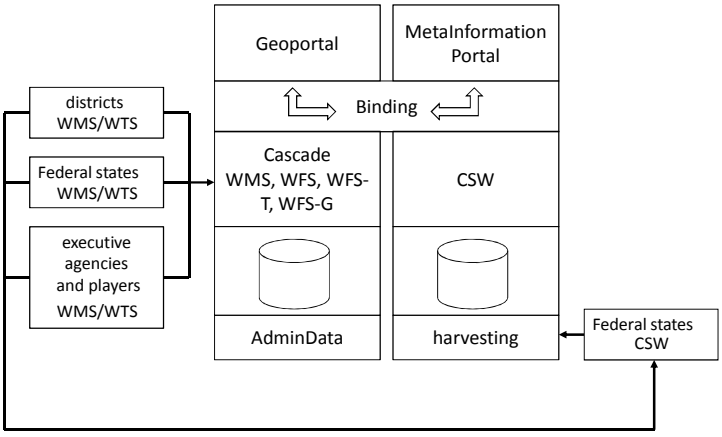

Fig. 4: technical infrastructure SDI-MRH

3 SDI FOR SPATIAL PLANNING

For the exchange of digital planning data between actors involved in planning processes, as well as for the internet-based visualisation of planning data to potential users, a digital harmonised data exchange format is needed. This data exchange format must be able to represent every possible spatial plan without loss of information. Existing exchange CAD formats like Autodesk DWG / DXF cannot be used for this purpose, because they mainly describe the graphical representation, and not the semantically content of a plan. A semantically data model, describing the geometrical and logical content of a spatial plan independent from its graphical representation and an object oriented data exchange format supporting this model are missing. For this reason a semantic data model (XPlanung) and a neutral exchange format (XPlanGML) for urban

planning data is developed since 2003 in Germany. XPlanung (http://www.xplanung.de) belongs to Germany's national eGovernment strategy pursued by the federal government, federal-state governments and municipal administrations "Deutschland-Online". XPlanung is part of the "Deutschland-Online Project Geographic Data". Lead management for this project has the federal state of North-Rhine Westphalia (GEObasis.nrw). LGV and SDI-MRH are involved since 2003 in the development of XPlanung. XPlanung is also part of SDI-DE.

The central goals of XPlanung are:

- lossless data exchange between the actors involved in planning processes,
- standardised data exchange format for horizontal (intermunicipal) and vertical (planner – municipality – county – federal state) process of coordination of planning,
- support electronically assisted proceeding on the granding of planning permission,
- standardised data format for e-participation platforms,
- semantic description of planning data as a basis for the establishment of services (query, monitoring, reporting) and visualisation in different software applications,
- central storage of urban land-use plans / other plans of special urban planning legislation (e.g. formally designated redevelopment area) in a uniform semantic structure as a data base for different software applications and information systems.

The developed standard XPlanGML relies on the international standard GML 3. XPlanGML formalizes all legal regulations relevant for urban planning. Corresponding to German planning law XPlanung standardised data models and data-exchange format (XPlanGML) for:

- comprehensive regional planning at federal, federal state and county level (based on framework law "Federal Spatial Planning Act"),
- preparatory land-use plan, binding land-use plan, project and infrastructure plan (based on "Federal Building Code")
- landscape programmes, landscape master plans, landscape plans (based on framework law "Federal Nature Conservation Act").

The standard XPlanGML represents the planned urban development from a juridical point of view. XPlanGML objects have a two dimensional geometrical representation. The XPlanGML objects and their corresponding attributes represent legal restrictions and regulations. Restrictions may be formulated geometrically (e.g. specification of the area where buildings are allowed or forbidden) and / or attributive (e.g. specification of a maximal height, number of storeys or occupancy index of a building). If a specific regulation cannot be formalized by a set of attributes, an integration into the XPlanGML data model as free text is possible. Optionally, this text can be related to specific parts of the planning area. The use of XPlanGML for exchanging spatial data is just a recommendation, using XPlanGML is not regulated by law.

Spatial planning is addressed by INSPIRE spatial data theme No. 4 "Land use": Territory characterized according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational). Additionally almost all the spatial data themes listed in the INSPIRE Annexes are valuable for spatial planning. XPlanGML is appointed as reference material for INSPIRE data specification for the Annex III theme "Land use" and for the by the eContentplus programme of the European Commission co-financed European project Plan4all.

The main aim of Plan4all is the harmonisation of spatial planning data according to the INSPIRE Directive. The project is based on the existing best practices in EU regions and municipalities and the results of current research projects in this area. The expected results are European forums for SDI (Spatial Data Infrastructure) in spatial planning, a database of best practices and analysis of best practices in terms of organisation, sharing, harmonisation and SDI building recommendations for spatial planning. SDI of the Free and Hanseatic City of Hamburg and the Hamburg Metropolitan Region (SDI-MRH) are part of the Plan4all network.

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Seeking the Best Urban Form

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1 ABSTRACT

Researches that are taking place show that the daily journeys in the urban tissue constitute the main cause of energy consumption and consequent atmospheric pollution creation. Every effort for this phenomenon's confrontation tries to intervene correctively, discouraging the use of private vehicles and encouraging the use of mass transport means, without however the required results.

The present research tries to investigate the best positions and the relations of urban functions, so that the daily urban journeys are minimized and simultaneously the residents needs, are satisfied.

Categorizing the economic activities of an area based on the access frequency, but also their groupments in the urban area, the research tries to formulate the urban functions best positions. These positions accessed by mass transport and constant orbit means will ensure the less and smaller possible urban journeys. This way Urban Planning tries to solve the problem of urban journeys creation, predefine, up to a point, the posts of departure and destination but also to formulate the ways of urban movements, in order to achieve the best sustainable development of urban tissue.

Thus the search of B.U.S.[1] consists in the ensurement during Urban Planning of urban elements groups and their areal forms that will lead to the configuration of an Urban structure which will result the minimal possible energy consumption with the simultaneous minimization of pollutants emissions via the optimization of daily function. These two goals will be achieved if the Urban tissue shaped by the allocated land uses can ensure the optimal planning for private cars, mass transport means and pedestrians use.

This will be achieved when the form of Urban tissue's structure incorporates evidently the local and supralocal movement in daily journeys.

2 URBAN ACTIVITIES IDEAL THEMATIC CATEGORIZATION.

From the continuous researches of functional structure's ascertainment in the Athens Basin Urban tissue, which we will use as model for our ideal planning, results the categorization of:

- a) land uses groups and
- b) their distribution in the Urban Web.

It is a fact that in the studied functional status of 1978-1988-1994 and 2001 result incomplete Functional linear relations of urban functions that hardly explain 50-55% of the total variance matrix.

This fact is logically expected since via the used Urban plans in combination with the being in effect Land uses decree, in the substance impose an odd "laissez – faire" on land uses distribution, therefore it depends henceforth on the market forces that they ensure and impose any regularity that rationalizes the city's daily function in a higher degree.

Generally from the revealed Functional Structures we can formulate "causual structures" that not only reveal the functional causes of the initial structure but also summarize the examined city's function.

More specifically economic activities are grouped in "Four Theoretical Functional Dimensions" (T.F.D. Theoretical Functional Dimension), that is to say

- TFD1 = Production–Catering of personal (permanent and equipment products) and intermediary products (industry, constructional and circulation sector).
- TFD 2 = Personal (permanent and equipment) products retail trade.
- TFD 3 = Services, and
- TFD 4 = Products Storages (Import and Rejection).

[1] B.U.S.-Best Urban Structure

These four Functional Dimensions summarize with a specific way city's function, and these theoretical dimensions must be allocated in the ideal city areal model in order to make it complete.

3 THE BEST AREAL DISTRIBUTION OF CITY'S FUNCTIONAL DIMENSIONS.

The total solve of city's areal distribution should be expressed in functional hierarchical levels with inductive form where each initial structural element composed in total will constitute the structural element of superior hierarchically level in a way that the targeted ideal structure runs through from the lower in its higher part.

The basic therefore question that is posed for the configuration of ideal Urban Structure is the determination of economic activities areal distribution in the Urban tissue.

The theoretical point that has already been formulated is that the circulation function diagram is determined initially, as well as the circulation types, and above these circulatory diagrams, Land Uses groups should be allocated. The relation of the circulatory model with the served Land Uses will ensure the proper and hence sustainable city's function.

As second basic theoretical point it is posed that the Personal retail trade is allocated on both sides of road axes or in the centers of residence areas. That is to say they will be mixed with the strictly residence areas that will allow easy access without automotive use.

4 BEST URBAN STRUCTURE'S AIM.

The combination of types (constant orbit means, steady itinerary means etc.) and forms (areal forms of urban tissue) of movement for the service of the daily needs and activities expressed in the total urban tissue i.e. combination of urban tissue with the distributed land uses adapted hierarcially in the existing social structure needs harmoniously will lead us to the best urban structure. The harmonious way consists in the ensurement of minimal possible energy consumption and the simultaneous minimisation of pollutants emission at city's daily function. These elements constitute the basic attributes of B.U.S. Their harmonious way presupposes also their general distribution in the city's total area, fact that will ensure its wider ecological function.

The above will be ensured with the conformed configuration of the two urban tissue's essential basic elements a) the circulatory tissue form and b) land uses allocation in it.

5 THE AREAL FORM OF URBAN LAND USES AND CIRCULATION TISSUE.

Urban tissue's form should be determined mainly from the proper circulatory flows for city's total service.Thus the used available transport means are:

- a) Mass Transport means of constant orbit (metro, tram and others),
- b) Conventional or electric Buses of steady itinerary,
- c) free circulation of private cars with the corresponding parkings and
- d) pedestrian movement.

The above will be closely associated in hierarchical levels according to the land uses they serve.

At the same time the circulation forms must be areally expressed so that they cover the classically acceptable land uses allocation via a formulation of Urban tissue that will serve their general and special requirements in daily and weekly base.

Thus the basic structural elements of B.U.S. are considered

- 1. One way peripherical axes so that self-existent functional regions are shaped (residence, centres, specialised centres, general activities, e.t.c..)
- 2. The via-central axes, of linear or circular form
- 3. Sub-centers peripherical axes
- 4. Supralocal axes, the basic entrances and exits of the city,
- 5. The basic urban tissue (internal streets) for the internal service of self-existent regions, in dimensions adapted to the land uses special requirements, that serves and is reliably expressed with an hierarchical ippodamius tissue, in a conformed planning so that the city's total is covered.

Thus the total city‘s form is progressively shaped with its structural elements "the residence cores" as below:

The“basic residence core" is defined with C level Region Centre (CC1,2,3,4,5,6) and influences a region of 1.000 metres radius. The defined region’s area is 31,41 ha and it can accomodate, with clearly ecological terms, from 40.000 until 100.000 residents depending on the established layout factor that can be defined from 1 until 2,5. Inside each core the TFD2 (Personal products retail trade) will be allocated in order to cover the daily and weekly needs of its population, as it is described above.

In shape 1 the basic structural elements of B.U.S. are shown in a linear form of three “residence zones”(R.Z.) constituted from seven cores each, as also the way they are circulatory served with metro, tram and peripherical axes. The mentioned form of three R.Z linear developments, based always on the "residence cores", and the creation of three central regions is achieved with second level functional centres CB1, CB2, CB3. The estimated population amounts in 240.000 residents for each R.Z.

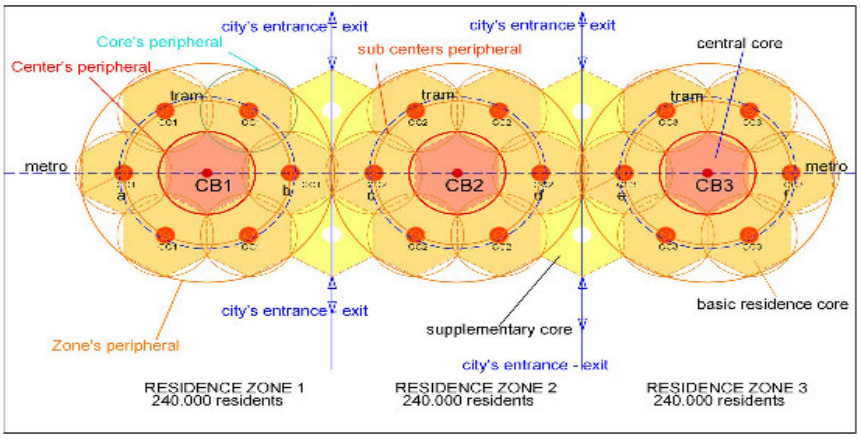

Figure 1: Best Urban Form, Strucural Elements Linear connection of three residence areas, each composed by seven residence cores,served by metro, tram and peripheral axes.

The linear development of residence areas occupies 2.194 ha each, has more advantages than the central nuclear form in the point of city’s extension, mainly from circulatory point of view because it gives us better possibility for total circulatory resolution which is in deed adapted more easily at the linear extension.This appears clearly in shape 2 where the allocation of the Theoretical Functiunal Dimensions is shown.

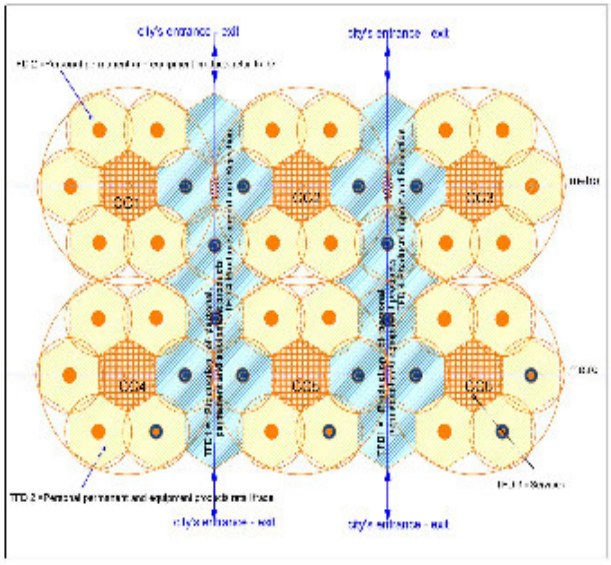

Figure 2: The ideal allocation of the four functional dimensions in six built up zones,with 1.120.000 residents capacity,served by metro, tram and peripheral axes.

For the achievement of the above, Production–Catering of personal intermediary products (TFD1) will be allocated inside the zone that is created by the two supplementary cores of two possessed R.Z that also occupies the two adjacent cores totally shaping a zone of eight cores. The Personal permanent and equipment products retail trade (TFD2) will be allocated inside the residence cores, as it is described above. Services (TFD 3) are placed in central cores CC1, CC 2, CC 3, CC4, CC5 and CC6. Each one of these occupies an area of 31,41 ha . The Services region totally occupies 188,46 ha. The Products import and rejection (Storages) (TFD 4) is allocated with TFD1.

This composition's form allows the horizontal and vertical spatial extension achieving the creation of wider residence areas with all the essential human functions and circulations. Thus the above following distributions are proposed in the diagram of the linear B.U.S. (shape 2).

6 THE ECOLOGICAL DIMENSION OF THE PROPOSED STRUCTURE.

It should be emphasised that with the proposed urban forms the soft, from ecological point, city's behavior is ensured. Thus the circulation inside the basic residence core, that occupies an 31,41 ha area is achieved from

- a) the regions that are influenced by 3rd level centers (CC1-CC6), that can be accessed on foot in 15 minutes in a 1.000 meters maximum distance.
- b) the passage from CC1 in the other six CC1,2,3,4,5,6 centers with constant orbit mean in a perimeter of 10.882 meters length.
- c) in positions (a) and (b) the re-embarkation in the corresponding metro stations is taking place. With this way a three region area that occupies 659,61ha and can accommodate 720.000 inhabitants is covered by transport.

The all therefore city's service is achieved by the most distant point with hardly 15 minutes walking and afterwards with land and underground mass transport means. The road network circulation is covered (shape 1) with the four peripheral axes of a) basic residence core area, b) centre's core (CB1 to CB6), c) residence zone area and d) sub-centers peripheral axes (CC1 to CC6).

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Senior Social Platform – An application aimed to reduce the social and digital isolation of seniors

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1 ABSTRACT

European society is aging; trends such as social isolation and health issues are on the rise as aging citizens become less mobile and the social interactions associated with work, family and friends weaken. Loneliness and social isolation among senior citizens can be as harmful to their health as smoking or a sedentary lifestyle. Just as the demographic makeup of society is changing, the manner in which citizens interact with each other has also changed dramatically in recent years. The Internet, Email and Web 2.0 social media have led to a migration of social interaction from physical to virtual communities. Yet, a mere seven percent of seniors participate in social networks. The Senior Social Platform (SSP) aims to use social networking applications to help reduce social isolation and loneliness among seniors and promote participation in today's increasingly virtual society.

2 STATE-OF-THE-ART

2.1 Social networks – defined

Social networks are essentially fora where people who share common interests come together to form a community. Traditional social networks include academic organizations, career associations, interest groups, etc. Interaction with peers in such social networks generally involves face-to-face meetings. Today, however, like many other activities, social networks have migrated to the Web. Dominant Web-based social networks include Facebook and MySpace, however, a multitude of other social networks also exist. A key attraction of such social networks is the ability to obtain information about members without actually contacting or "meeting" them. In addition, online social networks provide a variety of other functionality including video and audio file sharing that make them attractive to many individuals. [1]

2.2 Internet and Social Network usage

About six out 10 West Europeans regularly use the Internet. Recently – for the first time - the amount of time young people spend online exceeds time spent watching TV. [2] In 2006, Austria had 4,6 million Internet users and a broadband penetration rate of 61,8% which places it slightly higher than the EU average in terms of Internet usage. Although earlier Internet growth was driven by tech-savvy young people, more recently, an increasing number of senior citizens have been flocking to the Web. In fact, according to Senior Journal, "the fastest growth in Internet use is being driven by the older age groups, starting at 55."[3][4]

Previously the Web was about Email, instant messaging and blogging, in other words, communicating with the rest of the world on a large scale. Today in the era of Web 2.0, it is about becoming social and the Web's killer apps focus on connecting us and our online activities with our friends – real and virtual. [5] Thus social networks are becoming a key driver of Internet usage growth with 42 percent of Internet users active in social networks. [6]

As mentioned above, senior citizens are at the forefront of today's Web growth. However, relatively few seniors are involved in Web 2.0 social networks despite the many potential benefits for this age group. Whereas among young adults (age 18-24), 75 percent use social networks, usage levels by adults over 65 are still a mere 7 percent. [6] The main reason for this has been the lack of a social network platform that meets the needs of seniors in terms of usability.

This is changing. Social networks are expanding and diversifying. While MySpace (50%) and Facebook (22%) continue to be by far the most frequented by social network users, an increasing number of niche networks are also springing up. [7] These niche networks include a number which focus solely on older age groups – the so-called baby-boomers or empty-nesters. These age groups have both numbers and significant purchasing power (over $2 trillion) - an attractive combination that is feeding this new trend. [8] Some older people are joining Facebook to keep up with children and grandchildren. In fact, Facebook and MySpace have gone to great lengths to make their sites more accessible to senior citizens, as well as giving them more features specifically designed to an older demographic. [9] The strategy seems to be paying off. The Nielsen report reveals that from December 2007 to December 2008, Facebook added more than 13.6 million users

aged between 50 and 64, which is about twice the number of added users under 18 years old. [10] Seniors frequenting the new niche senior social networks perform activities ranging from exchanging photos, chatting and playing brain games to online dating and seeking advice on various topics. Some of the new senior-oriented (niche) social networks include:

- eons. A popular social network for Baby Boomers, eons offers ways to connect with others as well as brain games, blogs, videos, and photos.
- Rezoom. Offers articles on music, activities, going green, money, and more. Also allows users to find a friend, read blogs, or visit one of the city-specific sites.
- Multiply. While not just for older users, this site does have a large number of senior members. The features here include blogs, a social calendar, movie and restaurant reviews, and photo sharing.
- Seniorocity. Only for adults over 40, this network offers plenty of ways to connect with others including blogs, chat rooms, groups, and photo galleries.
- Maya's Mom. Specifically for parents, this site is known to have lots of older members. Connect with other parents in groups, by sharing photos, and more.
- BOOMj. This social networking site offers the opportunity to connect with friends and colleagues, shopping, photo and video sharing, and much more.
- Boomertowne. Users can create a profile and join in with discussion groups, movie reviews, recipes, and more. Boomertowne also features a singles dating service.
- EldersVoice. This site is a "social networking site for senior citizens who are young at heart." Users can post photos, video chat, play games, or post on their personal blog.
- TeeBeeDee. For anyone over 40, this site emphasizes sharing experiences and knowledge. Topics range from travel to food to sex to spirituality.
- BoomerGirl. Targeting Baby Boomer women this site is part social network and part eZine.
- Eldr. Users can participate in the forums or start blogging to connect with others. Don't forget to take advantage of the great articles ranging from travel to the environment to exercise.
- Secondprime. For the 50+ set, this community includes the usual forums and such as well as volunteer activities, a social calendar, and more.
- Growingbolder. The concept of this site is to create an intergenerational community around news that is inspiring, amusing, and uplifting. While most content is specifically directed at those over 50, the site welcomes members of any age.
- RedwoodAge. This site has a definite social-change aspect to it with topics such as the environment, poverty, and the state of health care right along side articles about health, exercise, and travel. Users can visit the Village to connect with others.
- eGenerations. Their tagline explains that they are "a worldwide community of experienced adults" and the home page shows there are members from 62 countries and ranging in age from 30 to 101.
- Boomer-Living.com. Users can join the Coffeehouse at this site to find their social network where you can meet others, play trivia, and more.
- LifeTwo. "Midlife improved" is how this site is described. Users can follow their online buddies with a free membership or just read the blogs and articles available.
- My Boomer Place. Users can create a profile and get started connecting with friends or making new ones, sharing photos, writing and sharing articles, playing games, etc.
- Maple and Leek. For those 50+, this community is one of adventure and entrepreneurial spirit. Users can connect with like-minded seniors.
- InteractWell, a site specifically designed for senior citizens. Not only is it a place for seniors to come together and interact, but a place for them to share their views regarding life experiences, all across the globe.

- GrownUps. A site out of New Zealand, this social network for those over 50 provides information on health, money, games, and more as well as an extensive listing of various online groups and organizations users can join. [11-13]
- Finerday. A commercial site, supported by Age Concern, it enables older people to stay in touch with their families and vice versa. The website allows the whole family to connect, share photos, special dates and memories. It has been designed in a simple way with the intention of making it easy to use for senior citizens who may not have used a computer before.
- Saga Zone. This is an online social community, based in the UK, targeted at the over 50's.
- The Peggy service was developed as a means of connecting older people with their younger relatives using social networking, in a way that is convenient for them. The Peggy function on Facebook allows members of the site to send a postcard from Facebook telling someone they are thinking of them. The function allows an individual to type their postcard on Facebook, the company will then print this out and send it. [14]
- thetimesofmylife.com - a site that enables older people (and others) to post their memories – in text, audio or video – to be shared and preserved for posterity.
- Information Now15 - This is not a social networking site but it is a website which was designed to address the needs of older people in Newcastle. The site was created in conjunction with older people to provide information for older people, their families and carers, about services available in the local area.
- Seniorkom – www.seniorkom.at – This Web page offers senior citizens a comprehensive selection of services and information as well as Chat possibilities for registered users
- Genkvetch, in honor of the generation that "kvetches," a Yiddish word meaning complains, whines or nags. The site, open to people of all faiths, accepts no advertisements. [15]
- ELDY (http://www.eldy.eu/de/) – simple Windows interface tailored to seniors, includes 6 areas (print, mail, etc.)
- http://jive.benarent.co.uk - jive is a range of devices that help seniors keep up to date and stay in touch with their loved ones. The devices were designed to help technophobes interact virtually.
- http://www.boomeryearbook.com/ - Easy to use social website geared to seniors.

The majority of these senior-oriented social networks are located in the U.S. However, social networking is hardly just a U.S. trend. It is popular in Europe and Facebook and MySpace are dominant players here as well. Nevertheless, the European social network market is more fragmented - often by country or language region. Dominant social network sites in German speaking areas of Europe include:

- hi5.com
- Netlog.com
- StudiVZ.net

2.3 User Interfaces

Probably the single most significant deterrent to widespread adoption of any form of ICT by seniors is their general unfamiliarity with such technologies and the user interface for managing them. This is especially true in the case of social networks. Services available and appropriate for older people are often inadequate. Unlike their younger counterparts, the physical and mental states of seniors limit their ability to make full use of social network functionality. Indeed, "the designs of most social network websites are poorly suitable for the elderly."

It is particularly challenging to develop a user interface for user groups that have little experience in using the technologies in question. To this end, researchers are currently examining the potential for existing technologies familiar to seniors to act as an interface to ICT and the applications that run on them. For many elderly, the television and the telephone are their main form of company and the most commonly used consumer devices in the household. Especially in light of the digital switchover for TV and the ubiquity of mobile phones, these two devices offer considerable potential as a means of interfacing with the Internet and,

ultimately, with social applications. WebTV is nothing new; it has been around for over a decade. However, researchers are currently examining how the TV and its remote can become an interactive device for seniors by augmenting it with Web connectivity. It is perfectly feasible for an older person to use their television to browse the net, access social networks, information about their health, or activities in their local area. There seems to be a smaller jump from watching a television, which older people are already familiar with, to getting online. Furthermore, there may be a role for the television here, specifically with the proposed digital switch over taking place by 2012.

Other interfaces are also under development. A recently launched communication device called Jive aims at getting elderly technophobes connected to friends and family by making the process of getting online and navigating a social network easier for seniors. [16] However, probably the most significant new forms of interfacing with ICT are coming from the gaming industry "where Joysticks and push-button controllers seem to be on their way out, replaced by simpler, more intuitive devices -- similar to Nintendo's Wii -- that let gamers move their arms and legs to guide their avatars' movements onscreen." Nintendo even has come out with a new device called the Wii Vitality Sensor, which is intended to help players visualize and control their pulses – a device with obvious potential for the eHomecare industry.

3 SOCIAL NETWORKS AND SENIORS

"Loneliness is a situation experienced by the individual as one where there is an unpleasant or inadmissible lack of (quality of) certain relationships. This includes situations, in which the number of existing relationships is smaller than is considered desirable or admissible, as well as situations where the intimacy one wishes for has not been realized." Loneliness often goes hand-in-hand with social isolation. Living in a society where there are massive inequalities has led to many people feeling excluded. A 2003 ESRC report defines social exclusion among seniors as, "the elderly missing out on material needs, social relations, civic activities or basic services". [17] There is a strong connection between social exclusion and digital exclusion. A Citizen's Online report from July 2007 revealed that 75% of people who are socially excluded are also digitally excluded. The growing virtualization of society and social contacts will exacerbate the situation and lead to further social isolation of the elderly.

Researchers have found that the health effects of loneliness are similar to those of a sedentary lifestyle or even smoking. These effects include a variety of ailments ranging from depression to Alzheimer's. The costs of treating these ailments are a burden on society which will increase as the number of elderly increase due to demographic trends in Europe. By 2050, 25% of the EU's population will be over 60.

Social contact can actually be a means of preventing such ailments. For example, researchers at the Rush University Medical Center in Chicago have found that social contact offers a protective effect against the damaging impacts of Alzheimer's disease. They found that the greater the social network size of seniors suffering Alzheimer's, the more protective effect on cognitive ability occurred. In other words, "social network size appears to have offered a protective reserve capacity despite the fact that their brains had the tangles and plaques indicative of Alzheimer's disease."

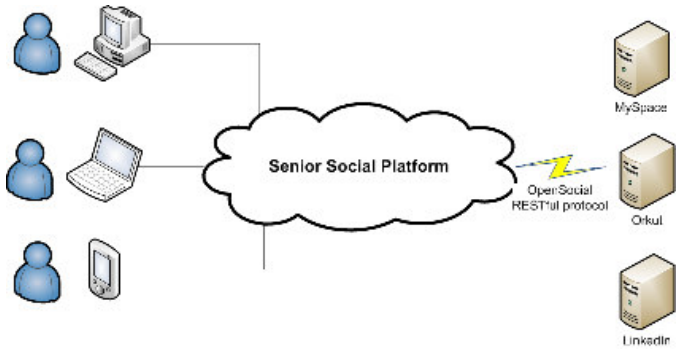
While this research focused on social networks in the physical world, there seems to be strength in the argument that virtual social networks could also be of benefit for lonely older people. Furthermore, Metcalfe's Law clearly states the value of any network is proportional to the number of connected users. Therefore, the value for any older person using a social network depends on the number of other older people using the same network.

Politicians, policy makers and citizen activists also are turning to social networking sites as a means to reach new audiences. Especially in the U.S., social networks are playing a key role in political campaigns. Some advocacy groups have created their own Apps on social networks, while others are using ones created by vendors that plug into member-management systems. On Facebook, for example, users can create "Causes," while groups can create "Fan Pages." [18] The social exclusion of seniors stemming from their limited use of social networks will eventually lead to political exclusion despite their growing numbers as a demographic group. [19]

4 THE SENIOR SOCIAL PLATFORM

This project is supported through a grant from the Internet Foundation Austria (IPA). The Senior Social Platform (SSP) project aims to use OpenSocial - a set of common APIs launched by Google and supported by many other social networking sites - to create a user-friendly interface to social networking sites which focuses on senior citizens and their needs. By involving seniors in social networks, the project aims to reduce the social and digital isolation of this age group while simultaneously providing a valuable tool for family, caregivers, and social services to meet the needs of a large and growing demographic group.

The OpenSocial recommendation standardizes basic elements for social network profiles such as property fields (name, DOB, friend lists, etc.) and media lists including photos, videos or music. OpenSocial is basically an API that provides a container that makes it possible for social network applications (also called widgets) to run on multiple sites without modification to the code. A major component of this project is connecting the SSP to existing social networks, which the platform will gather information from. The social networks which support OpenSocial, usually provide a RESTful interface, which makes it possible to retrieve necessary information from each social network. Using such an interface, we can integrate multiple sites into our SSP.



The SSP will be a Web application, e.g. written in Java, and will run on an Open Source application server, such as Apache Tomcat. It will have a database engine to store access tokens and settings of the different users. This could be IBM's free DB2 ExpressC, MySQL, or PostgreSQL. Communication will occur over a RESTful protocol either directly between the server and the social network site, or between the user's browser and the social network site with the help of JavaScript and the powerful JQuery framework, using JSON as data format.

Security is also an important. The RESTful APIs usually authenticate with OAuth, which is one of the most secure solutions available. The user will only have to enter his credentials once for example on a preferred social network. Our platform will only receive a dedicated access token, which can be used to access the user's profile on the given social network and can be revoked any time the user would like to deny access for our platform.

Currently, the SSP is still under development. The initiative has a project Web page (http://sites.google.com/a/ceit.at/ssp/) where progress can be followed.

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Smart Grid and E-Mobility

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1 ABSTRACT

Industrial companies and energy suppliers are working closely together with automotive engineering to make the vision of electric mobility in individual traffic a reality. An electric car is simultaneously both a means of transport and a mobile energy-storage device that can also be used as a source of energy in public networks in the medium term. Such cars could also be used as controllable loads for the fluctuating feed of wind or solar energy into a power grid - provided that the layout of the network permits such a scenario.

As an integrated technology company Siemens is heavily involved in electric mobility in its Corporate Technology department and in the Energy and Industry Sectors. The work focuses not only on the requirements made on the electric vehicle itself but also on the design of the infrastructure of the power grids. Areas under investigation include power generation and distribution, traffic and energy management, charging infrastructure, intelligent electricity meters, power electronics, software and sensors, and of course also the electric drives, and energy recovery and storage.

2 BACK TO THE FUTURE

On April 29, 1882, Werner Siemens drove the Elektromote - an electrically powered carriage - along a 540-meter test track in Halensee near Berlin.

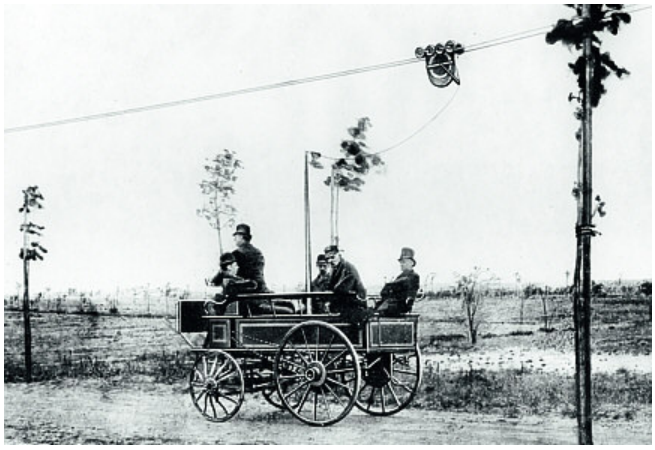

Fig. 1: Elektomote of Werner Siemens

Siemens' invention was not only the first electric vehicle, but also the world's first trolley bus. The Elektromote was followed in 1905 by the Electric Victoria, which rolled through Berlin as a taxi and delivery vehicle at a top speed of 24 kilometres per hour. Although these vehicles were well ahead of their time, their low battery capacities, speeds, and range couldn't compete with internal combustion engines. This state of affairs has lasted more than 100 years, and the rule of thumb even today remains that one liter of gasoline equates to nine kilowatt-hours. A lithium-ion battery with that sort of content weighs around 100 kilograms. Still, an electric car can travel around 60 kilometres on that energy, while a gasoline-powered vehicle will only manage 10 to 20 kilometres. This range superiority is due to the fact that electric motors are roughly four times as efficient as combustion engines. Lithium-ion batteries are familiar as high-performance energy storage devices in cell phones, PDAs, and laptops. They can store two to three times as much energy as conventional nickel-cadmium batteries of the same weight. However, a €10,000 Li-ion battery would be required to power a passenger car that uses approx.15 kilowatt-hours per 100 kilometres. Mass production will thus be required to bring prices down to affordable levels.

3 ELECTRIC ECOSYSTEM

A vision of mobility is emerging in which vehicles not only deliver clean transportation, but also store excess energy from renewable sources. New drive systems, battery, billing, and smart grid technologies are setting the stage for tomorrow's energy and transportation ecosystem.

Imagine millions of electric vehicles in parking lots and garages, each drawing power from the grid. Now take the thought one step further and imagine each vehicle returning some of its stored energy to the grid during periods of peak power demand. That's the vision that is set to transform the automotive industry over the next few years. It's a vision that is not possible with the internal combustion engine. However, it can be achieved with a bidirectional battery that can be charged up or used as an energy source.

Fig. 2: Tomorrow's electric vehicles will redefine mobility. Not only will they recharge in only minutes at fast charge stations.

They will also function as mobile power storage units for the smart grid.

This vision of electric mobility has come about as the result of the convergence of a number of factors. An increasing number of people want to be mobile, while energy consumption is rising dramatically, especially in emerging markets such as India and China. In the past, these demands were met mainly by using fossil fuels. And indeed, for over 100 years cars have been powered by combustion engines while electrical power has essentially been produced by burning coal or natural gas. Only railway traffic was mainly based on electric engines.

Time is running out, however, because fossil resources are being depleted, and the CO2 emissions they produce are accelerating climate change. More and more energy suppliers are therefore utilizing renewable and CO2-free energy sources, such as wind and solar power. The problem here, however, is that their yield depends on the weather. As the share of electricity from such sources increases, so too does the need to develop interim storage facilities whose energy can be tapped at a moment's notice. One idea is to use batteries in electric cars, which, depending on demand for electricity and price, can either be recharged from any power outlet or return electricity to the grid. If, for example, a surplus of electricity is available, as is often the case at night or during periods of windy weather, prices could be lowered, making it attractive to "fill up" at such times. Conversely, if winds were calm, or a lot of electricity was being used during the day, the price might rise accordingly, which would lead many vehicle owners to sell their electricity back to the grid at a profit.

In fact, an intelligent management system installed in each car could even make the decision itself, provided it knew how far its driver planned to travel that day, and how much electricity the battery would require for that distance. In any case, most cars sit idly for most of the day, which means they could be continually connected to the grid from their office parking spaces, parking lots or home garages. Flexibly determining electricity prices in accordance with supply and demand would also eliminate any problem associated with many vehicles trying to recharge at once, which of course would cause prices to skyrocket.

4 CARS THAT GENERATE INCOME

By storing energy that can be returned to the grid, electric cars can act as buffers for wind and solar power. The rule of thumb is that there should be some 300 electric vehicles as potential energy storage units for every wind turbine with a peak output of three megawatts. The existence of cars as mobile storage units would kill two birds with one stone. Assuming vehicle batteries could handle numerous charging and discharging cycles, energy supply companies would be provided with a buffer against surplus energy from renewable sources, while vehicle owners would have a source of income to help them finance their relatively expensive batteries. In the foreseeable future, batteries will remain one of the most expensive components

electric cars. Achieving a range of 100 kilometres for a mid-sized vehicle today requires a battery with approximately 15 kilowatt-hours of energy content. Such a battery currently costs more than €10,000. However, there are other options for such mobile power plants besides having them financed through income from electricity. For one thing, vehicle owners wouldn't necessarily have to buy the battery. Instead, it could be leased from an energy supplier. In other words, an energy company would decentralize its energy storage capacity and finance the battery through the latter's "secondary use."

Regardless of what form electric cars may take, and what role they will play in the electricity mix, any future concept will need to incorporate the most important stakeholders: electricity producers, automakers, suppliers, and governments, whose policies should pave the way for the necessary paradigm change. Extensive R&D investment will be required - particularly in the fields of energy storage, vehicle engineering, and power-grid integration. In fact, such alliances are already in place. For instance, BMW, Daimler and Volkswagen are working with major German power suppliers such as Vattenfall, RWE, and Evonik. VW also recently began working with Toshiba on the development of battery technology. Powerful batteries are indeed the key to the entire vision. The Siemens R&D focus is on electric vehicle system requirements and the design of a mobility power grid infrastructure. Among other things, Siemens engineers are examining power generation and distribution options, transport and energy management systems, smart metering, power electronics, software, sensors and, of course, electric drives and the recovery and storage of energy.

As electric vehicles enter the market, the power grid will have to be updated. It will, for example, be necessary to install systems that can accommodate the total electricity requirements of the individual vehicles in public areas such as inner-city parking garages and sports stadiums. Here, one distribution transformer complete with switchgear will be needed for every 50 vehicles. This means several dozen such transformers will have to be linked via medium-voltage switchgear. Having several thousand vehicles parked in one place will require major facilities, and these will have to be installed in basements or separate buildings. After all, if 10,000 vehicles simultaneously tap the grid for 20 kW each, the resulting required output will be 200 megawatts - which is what a medium power plant produces.

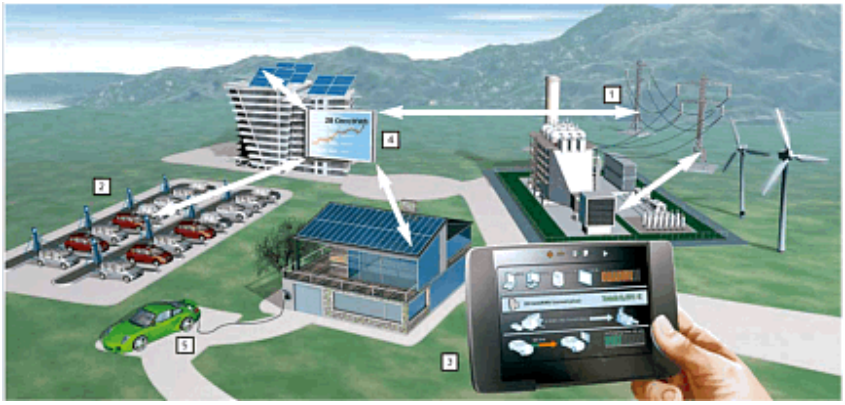

Fig. 3: Integration of electric vehicles into smart grids.

Experts believe that in Germany alone, there is potential for 4.5 million electric vehicles on the road by 2020. All of these vehicles could get their power from the existing grid. And that's just a conservative estimate, because these vehicles would only add up to about half of the second cars owned by families, most of which never travel over 70 kilometres a day. However using batteries as storage is today 100 times more expensive than storing energy in pump storage power plants.

5 SELLING MILES INSTEAD OF CARS

Germany is not the only country pursuing new electric mobility concepts; ideas are also being generated and implemented in the U.S., Australia, Israel, and Denmark, as well as in other nations. In California, a start-up called Better Place is addressing the entire value chain for a modern mobility system based on renewable energy sources. Launched two years ago, Better Place is working on the creation of a comprehensive infrastructure for the operation of electric vehicles. Following the concept used to attract mobile phone customers, Better Place plans to provide its customers with cars at discount prices - or even for free. Customers would then pay for the distances travelled, with their invoices based solely on the actual number of kilometres driven. Better Place believes it can provide customers with a better kilometre-based leasing

deal for electric vehicles than can be obtained for a vehicle with a combustion engine. Here, battery stations designed like gas stations would enable batteries low on energy to be quickly exchanged for fully-charged ones. Better Place has entered a partnership with Renault-Nissan and plans to work with local energy utilities to establish energy infrastructures in various countries. The first electric car-based systems are expected to be up and running by 2011.

German companies have also recognized the market potential offered by electric vehicles and are working hard to develop appropriate solutions. Daimler, for example, is looking to establish an alliance with energy provider RWE that would standardize battery charging stations. The fact that Abu Dhabi recently decided to become a major Daimler shareholder appears to confirm that the automaker is on the right track. Through Daimler, Abu Dhabi is banking on an accelerated transition from combustion engines to alternative drive systems, thus preparing itself for the "post-oil era." Similarly, BMW and Volkswagen are working with energy companies - among other things in order to determine which types of infrastructure are necessary for different mobility requirements. Their ultimate goal is to establish a foundation for the widespread introduction of electric vehicles.

The electric automobile revolution could end up taking place in Asia, however, as completely new players are now joining traditional automotive companies there. At the 2008 Geneva Motor Show, for example, a Chinese plug-in hybrid electric vehicle known as the "F3DM" was unveiled by a company called Build Your Dream (BYD). The car is equipped with a small-volume combustion engine (1.0 liters displacement), a complete electric drive system, and a battery/storage unit that can be charged internally via a generator and/or by exploiting braking energy recovery, or externally at a conventional 230-volt outlet. The vehicle's range in the pure electric mode is 110 kilometres, which is more than the average one-day requirement of most commuters. BYD, which is headquartered in Shenzhen in the Chinese province of Guangdong, was established in 1995. It now has 120,000 employees and is one of the top 20 companies in China. For six years now, its 6,000 engineers have been intensively studying and developing hybrid and electric vehicles. Thanks to Chinese expertise in the field of Li-ion batteries, which comes from decades of experience with cell phones and PCs, BYD is one of the few automakers anywhere that can independently develop and produce the battery technology required for modern electric vehicles. If these vehicles manage to fulfil the safety regulations in Europe, they would become serious competitors to European car manufactures.

6 MOBILE POWER PLANTS.

Connecting electric vehicles to the power grid poses a particular challenge, as large amounts of energy will need to flow quickly and in both directions if the electrical energy from batteries is to be used as so-called "regulating energy" during peak times. Regulating energy refers to the energy a power network operator must provide in order to offset frequency fluctuations in the network, which arise when more energy is being used than the base-load power plants are capable of supplying. Regulating energy then has to be supplied at short notice from natural gas plants, pumped storage hydropower stations, thermal plants, or energy storage units. Already most of the components, systems, and solutions needed to establish an infrastructure to connect electric vehicles to the power grid are available: Switchgears, inverters, and control technology, network coupling, and local grid transformers.

7 REFERENCE PROJECTS

Siemens' Energy Sector established a research alliance in February 2009, when it signed an agreement to join an international consortium in Denmark known as the EDISON project. EDISON stands for "Electric vehicles in a Distributed and Integrated market using Sustainable energy and Open Networks." The goal of the project is to standardize electrical energy-storage equipment and charging/discharging technologies for electric and plug-in electric hybrid vehicles. Innovative ways of linking electric vehicles to the power supply grid in Denmark are studied.

Today, 20 percent of Denmark's electricity is produced by wind power, making it the world leader in this area and this figure is set to rise to 50 percent by 2025. Still, the good feeling about so much renewable energy is dampened by the fact that when the wind blows too strongly, the wind-turbine rotors generate more electricity than Denmark's grid can handle. Up until now, Danish power utilities have had to send this surplus electricity to neighbouring countries - and pay for doing so. It is therefore not surprising that Denmark is a pioneer in the development of storage technologies to accommodate excess electricity, with

researchers focusing mainly on the batteries used in electric vehicles. Current plans call for one out of ten cars in Denmark to run on electricity from wind power in ten years. Although this goal may seem ambitious, given that there are hardly any electric vehicles on European roads today, Denmark is moving ahead rapidly with electric mobility through a broad range of projects. Practical testing will begin in 2011 on the Danish island of Bornholm in the Baltic Sea.

As a partner in the EDISON project, Siemens is responsible for coordinating and delivering key technologies, such as those needed for charging stations and associated control systems that ensure optimal utilization of battery capacities. At the heart of the overall setup are the power electronics and communication systems for managing battery charging and feeding to the grid. The power grid connection constitutes a special challenge because large amounts of energy have to flow quickly and bidirectionally to be able to use the electrical energy in the batteries also as balancing power.

Siemens' testing activities are not limited to Denmark, of course. The company's researchers are also active in Germany, where, for example, they are working with Harz.EE.mobility in a project designed to determine how distributed wind, solar, and biogas power systems can be better aligned with the grid. Three participating districts in Germany's Harz region are looking at how to incorporate electric vehicles into such a system. Siemens will deliver charging posts, an energy management system for the integration of electric cars into the smart grid, and associated communications.

The Austrian Mobile Power Platform was founded with the goal of rapidly implementing electro mobility in Austria. Amongst them is Verbund as electricity producer, Magna as producer of car components and Siemens as supplies of smart grid infrastructure. The platform comprises of a growing number of top representatives from the sectors of vehicle-, system- and infrastructure development.

Against the background of the economic goals of energy efficiency, reduction of emissions - especially those of CO2, but also particulate matter or noise - as well as supply security, the partners want to establish a valid superordinate overall system that works not only in Austria but also transnationally.

Fig. 4: Logo of the Austrian Mobile Power initiative

The Austrian Mobile Power initiative follows a clear vision for the future of automobility: cars and light-duty commercial vehicles will in future be powered by electricity from renewable energies. As the country of renewable energy sources, Austria offers the best prerequisites for an environmentally friendly, sustainable transport system based upon renewable energy sources. Austrian Mobile Power wants to use this unique opportunity and promote developments in this area.

In 2020 there will be at least 100,000 electric vehicles on the roads in at least one conurbation. Throughout Austria, there could indeed already be 500,000 electric vehicles in operation at this time. In 2050, there will then only be purely electrically powered vehicles in Austria. AMP is making an important contribution to achieving the platform members' ambitious goal by investing 50 million Euro for the introduction of electro mobility in Austria by 2020. The funds will be used to promote the market launch of production-ready electric vehicles, to make an ample charging infrastructure available for electricity generated from renewable energies, as well as developing customer-oriented mobility services. A central task of the platform is the integration of model regions for electro mobility in Austria.

8 OUTLOOK AND CONCLUSION

Climate change, gas prices, the increasing demand for mobility, new technological developments for engines and batteries - all these factors contribute to the fact that an old idea is coming back to life: electric automobiles. Electric vehicles are creating a surge of development and are the cause of exciting new alliances. Cars are turning into mobile energy storage units with the ability to re-feed energy back to Smart Grids. Electric vehicles, therefore, become much more than environmentally compatible vehicles: they are an

important element of an intelligent energy infrastructure and contribute to the grid's ability to compensate for fluctuating infeed from renewables and distributed generation units.

The increasing share of decentralised and renewable energy and electric cars are a growing challenge for the electrical grid. In order to master these challenges, the grid and its consumers must become more flexible and interactive. Therefore today's grid have to be transform into an intelligent network that allows bi-directional communication between electricity suppliers and consumers and fosters sustainability by providing incentives for the efficient use of green energy. What is needed is an end-to-end infrastructure starting with generation over transmission and distribution to smart consumption.

Much still needs to be done here. For instance:

- Power grids have to be able to react correctly and quickly to fluctuations in the supply of electricity from renewable energy sources such as wind and solar facilities.
- Standards must be defined regarding the charging voltage of the power electronics, and a decision needs to be made as to whether the recharging processes should be controlled by a system within the vehicle or one installed at the charging station.
- Components for bidirectional operations and flexible billing for electricity still need to be developed if passenger cars are to be used as electricity storage media. And all these things must be part of the smart grid of the future.

Siemens has years of experience and tremendous expertise in all aspects of the energy supply chain. The company is thus ideally suited to help design tomorrow's electric mobility system - from vehicle parts to power grid components.

9 ACKNOWLEDGMENT

Siemens is carrying out intensive research into the subject of electro mobility. The Corporate Technology department and the sectors Energy and Industry of the integrated technology company are investigating both the requirements that must be met by the electric car itself and the design of the infrastructure of associated electrical networks. In particular, Siemens is concerned with energy generation and distribution, the management of traffic and energy, smart metering, power electronics, charging infrastructure, software, sensors and, of course, the electrical drives and the recovery and storage of energy.

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Smart growth and integrated planning in Gdansk and Dublin urban changes

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1 THEME

'Smart growth and integrated planning in urban changes of Dublin and Gdansk' is a complex issue. Its complexity emerges from various factors that need to be considered. First, the urbanisation process in such different cities should be analysed separately because of differences in the planning systems and the context of governance. The next problem to be taken into account is the nature of the process itself. The discernible characteristics of the particular stage of urban changes in every particular city should be carefully examined and explained.

Therefore, the first assumption was that there were some groups among cities that were similar in the character and stage of their urban changes (van den Berg 1982, Cheshire and Hay 1989, Cheshire 1995 and Champion 1995) and that this situation was common and applied to Gdansk as well. Gdansk is following a similar path of development as other European cities, although it can be at a different stage of its urban changes. Hence the objective of the first part of the research was to designate the relevant European city, adequate to be compared with Gdansk. A key difficulty here was to position Gdansk among the whole array of European cities due to the differences in advancement in their respective urban development. Finally, Dublin was chosen for the comparison.

As far as the research on European urban changes in cities is concerned, it should be noticed that it was recommended by the European Environmental Agency [6], which stated that 'new member states, where little urban sprawl has been detected, may follow the same path of urban development in the coming decade' and 'this is a role devolved to spatial development in policy making where the EU can support the envisioning of spatial planning of Europe's cities and regions to effectively address the issue of urban sprawl. This articulated vision of sustainable urban and regional development can provide the context for a range of integrated mutually reinforcing policy responses, offering a new policy coherence to be implemented at all levels.' EEA indicates that major contributions to combat urban sprawl include the transport and cohesion policies. However, the research proposition concerned smart growth and integrated planning as the potential contributor in the struggle against urban sprawl, because the policies can respond exactly to several factors (as shown in the Fig. 1), i.e. by raising living standard, the quality of life in the city, by focusing on the usage of public transport and by the participative character of decision making processes.

Needless to say, smart growth and integrated planning represent the characteristic way of modern planning spotlighting e.g. 'concentrated deconcentration' [4] or the vision of European 'eco–metropolis': high-tech, culturally in the swim, ecologically correct and receptive to participatory democracy, connected by an efficient transport system. All these refer in general to establishing the city development policy that allows different localities to develop their respective qualities as nodes in the polycentric network, inside or outside the European core (London – Paris- Milan – Munich – Hamburg or as it used to be called '20-40-50' because this area covered 20% of the territory of the EU at the end of 1990s and 40% of the UE population were producing 50% of its GDP [2].

The thesis was that although the suburbanisation occurred in certain circumstances (as shown in Fig. 1), it was possible to control and/or mitigate the process with smart growth strategy and integrative planning. It is presumed that smart growth and integrative planning have been applied in Dublin as well as in many other cities with positive results. The multi sectoral study of the comparative evaluation between Dublin and Gdansk [1] has designated the number of issues that can be regarded as the smart growth and integrative planning indicators. They have been selected in order to measure the results of the implementation of these policies in both cities. They refer in general to the accessibility, 'soft location factors' [3], the transport nodes and citizen participation and governance.

Fig. 1: Drivers of urban sprawl [6]

'Smart growth and integrated planning in urban changes' was aimed to test the effectiveness of smart growth and integrative planning implementation first and at the transparent evidence of applying the adequate policies' necessity to control or mitigate the urban sprawl in Gdansk.

The results of the research can be the proposal to other cities that would be interested to test the effectiveness of smart growth and integrative planning implementation by comparative evaluation of the policies implementation.

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SmartCountplus – Towards Automated Counting and Modelling of Non -Motorised Traffic with a Stand-Alone Sensor Device

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1 ABSTRACT

We introduce a novel visual counting device being able to automatically discriminate between participants of non-motorised traffic (pedestrians, bicyclists). The sensor elements (pixels) respond to relative light intensity changes, thus avoiding conventional imaging and privacy issues usually raised by the public when it comes to visual surveillance. Three-dimensional depth information is computed with the stereo principle, and the set of light intensity change events is grouped together with a clustering algorithm to discriminate between moving objects. A classification algorithm based on descriptive features then identifies indivual participants of non-motorised traffic. A preliminary evaluation on a dataset with 128 passages shows a classification rate of 92% for riding cyclists and 100% for pedestrians for 2+1 classification, and 43-96% for 4+1 classification distinguishing between riding cyclists, pedestrians, walking cyclists, umbrellas and other objects.

2 INTRODUCTION

Volumes of non-motorised traffic are defined by the number of pedestrians and bicyclists per unit time. They are a key performance measure necessary to evaluate the impact of pedestrian and bicycle infrastructure improvements, to develop estimates of pedestrian and bicyclist risks, and to understand the environmental correlates of walking and cycling (SCHWARTZ et al., 2000). One of the most promising strategies for improving the amount and quality of non-motorised traffic volume data is to employ automated counting devices. Automated devices have the potential to reduce costs associated with traditional manual counting methods, including the cost of data input and storage, and to produce long-term continuous counts of non motorised traffic activity. Without automated devices, the manual collection of counts of more than a few days in length is highly impractical. (GREEN-ROESEL et al., 2008).

Ideally, rather than seperately counting pedestrians and bicylcles with dedicated automated devices, it is desirable that a single self-contained device be able to discriminate between the participants and provide at the interface the various traffic counts. Fig. 1a) shows a typical setup, where a park has two separate lanes for pedestrians and cyclicts, respectively. Fig. 1b) shows a similar setup with a bicyle and pedestrian lane. Fig. 1c) shows a mixed scenario comprising riding cyclists, pedestrians and pedestrians with umbrellas (a feature often not taken into account) captured from the bridge shown Fig. 1b).

The main objective of the SmartCountPlus project is to implement a stand-alone sensor device being able to deliver separate counts for pedestrians and bicycles and their velocities. After a brief review of the state of the art of automated pedestrian and bicyle counting in Section 3, this paper introduces the SmartCountPlus sensor device in Section 4. Section 5 sketches the main principles of individually counting non motorised traffic participants on data captured with the SmartCountPlus sensor device. Section 5 provides preliminarly experimental results performed on data captured at the scenario of Fig. 1b) and c).

Figure 1 a, b and c

Fig. 1: Many non-motorised traffic scenarios are mixed (a) bicycle and pedestrian lane in a park (b) bicycle and pedestrian lane under a bridge (c) mixed scenario involving bicyclists, pedestrians and pedestrians with umbrellas as viewed from the bridge in (b)

3 STATE OF THE ART AND CONTRIBUTION

Technologies for obtaining automatic pedestrian counts have been mainly developed for indoor environments (e.g. shopping malls) or low-density outdoor environments (e.g. trails). The study in (GREEN-ROESEL et al., 2008) provides an overview of existing pedestrian counting technologies. Due to strongly varying environmental conditions such as rainfall, snow and lighting, existing technologies are often not suited for counting pedestrians in urban outdoor environments. For example, (CLARK, 2009) reports findings from monitoring success and failure of walking investment in London, where laser based counters wer reported not to work as desired. Instead, (CLARK, 2009) reports 'CCTV' (Closed Ciruit Television) as a sucessful technology, without specifying the technology or product which actually performs automated analysis of the captured video data for pedestrian counting. The same holds for the study of pedestrian quality standards in New York City (NG, 2009). Indeed, reliable automated video analysis for pedestrian counting is still a challenging scientific top in the field of computer vision, especially for crowded scenarios involving dense groups of people, see e.g. the proceedings of the Performance Evaluation of Tracking and Surveillance (PETS) workshop series (PETS, 2009). While surveillance systems exist which classify between vehicles and loose groups of pedestrians, e.g. (SHAH et al., 2007), there is currently no system available discriminating reliably between pedestrians and cyclists. Recent commercially available pedestrian counting technologies include the modulated light intensity (MLI) (IEE,2010), which does not discriminate between pedestrians and bicyclists.

Automatic bicycle counting technologies are already more established and have similar advantages and disadvantages as pedestrian counting technologies, though desnse groups of bicycles are less likely than pedestrian crowds. As an example, automated bicycle counts have been measured in the city of Vienna, Austria since 2002 with the help of radar technology, and recently with induction loops. Simple rules dicriminate between bicyclists and other objects.

SmartCountPlus builds upon an existing visual indoor people counting technology developed by the AIT Neurinformatics group (SCHRAML et al, 2010a). This highly accurate people counting system has been already installed at a number of indoor locations, including a crowd control systems for a subway station attached to a soccer stadium (SEER et al, 2008). The major objective of SmartCountPlus is to extend this counting technology to be robust against outdoor conditions, where the major contributions are as follows:

- to extend the maximum capturing area of 3.3 meters in order to cope with broader outdoor scenarios,
- to develop embedded clustering and classification algorithms which run on the sensor device and are able to discriminate between pedestrians, pedestrians with umbrellas and bicyclists and calcluate their velocities,
- to perform extensive field tests at various scenarios, and to model classification and counting accuracy as well as dependencies on external data such as weather.

4 SMARTCOUNTPLUS SENSOR DEVICE

The sensor device is based on the principle of stereo vision which aims at duplicating the human visual system by computing a third dimensions (depth) using a pair of vision sensors. With stereo processing, adverse environmental conditions such as rain or cast shadows (which are a major challenge in visual processing systems) can be better met than with a mere 2D visual processing (GRUBB et al., 2004).

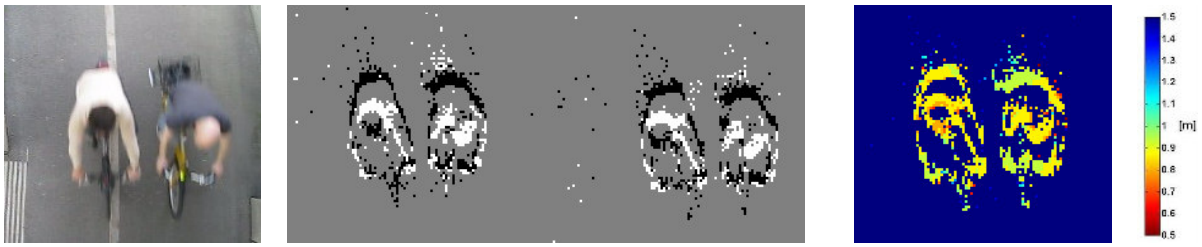

Figure 2 a, b, c, and d

Fig. 2: (a) Still image of two cyclists from a conventional video camera (b) light change events of the two dynamic stereo vision sensors corresponding to the scene in (a), (c) depth map computed by stereo (d), color code indicating range in meters from sensor

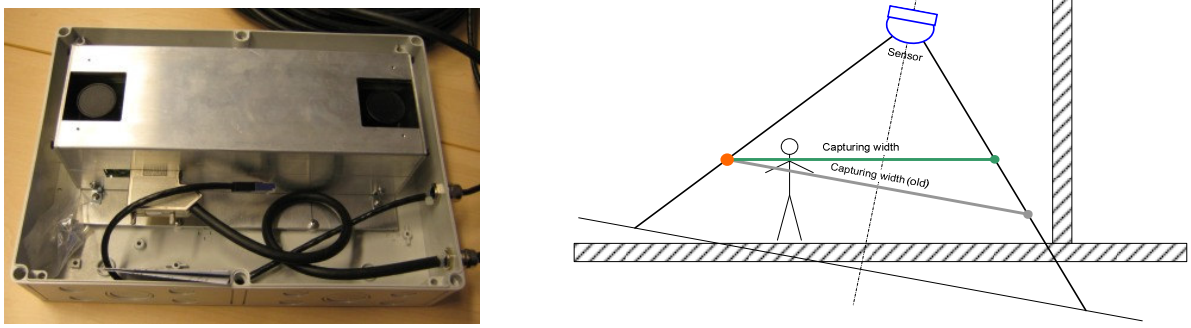

Figure 3 a and b

Fig. 3: (a) SmartCountPlus sensor housing (b) illustration of reduced capturing width when sensor device is mounted in a slanted position.

One vision sensor consists of an array of 128x128 array elements (pixels), where the pixels respond to relative light intensity changes. Note that since only light intensity changes are captured, no classical image in the visual spectrum is ever generated. Fig. 2a) shows a still image of a scene captured with a conventional video camera: The scene contains two riding cyclists, and Fig. 2b) shows the two corresponding two stereo pairs which are generated by the SmartCountPlus sensors: a dark pixel indicates a change from high intensity to low intensity and vice versa. Only the pixel elements which are changing intensity, so called 'address events' are transmitted by the sensor. Fig. 2c) shows the corresponding 'event depth map', where the color indicates the distance from the sensor (see Fig. 2d). Such spatio-temporal depth data are the input for the algorithms discriminating between cyclists and pedestrian.

Note that the image in Fig. 2a) is only for illustration purposes, and the sensor device never captures a conventional image. People can never be recognized in the captured depth data illustrated in Fig. 2b) and c) – such a processing therefore meets privacy concerns which are always raised when capturing visual data.

Fig. 3a) shows the housing of the SmartCountPlus device, including the two lenses of the two stereo vision devices which are separated by 26 cm. When installed in a 'top view' bird's eye position, a cross-section of 4.4 m width can be captured. In contrast to indoor scenarios, top view positions are often hard to obtain in outdoor scenarios, thus requiring mounting the sensor device in a slanted position. A slanted mounting position, however, will reduce the overall width of the captured cross-section, as illustrated in Fig. 3b). Table 1 quantifies the reductions of the capturing width depending for different angles as well as the optimal maximum mounting height. The 'left' and 'right' widths refer to the areas left and right of the dash-dotted line in Fig. 3b).

	optimal	**10° slant**	**20° slant**	**30° slant**
Stereo basis [cm]	26	26	26	26
Slant angle [degr]	0	10	20	30
Mounting height [m]	5.2	5.15	5.0	4.8
Capturing width (left) [m]	2.2	2.77	3.2	3.5
Capturing width (right) [m]	2.2	1.18	0.44	0.0
Capturing width [m]	**4.4**	**3.96**	**3.64**	**3.45**

Table 1: Optimal mounting height and capturing width for cross-sectional counting depending on the mounting angle

5 CLUSTERING AND CLASSIFICATION

The SmartCountPlus stereo vision sensor continuously generates events as a reaction to moving objects crossing the sensor field of view. Fig. 4 provides and overview of the processing steps, which are described in more detail in (BELBACHIR, 2010), (SCHRAML, 2010a) and (SCHRAML, 2010b).

The objetive of clustering is is to group together events belonging to the same moving object (pedestrians, cyclists, umbrellas). The clusters are computed online, meaning that all events are grouped in one step such that individual events are assigned to a cluster at once.

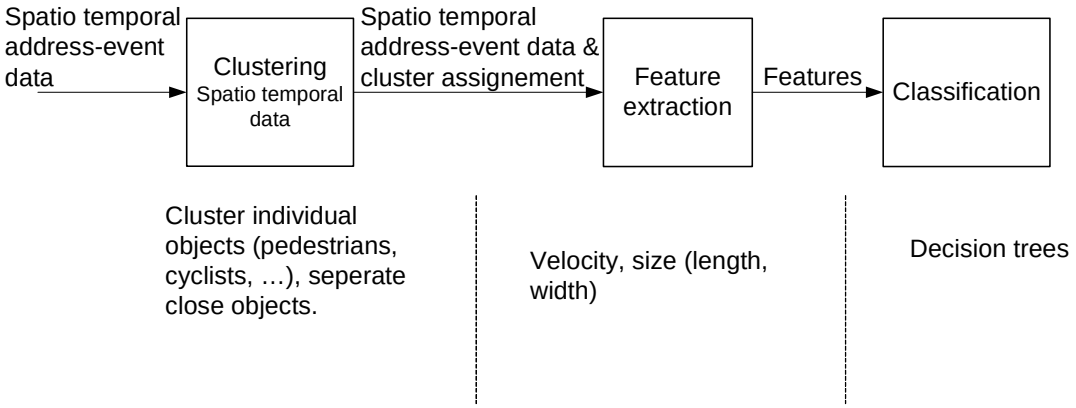

Fig. 4: Steps for processing sensor data as shown in Fig. 2 to classify between different participants

The objective of classification is to recognize the clustered objects' events and separate them into pedestrians and cyclists. After having built clusters from events through moving objects, descriptive cluster features are used to separate between pedestrians and cyclists with the help of a decision tree. We use three features (length, width and passage duration) for the classification as illustrated in Fig. 5. For the decision tree, thresholds on length, width and passage duration are set in order to distinguish between the multiple objects,

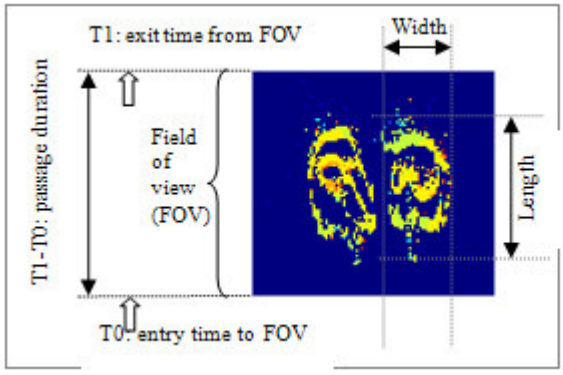

Fig. 5: Illustration of the features used for classification

6 EXPERIMENTAL RESULTS

To evaluate the event-based system and the classification method, we have collected real-world data at the test site shown in Fig. 1b). Test scenarios have been collected with a total of 128 passages (82 riding cyclists; 26 pedestrians, 13 walking cyclists and 7 pedestrians with umbrellas). Fig. 6 shows selected test cases.

Fig. 7a) shows classification results of riding cyclists and pedestrians for multiple scenarios using two dimensions (length to width ratio in the x-axis and passage duration in the y axis). The separating line represents the thresholds used in the decision tree for the classification. The two objects classes are almost linearly, separable. However, running persons can coincide with slowly riding cyclists.

Fig. 7b) and c) present classification results for 2+1 classes (pedestrian and riding cyclist) and 4+1 (pedestrian, riding cyclist, walking cyclist and pedestrian with umbrella), respectively. In these tables only the true positive classification (correctly classified) is represented as a first step. Still a full classification evaluation needs to be performed. It can be noticed that riding cyclists are best distinguishable together with pedestrian and walking cyclist, while pedestrians with umbrella are not efficiently classified. One reason for the bad classification of umbrellas might be the low density of the events and the difficulty to recognize them as one cluster. The other reason is probably the low number of test examples for this classification. This object (umbrella) still needs further investigation with more test data for robust analysis

Fig. 6: Selected test scenarios

7 DISCUSSION

While the initial counting results are promising, a sample of 128 passages is clearly too small for representative performance figures. While nearly every commercially available counting technique claims counting accuracies of at least 95%, it remains often unclear for which accumulation interval the counting accuracy has been evaluated: If accuracy figures refer to a time interval of several hours, temporary gross errors could be compensated. Furthermore, the nature of the ground truth data (reference) can help interpretation: Has the ground truth data been directly collected by human observers (with corresponding inaccuracies for high people densities) or with the help of manual video annotation? Future work will therefore include mounting the SmartCountPlus sensor for an extended period of time at different locations. In order to provide a sound basis for evaluation, video footage will be captured for well-defined intervals, in order to obtain a sound model of classification and counting accuracy for different aggregation time intervals.

8 ACKNOWLEDGEMENTS

This project was supported by the Austrian Ministry of Traffic, Innovation and Technology (BMVIT) under the ways2go program (grant No 819167). We gratefully thank Helmut Hiess (Rosinak & Partner ZT) and Helmut Koch, Sebastian Reinberg (komobile) for their valuable input.

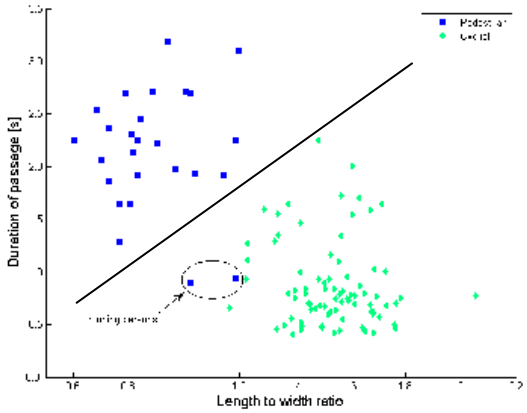

Figure 7a)

Type	Nb. cases	Correctly classified (true positive only)	Classification rate (%)
Riding cyclist	82	82	100
Pedestrian	26	24	92

Figure 7b)

Type	Nb. cases	Correctly classified (true positive only)	Classification rate (%)
Riding cyclist	82	79	96
Pedestrian	26	24	92
Walking cyclist	13	12	92
umbrella	7	3	43

Figure 7c)

Fig. 7: Classification Results (a) classification for riding cyclists and pedestrian using the two features 2D size (length to width ration) and passage duration (b) 2-1 classification, (c) 4-1 classification

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Spatial Analysis of Municipal Water Supply in Abeokuta Metropolis, South Western Nigeria

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1 ABSTRACT

The study examined the spatial dimension of Public Water Supply in Abeokuta Metropolis with the aim of providing effective planning, development and operation of water supply and distribution networks which is one of the most essential components of urban infrastructure. A number of factors ranging from population expansion to inadequate existing facilities are thought to be responsible for the frequent shortage in water supply to the metropolis. The study delineated the areas within the metropolis that are un-served or underserved by the Water Cooperation. A framework for taking management decisions such as an extension of the supply network and location of new facilities was given. Large sale facility maps that will serve as source of information for vital application for the Ogun State Water Cooperation in carrying out its daily functions were produced. Such maps in digital forms are extremely vital and are useful to integrate collateral data i.e. available within the corporation.

Keywords: water supply networks, questionnaires.

2 INTRODUCTION

Water makes life possible as without it; life and civilisation cannot develop or survive. As man's standard of living increases; so does his need for consumption of water. It is therefore not surprising that early civilisations flourished around river valleys such as those of the Nile in Egypt, Indus in India, Hwangho in China and Euphrates and Tigris in ancient Mesopotamia (Ayoade 1988).

In modern times, there is a close relationship between water availability and economic development, especially in the developing countries (Warner, 1995). In Nigeria, water availability controls population distribution. Settlements that are provided with modern water supply networks are usually those situated along the major trade and transportation networks and all improved water supply in Nigeria is from public water supplies (Oyebande, 2005). Though the pattern of water supply varies from one settlement to another, generally as the population of a settlement increases, the service efficiency to the expanding population decreases. This usually creates a great disparity in supply to different zones of the settlement. This problem is more pronounced in the Pre-Cambrian Basement Complex Rocks areas to which the study area belongs.

In terms of personal needs, an average man requires 2.5 litres of water daily for drinking. Apart from drinking, man requires water for various other uses such as cooking, washing, sanitation, agriculture, industrial production, hydro-electric power, etc.

To provide for these various uses, the supply of water must meet the demand of the user, be satisfactory in quality and adequate in quantity, be readily available to users, and be relatively cheap and easily disposed of after it has served its purpose. Necessary works are waterworks or water supply systems or waste works or

wastewater disposal systems (Oyebande, 2005). Waterworks tap natural sources of supply, treat and purify collected water and deliver it to the consumer. Municipal water systems generally comprise:

- Collection or intake works 3
- Purification or treatment works
- Transmission and distribution

3 STUDY AREA

Abeokuta, the capital of Ogun state, situated in south-west Nigeria (fig. 1), covers an approximate area of about 40.63km2. It lies between latitude 70 10′ N and 70 15′ N and longitudes 30 17′ E and 30 26′ E. Abeokuta is a historic Yoruba town, formed by the Egbas in 1830. The town has become increasingly cosmopolitan as a result of the elevation in status of Abeokuta to state capital in 1976. The town is within the rainforest zone of Nigeria, its geographical location making it easily accessible to Lagos, the commercial capital of Nigeria, industrial state and main seaport.

The terrain of Abeokuta is characterised by two types of landforms; sparsely distributed low hills and knolls of granite, other rocks of the basement complex and nearly flat topography. The rugged rock-strewn relief is prominent towards the north, in the central and south-eastern parts of the city. The city is drained by two major rivers, Ogun and Oyan and many small streams. Some of these streams take their source from local rocky hills while some are distributaries to the two major rivers. Abeokuta is one of the areas in Nigeria with equatorial climate. Two main climatic conditions exist, the rainy season lasting for between seven and eight months between April and October with an interruption in August, and the dry season; running through November till February. Annual rainfall of about 963mm (Ogun State Nigeria, 1986) and the temperature is usually between 260C and 280C.

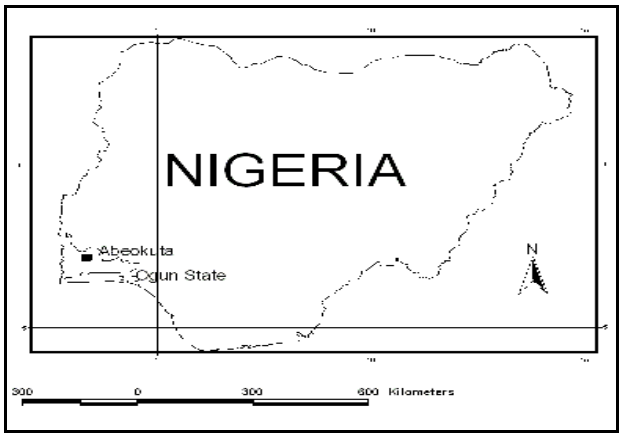

Figure 1: Map of Nigeria showing Abeokuta

4 EXISTING SITUATION

Public water supplies to the residents of Abeokuta are mainly drawn from surface sources. There is only one functioning water station, the Arakanga water scheme which has a pumping capacity of 103.68 million litres per day and relies principally on water from the Ogun River (Ufoegbune et al 2009). The first water scheme in Abeokuta was commissioned in 1914 designed to supply water to about 40000 people. In 1962 the Iberekodo waterworks (now referred to as the old scheme) was constructed due to an increase in the population of Abeokuta. This was designed for about 7 million litres per day to serve a population of about 180000. The capacity was increased to 8.5 million litres per day when in 1974, the Osiele and Odeda waterworks were incorporated and this further increased to 13 million litres per day to meet the peoples' demand. Due to increased water production, the capacity of the treatment plant became inadequate thus leading to the construction of the new water scheme. The new water scheme was redesigned to increase supply of potable water from 13 million litres per day to 163 million litres per day. The new scheme was expected to have brought to an end the endless search for water by the residents of the town and it was planned to have catered for an estimated population of about 660000 by the year 2000.

There are two erected tanks at the waterworks – the backwash tank and the clear water tank with a capacity of 6.83 million litres. There are storage reservoirs for storing treated water at different sites in the town. The Asaran hills with two sets of reservoirs have a capacity of 22.5 million litres, the Oke-egunya hill reservoir has a capacity of 6.5 million litres; and the old waterworks reservoirs have a capacity of 25.5 million litres. The reservoir at Itoko has since been abandoned. Within the new waterworks are 5 high lift pumps, each capable of lifting 19000 litres of water with a driving motor power of 1100 kilowatts through 160 metres every hour.

The major functions of the Ogun state Water Corporation include;

- To manage and control all waterworks within the state.
- To extend, establish and develop existing waterworks as the corporation may consider necessary for the purpose of providing water in order to meet the requirement of the general public, trades and industries in various parts of the state.

The present water supply situation in Abeokuta can best be described as inefficient as most residents cannot be assured a regular and adequate supply of water. This study assessed the spatial dimension of public water supply with the intention of providing ways of enhancing the distribution system in order to greatly

maximise the potential of the utility's facility in the supply of water to the metropolis. In addition, the assessment provided a means that could be used by policy makers in locating distribution networks in new development areas.

5 METHOD

The data types collected were primary and secondary data. Primary data was collected by administration of structured questionnaires. For the distribution of questionnaires, the study area was divided into 12 zones based on the zoning method adopted by the state water corporation. Each zone was allocated 200 questionnaires bringing the total number of administered questionnaires to 2400. A total of 2200 questionnaires were however responded to. A GPS was also used in collecting data on the geographic position as well as elevation of the various facilities of the water corporation including reservoirs, pumping stations and the water distribution pipelines. The secondary data used included, topographic map of Abeokuta (1964) to the scale 1:50000, obtained from the Federal Bureau of Surveys, Abeokuta, water distribution facility map of the Ogun State Water Corporation (2000) to the scale 1:30000, obtained from the Ogun State Water Corporation, road network map of Abeokuta (1998) to the scale 1:250000, obtained from the Ministry of Lands and Survey, Abeokuta and population estimate from the Federal Office of Statistics.

Arcview 3.2a was used to perform the spatial analysis. A proximity analysis to show areas to be included in design of the utility network and those left out was first carried out. This having been carried out, the optimal location of reservoirs and pumping station was determined using the overlay functionality to identify the best positions to locate new reservoirs bearing in mind the criteria for sitting a reservoir. Possible reservoir locations were suggested using queries module. Areas suitable for reservoir were those with an elevation of above 100 metres. This is because reservoirs must be located at the highest possible elevation in order to maximise gravity flow of water. It also reduces additional costs usually incurred in constructing booster stations. Hence a digital elevation model was produced from topographic map and data from GPS. Another criterion considered was distance from inhabited areas. For the purpose of this study, a buffer of 750 metres was created from all inhabited areas within the metropolis, major roads and streams.

Statistical analysis was carried out using the SPSS software to determine the water consumption trend of the population of the study area.

6 RESULTS AND DISCUSSION

This study is carried out to examine the spatial dimensions of existing public water facilities with the intention of providing information that would help improve on the facilities. Figures 2a and 2b shows the existing facilities of the Ogun state water corporation in terms of existing reservoirs, booster stations and utility pipes networks. From the map it will be seen that some areas including Bode-Olude, Sabo, Itan-Osin, Oke-Ata, Adigbe and Onikolobo do not have adequate pipeline connection. From this map it could be seen that the pipe network needs to be expanded to cover these areas more effectively for new development areas that have not been adequately catered for. Figure 2b also shows the different development areas of the town.

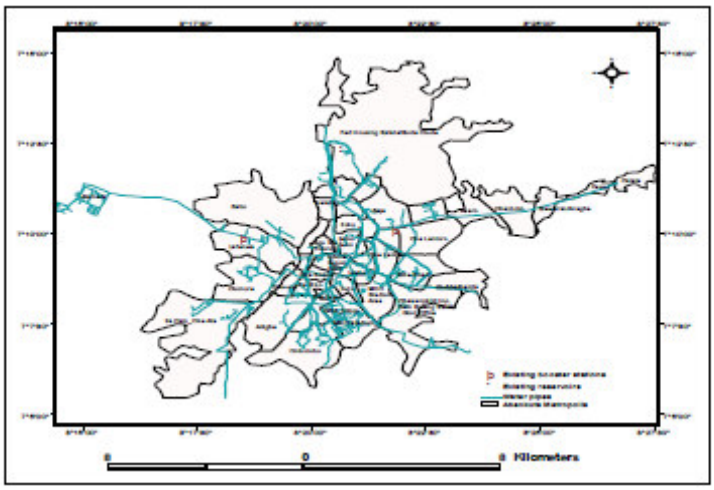

Figure 2a: Map of existing facilities

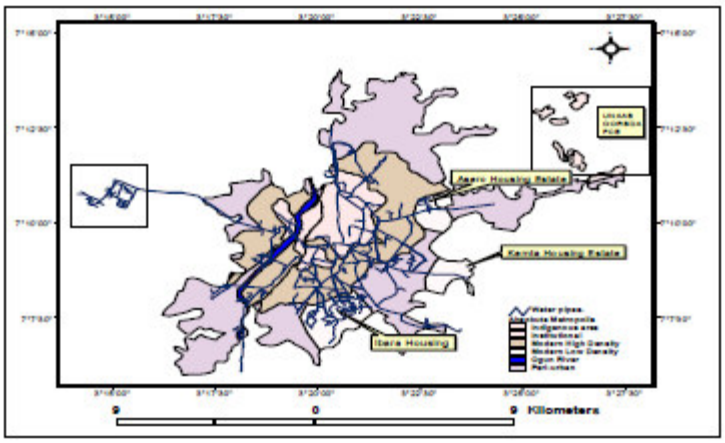

Figure 2b: Map of Abeokuta metropolis showing utility pipes networks

The facilities of the water corporation, with the pipelines, include three booster stations (Adatan, Ibara and Lafenwa), four reservoirs (Asaran hills, Iberekodo, Itoko and Oke-Egunya). It is noted, however, that the reservoir at Itoko had since been abandoned thus reducing the number of working reservoirs to three. This cannot possibly cater for the water requirements of the metropolis especially as the population of the city keeps expanding.

Figure 3 shows the population dot map of the metropolis (2000 estimate) along with the suggested extension of the utility pipes. The suggested extension of the pipeline network is as a result of the newer development areas forming. Communities without adequate pipeline including Bode Olude, Sabo, and Oke-Lantoro should be given priority for future pipeline development because of the growing size of these communities. The new development areas around Oke-Ata, Obantoko and Ita-Osin should also be considered for additional pipelines.

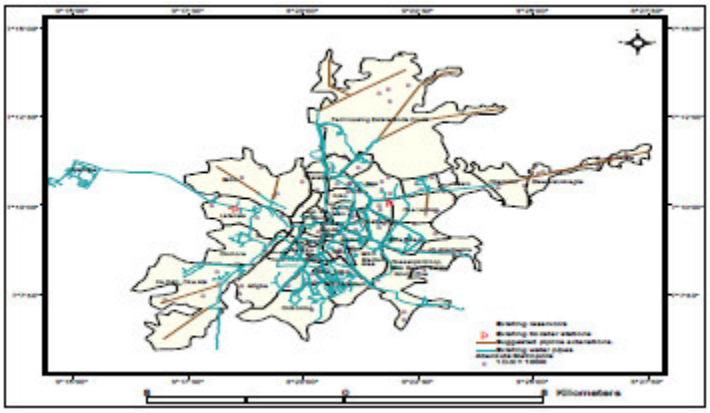

Figure 3: Population dot map of the Metropolis and the suggested extension

It is suggested that a reservoir be sited at the Asero – Oke-Aregba axis from figures 4 and figures 5, considering the digital elevation model existing services and population. This is in consonance with Chaudhery (2005). It is also suggested that the capacity of the booster station at Adatan be increased to adequately supply water to the proposed reservoir which will cater for the high lying areas in that zone.

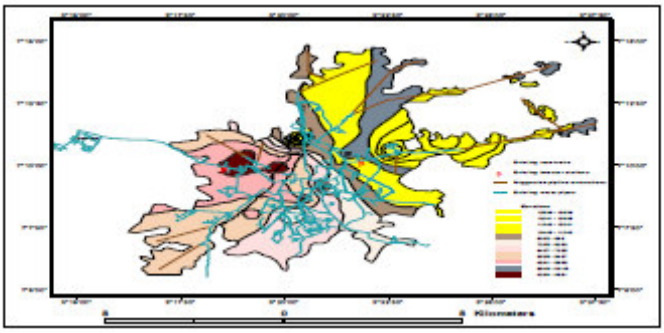

Figure 4: Elevation of the Metropolis

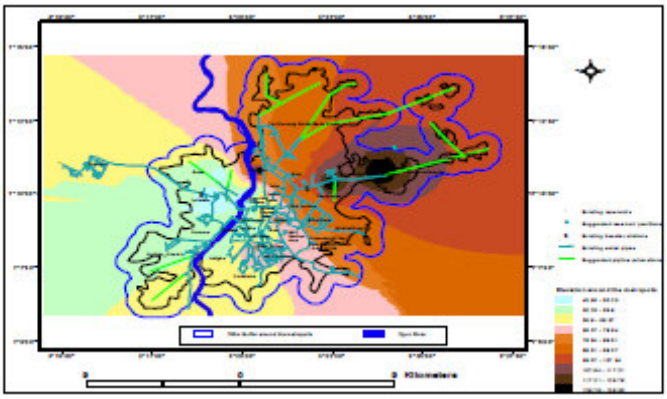

Figure 5: Map showing digital elevation model of the metropolis with proposed location of new facilities

Various frequency tables were produced following statistical analysis of the questionnaires. These include frequency tables showing access, type of connection and water supply per week.

Access	Frequency	Percent
Yes	1290	58.6
No	910	41.4
Total	2200	100.0

Table 1: Analysis showing Access

For the table 1, on access to water supply, it is seen that 59% of the questionnaires responses have access to water supply from the water corporation. 41% however have no access, either through public taps or house connection. Although the ratio of people without access seems to be high, it should be noted however that this group may include respondents who have defaulted in the settlements of their monthly bills and as a result, have been disconnected; those with private boreholes within their compounds and are not connected to the supply network of the corporation and those who have no public taps within their vicinity thus relying solely on other sources of water such as wells.

Connection type	Frequency	Percent
Not required	910	41.4
Connection	750	34.1
Public tap outside	540	24.5
Total	2200	100.0

Table 2: Analysis showing type of connection

Of the residents that responded to the question on connection type (Table 2), 34% of them have house connection while 25% have access to the water corporation's supply by means of public taps outside their homes. The residents of the indigenous areas such as Oke-Itoku, and Ikija have mainly public tap connection outside their homes. This is may be because many of the residents of these areas can hardly afford to pay the charges of the corporation or that the buildings within this area are distributed irregularly thus making individual house connection difficult.

Weekly supply	Frequency	Percent
Not required	910	41.4
Once a week or less	390	17.7
2-3 days per week	620	28.2
3-4 days per week	280	12.7
Total	2200	100.0

Table 3: Analysis showing frequency of supply per week

Going by the response of the respondents (table 3), 18% have running water from the corporation once a week or less, 28% received water between two and three days weekly while 12% received water more than thrice weekly. The areas receiving water once weekly include Obantoko, Adigbe, Oke-Aregba and Asero. This may be as a result of the elevation of these locations. In the case of Adigbe and environs however a number of problems have existed ranging from power outage, insufficient pipelines and rapid expansion of the area.

7 CONCLUSION

This work looked at the spatial content of Municipal Water Supply in Abeokuta. It was found that the only functional water reservoir in the town was not capable of supplying the inhabitants of the town adequate water supply. From the map it was seen that some areas including Bode-Olude, Sabo, Itan-Osin, Oke-Ata, Adigbe and Onikolobo do not have adequate pipeline connection. It was ascertained that communities without adequate pipeline including Bode Olude, Sabo, and Oke-Lantoro should be given priority for future pipeline development because of the growing size of these communities. The new development areas around Oke-Ata, Obantoko and Ita-Osin should also be considered for additional pipelines. It is suggested that a new reservoir be sited at the Asero – Oke-Aregba axis considering the digital elevation model existing services and population. It is also suggested that the capacity of the booster station at Adatan be increased to adequately supply water to the proposed reservoir which will cater for the high lying areas in that zone (Ufoegbune et al 2009).

Despite the substantial investment of the Ogun state government in this sector over the years, it is evident that a significant portion of the populace does not have access to adequate water services. The insufficiency in the access to potable water by the residents of the city could be attributed to the following;

- The current population of the metropolis exceeds the design population of the water scheme at inception.
- With the incessant power outages, the water corporation is handicapped in meeting its daily pumping requirements to the metropolis. The water corporation gets about four hours of power supply every day and even this power supply is not steady. Furthermore, the cost of running on generators when there are power outages is considerable therefore generators can not replace the public power source on a full-time basis.
- The lack of maintenance culture that pervades almost all sectors of the Nigerian polity. This is responsible for the frequent breakdown of facilities of the waterworks resulting in water shortages affecting various locations within the metropolis at almost frequent intervals.
- Inadequate funding, which has been the bane to the operations of most government establishments is also very relevant to the Ogun state water corporation's functions such as necessary repairs will not be carried out unless funding is available and adequate.
- The Ogun State Water Corporation is yet to explore the option of groundwater exploitation in meeting the demands of the residents of Abeokuta who reside in areas where the distribution network of the corporation is not present, rather it employs the use of water tankers to supply water to those distant communities in its ORUWA project which could be more expensive on a long term basis.

The services of the Ogun State Water Corporation are fraught not only by the inadequacies of the corporation in meeting its requirements but also by the acts of vandalism of some the residents of the metropolis. Worthy of mention is the Fajol junction at Obantoko, where petty traders and shop owners deliberately vandalise the water lines in order to fetch water from the burst pipes. Also the apathetic attitude of some of the staff towards their jobs, especially on the subject of unattended complaints may be responsible for some of the problems of the organisation.

To improve on the quality of services rendered by the corporation, the following is suggested;

- An expansion of the water scheme to meet a more realistic demand for water as a result of population increase.
- Manpower development and training in modern relevant technology for water resources management should be facilitated by the organisation for its staff.
- A more detailed database management strategy as proposed in this study ranging from facility data to customer data should be adopted by the corporation.

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Stadtentwicklung versus Lifestyle – zur steigenden Prosperität des Brunnenviertels in Wien Ottakring

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1 KURZFASSUNG

1.1 Ausgangslage

Es gibt Stadtteile in Wien, die als „stagnierend" eingestuft werden. Kumulative Verfallsprozesse initiieren einen Sog nach unten: kaufkraftstärkere Schichten verlassen ein Viertel, vorwiegend sozial Benachteiligte bleiben, Billigprodukte erfahren eine stärkere Nachfrage, teurere Geschäfte sperren zu; Ein-Euro-Shops, Massagesalons und Wettlokale bestimmen zunehmend das Bild der Straßen, Erdgeschoßlokale stehen leer und verkommen. Dazu kommen geringe Investitionen in die bauliche Erneuerungen, ein hoher Substandardanteil des Wohnunsbestandes, Verkehrs- und Straßenlärm, auch verursacht vom täglichen Auf- und Abbau der Marktstände ab 4h früh. Die Rede ist vom Brunnenviertel in den letzten Jahrzehnten des vorigen Jahrhunderts.

Bereits Mitte der 90er Jahre versuchte man durch verschiedene Maßnahmen den Abwärtstrend durch Projekte wie „Wien Urbion – Urban Intervention Gürtel West" umzupolen. Seit 2001 gibt es Bestrebungen, das Brunnenviertel umfassend durch ein differenziertes Maßnahmenprogramm aufzuwerten. Das „Upgrading" war ein Wunsch vieler, angefangen von Stakeholdern und „Local Heros" bis zu den Bewohnern/-innen des Viertels, von den Kaufleuten bis zu den Verantwortlichen der Stadt und des Bezirkes.

1.2 Aufwertungsprozess

Die Gebietsbetreuung Ottakring bildet dazu seit 2001 die Vernetzungsdrehscheibe und Informationsplattform. Zusammen mit den involvierten Stellen des Magistrats, den zugeordneten Kammern und wesentlichen Institutionen, den wichtigen Akteuren vor Ort und den Vertreter/innen der Stadt und des Bezirks wird in abgestimmter Form der Aufwertungsprozess koordiniert.

Seit 9 Jahren läuft der Aufwertungsprozess Brunnenviertel. Was als Bürgerbeteiligungsprojekt mit Unterstützung der MA21A begann, wird nun sukzessive bis 2010/2011 in einem 10 Punkte Programm umgesetzt. Als Vorgehensweise hat man sich für parallel gesteuerte Umsetzungsschritte in langsamerer und „verzögerter" Form entschieden, damit alle involvierten Akteure auch die Chance haben, sich am Aufwertungsprozess aktiv zu beteiligen. Das Kunst- und Standortprojekt „SOHO in Ottakring" bildet dabei bis heute einen wesentlichen Impuls und wird als wichtiger Motor der Stadterneuerung gesehen.

Die bestehenden Potenziale des Marktes werden langsam sichtbar, eine neue Marktinfrastruktur ist im Entstehen begriffen. Neue Marktstände, Neubauten, attraktiv sanierte Gründerzeithäuser, eine vielseitige Lokalszene, verkehrsberuhigende Maßnahmen, neu gestaltete Freiräume und ein besserer Nutzungsmix prägen das neue Bild des Viertels.

Das Bauvolumen der Wohnhaussanierung und des Wohnungsneubaus beträgt derzeit mehr als 40 Mio. Euro. Bis Ende 2010 werden rd. 500 neue Mieter, die überwiegend das urbane Flair des Viertels als Wohnort bevorzugen, in unterschiedlichen Wohnprojekten – einem Mix aus Eigentums- und Mietwohnungen – eingezogen sein und damit einen Beitrag zu einem sozial besser ausgeglichenen Stadtteil leisten. Durch den sanften Aufwertungsprozess mit viel Augenmerk und Respekt vor dem Bestehenden, blieb die immer wieder prognostizierte Absiedlung von einkommensschwächeren Bevölkerungsgruppen geringfügig, vielmehr ist ein stärker sozial durchmischter Stadtteil in Entstehung begriffen.

2 OTTAKRING, NEULERCHENFELD UND DAS BRUNNENVIERTEL

2.1 Zur Lage im Stadtgebiet, Zahlen, Daten

Ottakring (16. Bezirk) gehört zu den westlichen Bezirken Wiens, der sich vom Gürtel bis zum Wienerwald erstreckt. Mit seinen fast 95.000 Einwohnern ist er der viertgrößte Bezirk der Stadt. Der Migrationsanteil beträgt rd. 27 % (2008, in Wien 20%), der Anteil an Substandardwohnungen rd. 22 % (in Wien 9 %).

2.2 Neulerchenfeld und das Brunnenviertel

Neulerchenfeld war um 1860 eine Vorstadt von Wien und bildete zusammen mit dem „Alten Ort“ den ältesten Teil des Bezirks. Einige bauliche Reste aus der Barockzeit und dem Biedermeier sind auf schmalen Langriemenparzellen noch sichtbar.

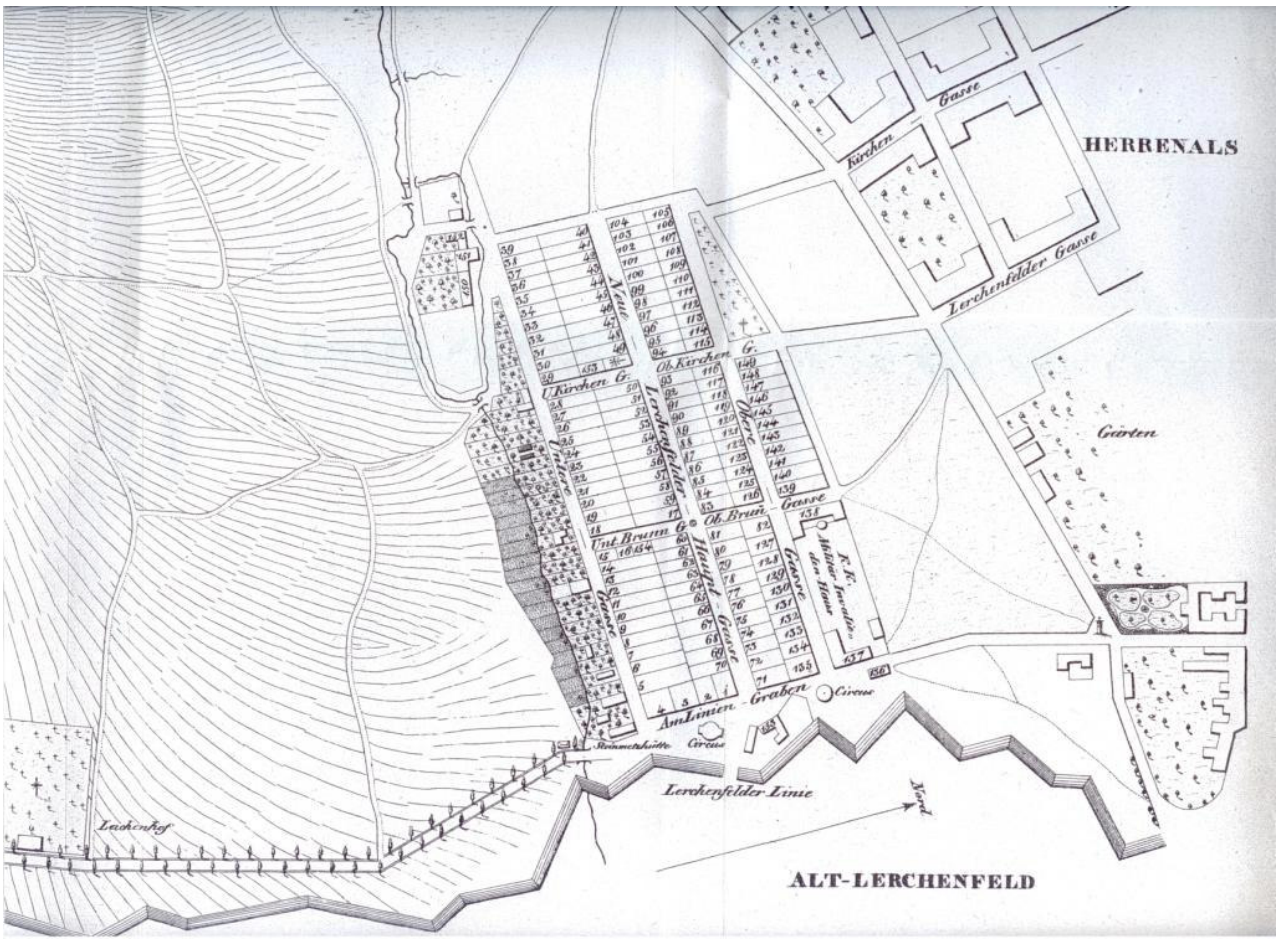

Abb.1 Neulerchenfeld um 1819

Die gründerzeitliche Baustruktur sprengte den Maßstab der 2- bis max. 3- geschossigen Vorstadtbauten. Entgegen anderen Gebiete im Bezirk, wo eine „einheitliche“ gründerzeitliche Bebauung in Form von Rastervierteln sichtbar wurden, zeugen hier bauliche Implantate unterschiedlicher Maßstäbe und Dichten von der Differenziertheit des Viertels.

Abbildung 2) Gründerzeitliche Hinterhofbebauung und Abbildung 3) Der Hof im Gasthaus „Zum Pelikan“

Im Neulerchenfeld lebten 2005 rund 10.100 Bewohner/-innen, der Migrationsteil entsprach einem Anteil von 34,5%, in einigen Baublöcken lag er deutlich über 40%, der Substandardanteil betrug rd. 25%. Im Stadtentwicklungsplan 2005 wurden für das Viertel noch rd. 45% der Baublöcke als erneuerungsdringlich ausgewiesen.

Das prägende Element des Stadtteils bildet bis heute der rd. 600m lange Brunnenmarkt. Mit seinen 197 Ständen stellt er den größten Straßenmarkt Europas dar. Im Brunnenviertel leben auf 0,4 km² ca 7000 Einwohner, davon rd. 41% mit Migrationshintergrund. Die hohe Abnahme von österreichischen Staatsbürgern über den Zeitraum von 1991-2001 steht einem Zuzug von rd. 28% ausländischer Bevölkerung gegenüber, die diese Abnahme bis auf 2% kompensiert. Heute dürfte das Brunnenviertel wieder den Bevölkerungsstand von 1991 erreicht haben.

2.3 Die Negativspirale oder der kumulative Verfallsprozess des Brunnenviertel

- Der hohe Substandard und die kleinen Zimmer-Gangküchenwohnungen (rd. 30 m²) waren für viele Bewohner/-innen seit den 80er Jahren Anlass ihr Wohnquartier zu wechseln. Zurück blieben ältere und meist einkommensschwächere Bevölkerungsgruppen.
- Es erfolgte ein hoher Zuzug ausländischer Bevölkerung, vorwiegend aus Ostanatolien und den Ländern aus Ex-Jugoslawien. Der Brunnenmarkt wird sukzessive von der türkischen Community übernommen.
- Der Lärm, der durch den täglichen Auf- und Abbau der Stände entstand, erzeugte zur ohnedies geringen Wohnumfeldqualität Ärgernis bei der anrainenden Bevölkerung.
- Aufgrund einer einkommenschwächeren Bewohnerschicht mussten attraktivere Geschäfte zusperren, Ein-Euro-Shops, Massagesalons und Spiellokale entstanden, zahlreiche Geschäftslokale blieben leer. Kaufkraftkräftigere Kunden aus den benachbarten Innenstadtbezirken sind aufgrund der Qualitätsminderung des Warenangebots ausgeblieben, die Kundenfrequenz ging zurück. Man war auf den Verkauf billiger Massenprodukte an kinderreiche Großfamilien angewiesen.

3 DER AUFWERTUNGSPROZESS BRUNNENVIERTEL

3.1 Die Phase der Vorbereitung (2001-2002)

Im Herbst 2001 begann die Gebietsbetreuung Ottakring in enger Kooperation mit dem Bezirk den Prozess der Aufwertung einzuleiten. Grund dazu war der allgemeine Wunsch von Politikern und Politikerinnen des Bezirks zu ortsansässigen in- und ausländischen Geschäftsleuten, von Bewohnerinnen und Bewohnern mit und ohne Migrationshintergrund bis zu local playern, von unterschiedlichen Geschäftsstellen des Magistrats bis zu vorhandenen Netzwerken und Interessensvereinigungen im Viertel. Obwohl „alle“ eine Veränderung als unumgänglich ansahen, waren die Interessen und Vorstellungen was eine Aufwertung ausmacht, mehr als unterschiedlich.

Die Einleitungsphase stellte sich im Nachhinein als eine wichtige Grundlage des Aufwertungsprozesses dar. Sie diente vor allem der Aktivierung und dem Auffinden von Kooperationspartnern und wichtigen Akteuren zur Einleitung einer gemeinsamen, oft nicht einfachen Problemfindung und Planung des späteren Bürgerbeteiligungsprozesses. In dieser Phase fanden die ersten vertrauensbildenden Veranstaltungen statt, die vor allem das Ziel hatten das vorherrschende Misstrauen gegenüber nicht eingelösten Versprechungen aus der Vergangenheit langsam abzubauen.

3.2 Die Phase der Bürgerbeteiligung (ab Herbst 2002-2003)

Mit der Aufnahme des Brunnenviertels in das von der MA 19 (Architektur und Stadtgestaltung) initiierte 50-Orte-Programm und die Beauftragung der Gebietsbetreuung durch den Bezirk mit der Projektvorbereitung begann ein Diskussionsprozess mit den Akteurinnen vor Ort und den Verwaltungsstellen unterschiedlicher Ressorts. Das daraus entwickelte Strategiepapier wurde im Frühjahr 2002 präsentiert und im Sommer 2002 von den beteiligten Entscheidungsträgern auf Stadt- und Bezirksebene unterstützt.

Im Herbst 2002 wurde ein großangelegter Bürgerbeteiligungsprozess eingeleitet, das von einer, von der MA 21 A (Stadtteilplanung und Flächennutzung) beauftragten Zivitechnikergemeinschaft moderiert wurde.

Gleichzeitig beauftragte die MA 19 (Architektur und Stadtgestaltung) ein mit den Themen des Brunnenviertels vertrautes Architektenteam ein Gestaltungskonzept für die Aufstellung und Gestaltung der Marktstände auszuarbeiten.

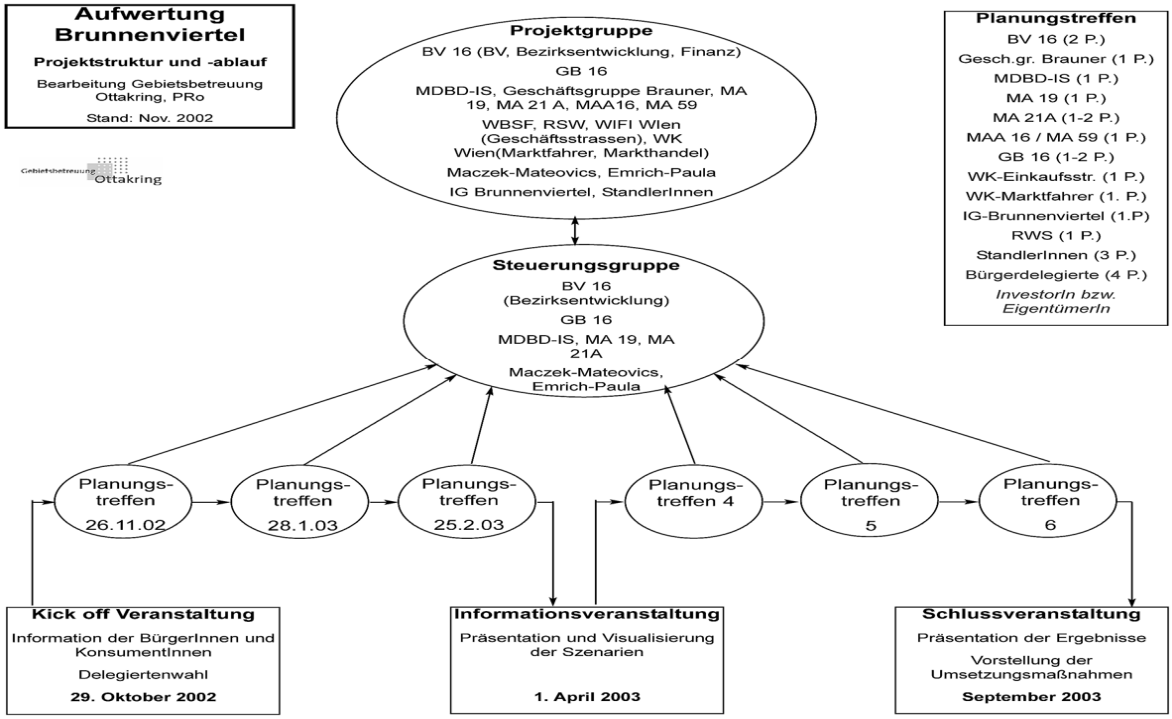

Abbildung 4) Projektstruktur und Ablauf des Bürgerbeteiligungsverfahrens

Bei dem auf ein Jahr begrenzten Verfahren wurden die Bewohner des Viertels, die Betreiber der Marktstände und die vor Ort tätigen Gewerbetreibenden in sechs Planungsgruppentreffen eingeladen, an der Ausarbeitung eines Ziel- und Maßnahmekataloges mitzuwirken. Gemeinsam mit der Bezirkspolitik, den Fachdienststellen der Stadt und der Gebietsbetreuung erarbeiteten sie ein Nutzungs- und Gestaltungskonzept, inklusive eines Verkehrskonzeptes für das Gebiet, die bei der Schlußveranstaltung in Form eines 10-Punkte Programms im Herbst 2003 der Öffentlichkeit vorgestellt wurden.

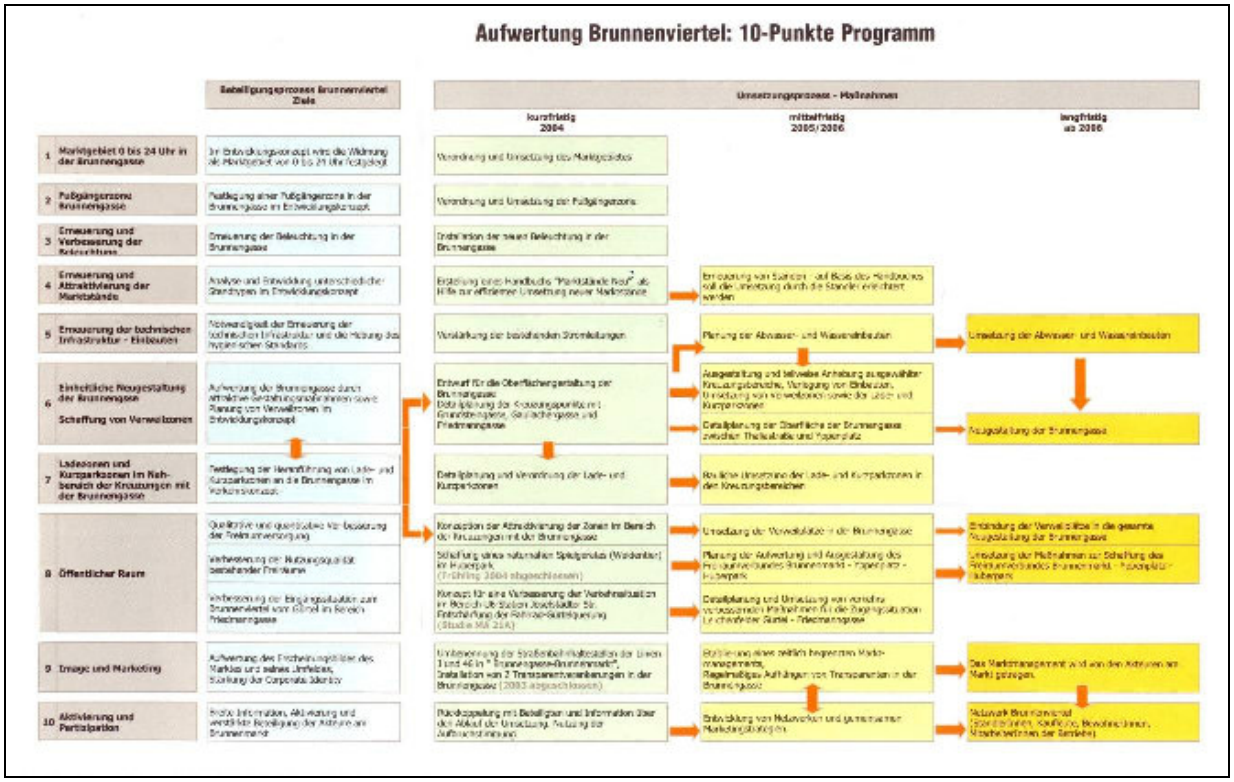

Abbildung 5) Das 10-Punkte-Programm

3.3 Die Umsetzungsphase (2005-2010)

3.3.1 Maßnahmen, die den Markt betreffen:

- Neugestaltung der Fußgeherzone Brunnengasse im Sinne des Bürgerbeteiligungsprozesses mit einer neuen Infrastruktur, die einen Anschluss der Marktstände für Strom, Zu- und Abwässer ermöglicht. In 5 Bauphasen wird die Brunnengasse bis Ende Juni 2010 fertig gestellt sein. Stadt und Bezirk investieren dazu rd. 4,5 Millionen €.
- Die Fußgeherzone wurde später um den Bereich der Schellhammergasse erweitert.
- Mit der „Piazetta“ (ein kleiner Platz mit rd. 350 m²) steht ein temporär nutzbarer Freiraum zur Verfügung, der eine hohe Flexibilität gewährleistet.
- Mit einem Handbuch zur Neugestaltung der Marktstände wurde ein Instrumentarium für unterschiedliche Standformen geschaffen. Die Vorgaben von transparent wirkenden Marktständen sollen eine Sicht auf dahinter liegende Geschäfte ermöglichen.
- 24 neue Marktstände befinden sich im Stadium der Ausarbeitung, davon sind 12 Stände bereits fertig gestellt. Die Kosten dafür tragen die Standbetreiberinnen und Standbetreiber
- Die Piazza an der Payergasse wurde durch zahlreiche neue Lokale aufgewertet und als Szenetreff positioniert. Eine Entwicklung, die auch den Geschäfts- und Standbetreiber der Brunnengasse zu Gute kommen soll.

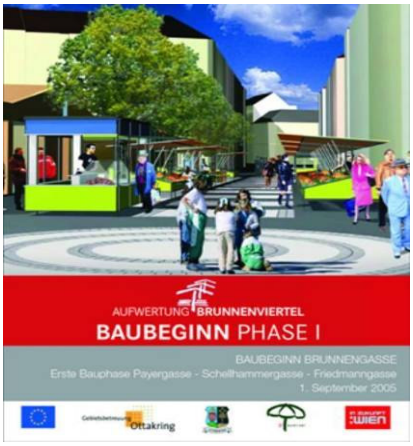

Abbildung 6) Neugestaltung der Fußgeherzone und Abbildung 7) Fertigstellung 1. Bauabschnitt (Ausschnitt aus dem Flyer anlässlich des Spatenstichs durch den Bürgermeister und den Bezirksvorsteher)

Abbildung 8) Sommerflair auf der Piazza und Abbildung 9) Immer mehr neue Marktstände prägen das Bild der Fußgeherzone

3.3.2 Maßnahmen, die zur Erhöhung der Wohnungsumfeldqualität der anrainenden Bevölkerung beitragen:

- Reduzierte Lärmentwicklung durch den Wegfall des täglichen Auf- und Abbaus der Marktstände
- Schaffung von „verkaufsfreien“ Räumen in der Brunnengasse und Errichtung von Verweilplätzen
- Einführung einer Tempo30-Zone für das Brunnenviertel
- Einführung eines Marktmanagements, das durch Marketingstrategien, Öffentlichkeitsarbeit und Initiierung einer Produktvielfalt zu einer Qualitätsverbesserung der angebotenen Waren bzw. des Warensegments beitragen soll.

3.3.3 Unterschiedliche Formen von Sanierungs- und Neubaumaßnahmen für ein an urbanem und multikulturellem Flair interessiertes Publikum. Eine Maßnahme, die das städtebauliche Ziel eines „sozial durchmischten“ Viertels ermöglicht und zur Aufwertung des Markthandels beitragen soll:

- Geförderte Wohnhaussanierungen in Form von Sockel- und Totalsanierungen
- Sanierung als Aufwertungsinitiative privater Investoren
- Abbruch und Errichtung geförderten und ungeförderten Neubauten
- Alternative Wohnformen:
- 50+, ein gefördertes Gemeinschaftsprojekt für eine aus mehreren Familien zusammengesetzte Baugruppe (Sockelsanierung), BaubeginnSommer 2010
- „Haus der Nationen“ als Begegnungshaus für Familien und Singles unterschiedlichster Kulturen. Baubeginn 2010/2011

Abbildung 10) Anstelle eines alten Kaufhauses wurde ein Wohnhaus mit Loggien zum Markt errichtet und Abbildung 11) Ein überwiegend aus privaten Mitteln saniertes Gründerzeithaus mit einem modernen DG-Ausbau

Abbildung 12) Ein neues Wohnhausprojekt gegenüber dem Wallnerhof (Baubeginn 2011) Abbildung 13) Ein über ein Jahrzehnt bekanntes Problemhaus (Wallnerhof) wurde im Rahmen einer Sockelsanierung umfassend revitalisiert

3.3.4 Umsetzung des Verkehrskonzepts

- Die Kurzpark- und Lieferzonen werden in den querenden Seitengassen direkt beim Markt geschaffen
- Ortsbekannte Schleichwege durch das Viertel werden durch entsprechende Maßnahmen unterbunden
- Der dringend erforderliche Garagenstandort im Bereich „Hernalser Hof/Vorplatz Yppenheim“ genießt vorrangige Priorität.

3.3.5 Umsetzung des Freiraumkonzepts

- Schaffung von zusätzlichen Aufenthaltszonen im Bereich der Fußgeherzone.
- Erweiterung des Huberparks um 250 m²
- Neugestaltung des Yppenplatzes mit erhöhtem Augenmerk auf eine „beschattete“ und klimagereche Gestaltung. (Eröffnung Ende Mai 2010)

3.4 Kunst und Kultur als Motor der Stadterneuerung

Seit 1999 bildet das alljährlich im Mai/Juni stattfindende 14-tägige Kunst- und Stadtteilprojekt „SOHO IN OTTAKRING“- das zu einem wesentlichen Branding des Brunnenviertels beigetragen hat - einen fixen, kulturellen Bestandteil. „SOHO IN OTTAKRING“ hat sich sukzessive zu einem Label entwickelt, das dem Brunnenviertel eine neue Form der kulturellen Aufmerksamkeit, weit über die Bezirksgrenzen hinaus, vermitteln konnte.

Mit der Etablierung der “Brunnenpassage” der Caritas Wien im Jahre 2007 wurde eine weitere Institution geschaffen, die regelmäßig Kunst- und Kulturveranstaltungen auf „gehobenem“ Niveau mit niederschwelligem Zugang vermittelt. Mit der Intention Kunst als Integrationsfaktor zu propagieren erfährt sie durch ihre unterschiedlichsten Veranstaltungsreihen und Angebote eine immer stärker Positionierung im Viertel.

Abbildung 14) Flyer über die Brunnenpassage (Auszug) und Abbildung 15) Posters für „SOHO IN OTTAKIRNG“ aus den Jahren 1999-2007

4 SCHLUSSFOLGERUNGEN

Eine einfache Erklärung kausaler Zusammenhänge zum Phänomen „Aufwertung Brunnenviertel“ ist aus heutiger Sicht kaum möglich. Der „Stein der Weisen“ konnte bis dato nicht gefunden werden. Und das ist auch gut so. Wahrscheinlich muss von einem vielfältigen Wirkungsgefüge ausgegangen werden, deren einzelne Teile zu unterschiedlichen Zeiten eine unterschiedliche Gewichtung erhalten haben.

- 1. Stadtmorphologische Gegebenheiten:

Unverekennbarer Stadtgrundriss mit einer unterschiedlichen Parzellenstruktur und verwobenen, noch heute sichtbaren Spuren zur Geschichte des Stadtteils (z.B. vom Impulszentrum zum Weinhaus Sittl)

- 2. Räumliche Ressourcen:

Vorhandene Folgen verschiedener Freiräume, unterschiedlich bespielbare Orte, alte Industriegebäude, die ihre Funktion verloren haben, periodisch unterschiedlich lange Leerstehungen von Erdgeschosszonen

- 3. Soziale Dichte:

Verschiedene Bevölkerungsgruppen und das vorherrschende Nationen- und Sprachgewirr ermöglicht einen stadtsoziologisschen Diskurs über Fragen zum „sozialen Raum“

- 4. Vorhandene Potentiale und Partner:

Flair des Marktes, kommunikative Dichte und Treffpunkt unterschiedlicher Schichten, multikulturelles Erscheinungsbild, stark sichtbare Improvisation, vor Ort ansässig Kreative (Galerienverbund Grundsteingasse), Kunst- und kulturschaffende Einrichtungen mit hohen integrativen Ansätzen (SOHO IN OTTAKRING, Brunnenpassage)

- 5. Vorhandenes Netzwerk, das sukzessive verdichtet wurde: Kaufleute, Interessensgemeinschaften, Kammern, lokale Players.
- 6. Top-Down und Bottom-Up:

Unterschiedliche Partizipationsvorhaben von Mietermitbestimmung zum klar strukturierten Bürgerbeteiligungsverfahren.

- 7. Klare polilitische Positionierung:

Nach vorliegen der Ergebnisse des Bürgerbeteiligungsverfahrens erfolgte eine Bereitstellung öffentlicher Mittel mit den Intentionen eines nachhaltigen Empowerments.

- 8. Klar strukturierter Organisationsablauf:

Regelmäßige Abstimmung und Information im Rahmen von Steuergruppentreffen, an den alle involvierten Stellen, Planerinnen, Planer und Interessensvertretungen unter der Moderation der Gebietsbetreuung Ottakring mitgearbeitet haben, Jahr-fixe-Veranstaltungen im Bezirk, Baubesprechungen, usw.

- (Anmerkung: Insgesamt wurden ca 25.000 Arbeitsstunden in den Planungsprozess investiert)
- 9. Hohes Engagement aller involvierten Akteure
- 10. Ressort- und diensstellenübergreifende Vorgehensweise:

In dem Aufwertungsprozess waren fünf Geschäftsgruppen der Stadt mit 16 Diensstellen vertreten, die untereinander vernetzt tätig waren. Dazu kamen die Vorsitzenden der Bezirksaussschüsse, Vertreter der Fonds und der Wirtschaftskammer.

- 11. Herausnahme der Umsetzungsgeschwindigkeit und paralle Umsetzung der vorgesehenen Maßnahmen

Die übliche Vorgehensweise, vorgesehene Maßnahmen Punkt für Punkt abzuarbeiten, wurde zugunsten eines parallel gesteuerten Maßnahmenprogramms verändert. Dazu bedurfte es eines hohen Managementgrades, um unterschiedliche Interessen auszugleichen. Auf diese Weise kann und konnte ein Public-Private-Partnership-Modell entwickelt werden, das auf eine bis 2012 getätigte Investition von rd. 11 Mio € - die von der öffentlichen Hand getragen wird – mit rd. 55 Mio € (durch Private und verschiedene Bauträger) auf den Aufwertungsprozess reagiert.

- 12. Glück

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Sustainable Cities

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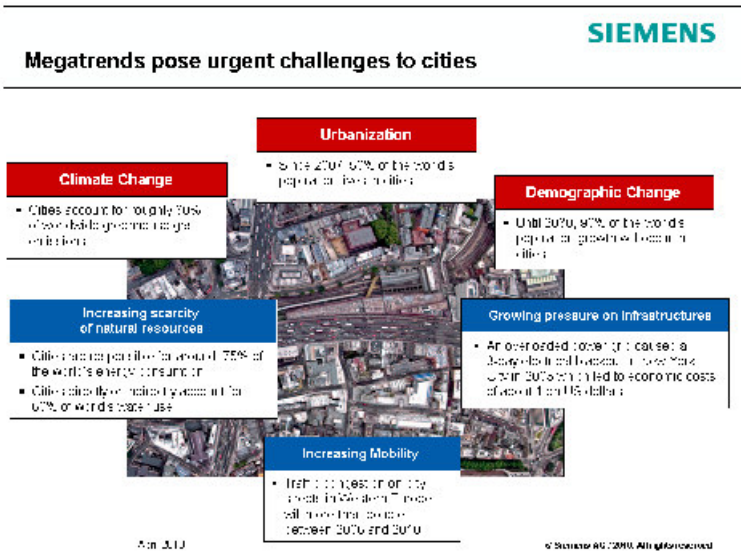
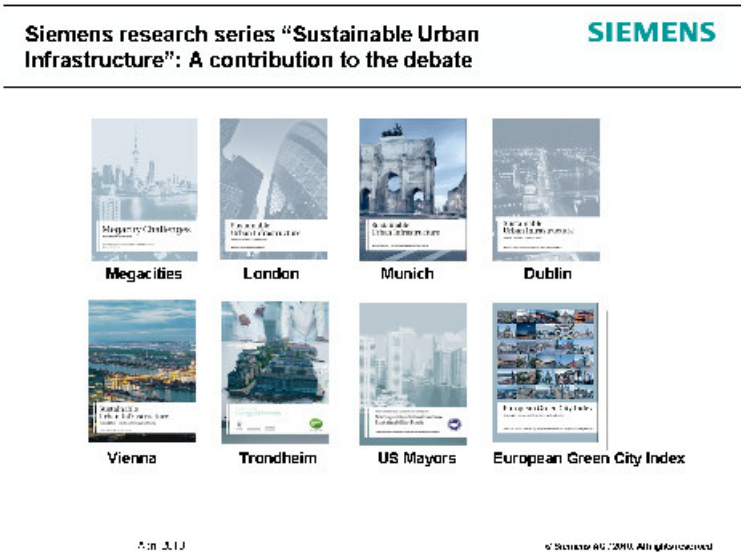
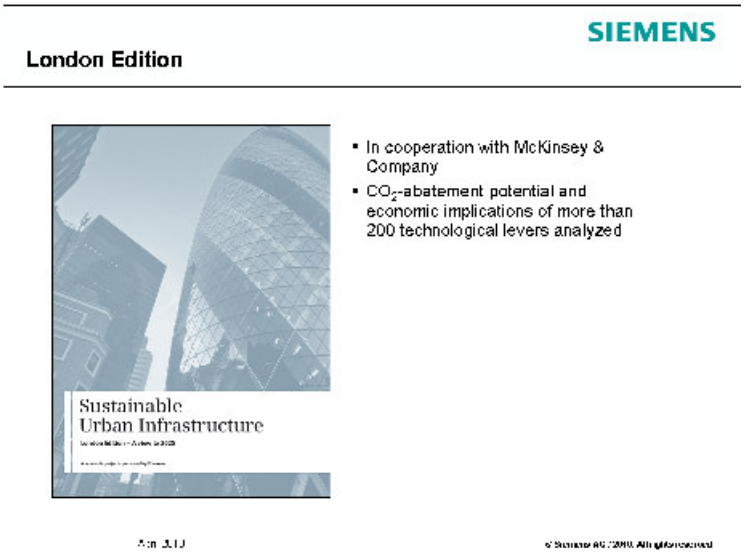
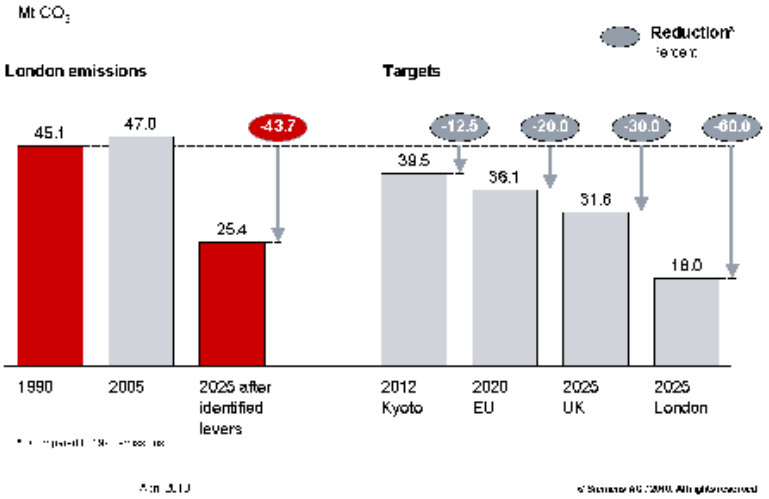


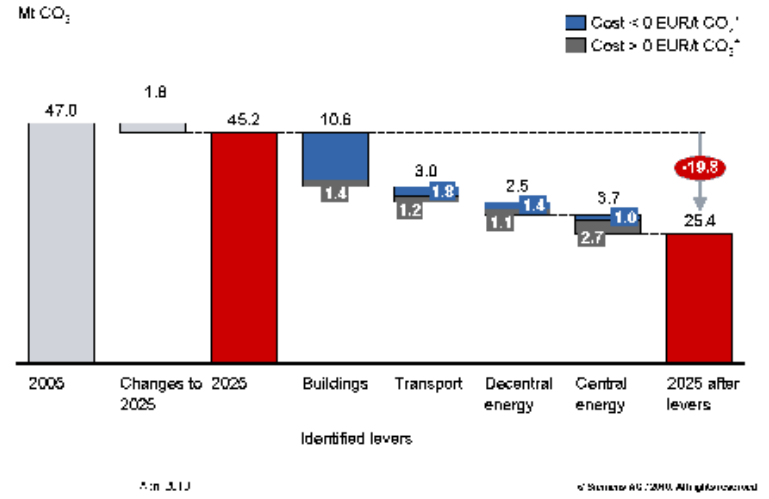




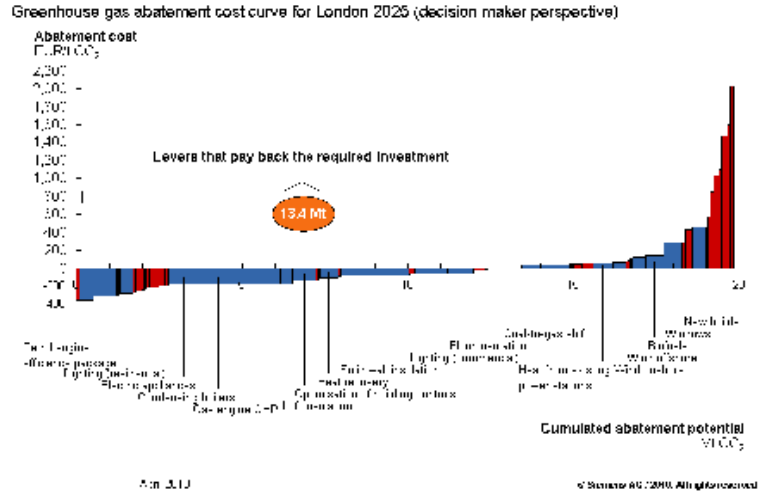
In London, international targets for greenhouse gas reduction are achievable through technological levers SIEMENS



The biggest contribution to London's abatement potential comes from buildings SIEMENS

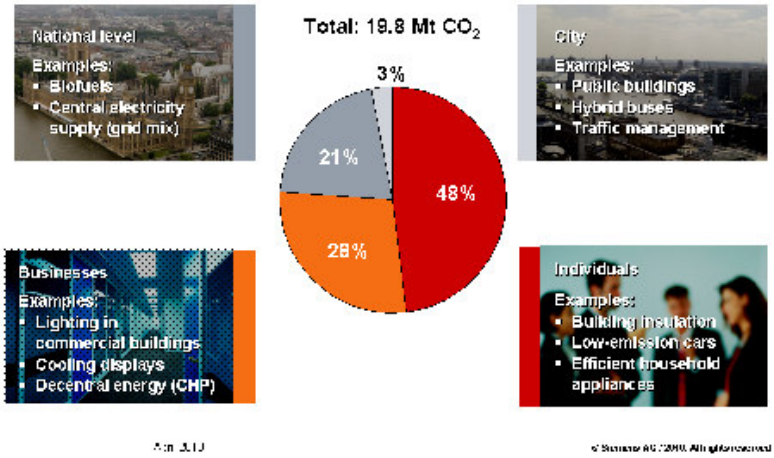


The majority of technologies pay back the required up-front investment through energy savings SIEMENS



Around 75% of abatement potential lies in the hands of individuals or businesses who make technological choices

SIEMENS



The total investment required constitutes less than 1% of London's GVA

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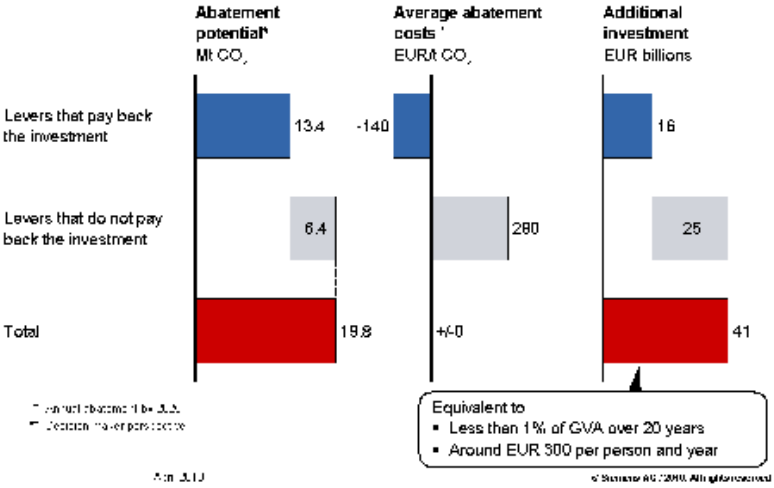

European Green City Index

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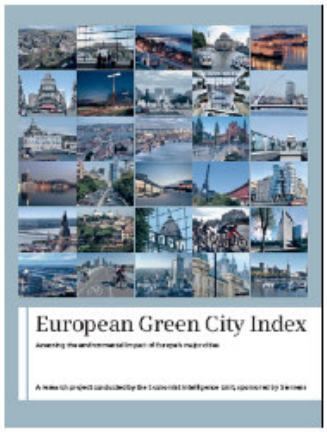

- In cooperation with Economist Intelligence Unit
- Assessing the environmental impact of Europe's major cities
- Published Dec 2009

The European Green City Index assesses 30 major European cities from 30 European countries

SIEMENS

16 quantitative and 14 qualitative indicators in 8 categories were assessed

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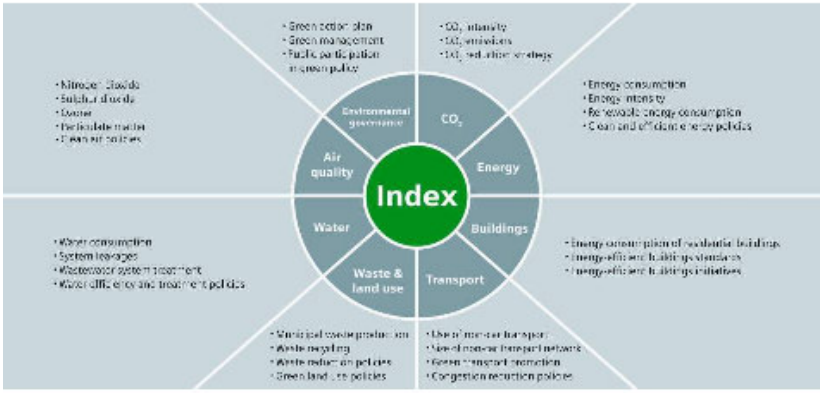

Overall ranking: Scandinavian countries score best, Copenhagen comes in first overall

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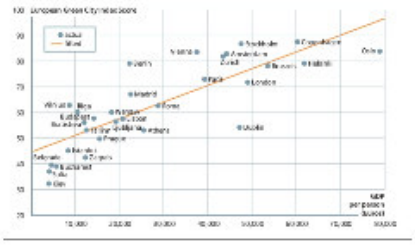
General trend: The wealthier, the better

- Index shows a strong positive correlation between wealth and environmental performance
- Nine of the top 10 cities in index are "wealthy" (above average GDP)
- Some worthy exceptions:
  Berlin ranks 8th overall and 1st for Buildings, despite the 9th lowest GDP;
  Vilnius ranks 13th overall and 1st for Air quality, despite the 6th lowest GDP

The link between wealth and environmental performance



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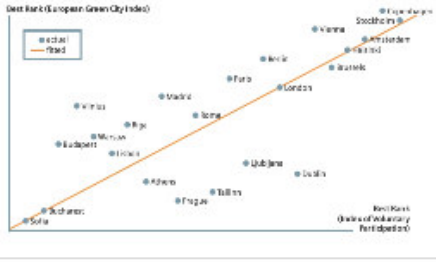
However, an active civil society can have a major positive impact on the environmental performance

- Cities with an active civil society perform well in the index
- Comparison with other studies shows a strong correlation between voluntary civil participation and environmental performance

Comparison of rankings: EFILWC Voluntary Participation Index and European Green City Index



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A lot has been achieved...

- Nearly all cities have **lower CO_2 emissions per head** than the overall EU27 average of 8.46 tonnes. The 30-city average is also well below the average, at 5.21 tonnes.
- **23** out of 30 cities have a **CO2 reduction target** of some kind, separate from any national target. Of these, 15 have a concrete, city-specific action plan in place to support this.

- More than half of all citizens in these cities **(52.5%) either walk, cycle or take public transport** to commute to work.
- Two thirds of all cities actively **promote** public awareness around **green modes of transport**.
- The average **municipal waste per head** generated each year across these cities is 511 kg, slightly better than the EU average of 522 kg. By contrast, the US average is 760 kg and Australia is 690 kg.

SIEMENS

... but there's still work to be done.

- The average proportion of **renewable energy** consumed is just **7.3%**, a long way short of the EU's stated goal of increasing the share of renewable energy usage to 20% by 2020.
- Just 14 of the 30 cities actively **promote green energy usage** through low or no taxes, subsidies or regulations.
- Nearly **one in four litres of water** consumed by cities is **lost through leakage**.
- **Less than one fifth** of overall waste is currently **recycled**.

SIEMENS

Siemens offers cities a broad range of energy efficient and sustainable products and solutions

Solution:
Energy consumption – Huge potential for energy savings

SIEMENS

Buildings: Performance contracting models pay for them self

Transport: New trains use 30% less energy than Oslo's current trains

CO_2 abatement of our products and solutions
more than 40 times greater than our own GHG footprint

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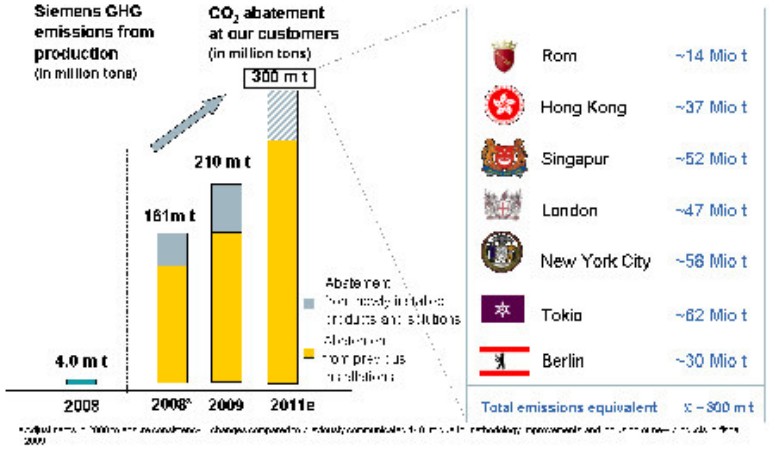

Sustainable Urbanism with Green Roofs – Natural Stormwater Management

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1 ABSTRACT

In the district Zazenhausen, the City of Stuttgart (Germany) is developing the new building site, 'Hohlgrabenäcker'. In total, the final construction on an area of 16.7 ha shall comprise approx. 265 private homes and 9 apartment buildings in relatively dense development. Through the combination of cisterns, infiltration pavement and green roofs, significant costs could be diverted from rainwater management. Concurrently, the green roofs provide the important contribution of reducing the impact of the building measures on ecosystem functions.

2 INTRODUCTION

In recent years flood disasters have become 'an inconvenient truth' for many people. On a local scale this problem is very often man-made due to the paving over of open land. As a result, the natural water cycle is defective and most of the precipitation during a rainstorm is immediately routed into overloaded storm-sewer pipes. Moreover, the impacts of global warming and the attendant stronger storms with more rainfall have intensified the situation. This means that at present, public water authorities are at a crossroads. They can try to solve the problem conventionally by costly end-of-pipe interventions, e.g. the extension of stormwater collection, storage and treatment facilities. However, these efforts fail to address the source of the problem – impervious surfaces. Therefore, modern stormwater management policies go upstream and manage the problem in a sustainable way by using green roofs for temporary water storage.

Within the array of preventive stormwater management techniques green roofs play an outstanding part. This is not only due to the fact that 40-50 % of sealed surfaces in urban agglomerations represent roofs. Moreover, green roofs are real all-rounders in both an economical and ecological sense. Depending on the green roof system build-up and substrate, the immediate water runoff from vegetated roofs can be reduced by 50-90% (ROTH-KLEYER 2009). A large part of the water returns into the natural water cycle by transpiration of the plants and evaporation from the substrate. The accompanying cooling effect of this process contributes to a better microclimate and a decrease of the 'urban heat island effect'.

The remaining excess rainwater drains from green roofs with a substantial lag time so the peak flow rates are reduced. Due to the natural drainage pattern of green roofs less or smaller dimensioned sewerage systems can be installed on new development areas or large projects. Innovative stormwater master-plans include the combination of green roofs with cisterns, so the roof water not absorbed by the green roof build-up will be captured and provide grey water for other uses (e.g. irrigation, flushing toilets). As stormwater volume reduction benefits the budgets of the municipalities, many water authorities promote the opening of scaled surfaces with financial incentives. In Germany, for example, property owners receive a special discount on the annual stormwater taxes for areas which are covered by green roofs (ANSEL 2009).

3 CASE STUDY STUTTGART-ZAZENHAUSEN

The first indication of integrating green roofs into the development of the building site "Hohlgrabenäcker" in Stuttgart-Zazenhausen already appears in the land development plan of the City of Stuttgart. Effective since 2000, the land development plan 2010 is the pivotal controlling tool that directs urban planning and development of Baden-Württemberg's capital city on a sustainable course. In order to minimize encroachment and provide internal compensation measures in the building site 'Hohlgrabenäcker', ecological stipulations were proposed in the land development plan for the comprehensive building site, notably green roofs and stormwater retention and -infiltration.

Given that the development of the housing area assumes significantly detrimental impacts on the environment, an Environmental Impact Assessment (EIA) was conducted before the development plan was assembled. In doing so, the Environmental Impact Assessment considers the effects of a construction project on the protection of humans, animals, plants, soil, water, air, climate, landscape, as well as culture and other

real assets. The measures that were recommended on the basis of the assessment - for prevention, minimization and compensation - are then found again as regulations in the development plan. While the regulation of green roofs as minimization measure for the protection of species, biotopes, water, climate and natural scenery has become standard in the interim, the active integration of green roofs with drainage planning is still rather something of a special case.

To this end, layer depth of the green roof substrate plays a decisive role for green roof function as primary stormwater storage and for delayed runoff occurring from long-lasting rain events. For the regulation of extensive green roofs in the development plan, therefore, from the framework of an integrated approach, a higher value for substrate depth was deliberately selected (12 cm), such that the runoff coefficient from the roof surfaces would achieve the desired value of 0.3.

The regulations for extensive green roofs in the development plan are as follows:

“Free-standing garages and carports must be greened. Here the green roof must have a substrate depth of at least 12 cm. The substrate layer is to be planted with grasses and wild herbs and shall be preserved as such (extensive green roof).”

„For retention of stormwater, areas with flat and single-pitch roofs are to be covered with green roofs. … Here the green roof must have a substrate depth of at least 12 cm. The substrate layer is to be planted with grasses and wild herbs and shall be preserved as such.”

The total green roof area of the building site ‘Hohlgrabenäcker’ adds up to a total of 18,300 m². Regulating green roofs into the development plan was therewith an important step for achieving the ambitiously low degree of 20 % imperviousness within the building site.

4 SPECIFICATIONS AND BASIC CONDITIONS FOR THE DRAINAGE DESIGN

4.1 Legal basis

According to the Water Act for Baden-Württemberg (WG) § 45 b Abs. 3, when technically possible and without incurring damage, stormwater from new development sites should infiltrate or be conveyed away separately. It is important to note here that selective runoff infiltration in Baden-Württemberg may only be accomplished in troughs with over-grown topsoil layers.

4.2 Municipal specifications

Because of limited capacity of existing sewers, the planned new development site ‘Hohlgrabenäcker’ is required by statement of Stuttgart City Council to comply with a maximum runoff co-efficient of 0.3 (impervious degree of 30 %).

4.3 Hydro-geological conditions

The soil analyses that were conducted indicate predominantly homogenous, cohesive soils in the upper layer, which is the layer that is relevant for precipitation abatement. These soil types have limited suitability for stormwater infiltration. Prospecting did not reveal noteworthy levels of groundwater. Furthermore, the steep hillside situation (in parts over 10 %) strongly restricts the possibilities for surficial stormwater infiltration.

5 THE DRAINAGE CONCEPT IN PRACTICE

Due to the specifications and basic conditions described above, drainage by separate sewer system is obligatory. Residential wastewater is collected via drainage system and passed into an existing combined wastewater sewer. The basic conditions encountered at the building site did not permit comprehensive and selective stormwater infiltration, so a combination from various basic elements of stormwater management came into use.

5.1 Drainage from private areas:

Facilities for rainwater storage and -use on all built surfaces upon which single- or semi-detached housing (loose development) are planned and for which no obligation for green roof construction exist. Rainwater storage results from cistern facilities on private properties which empty partially by force. The part of the cistern volume that is not partially emptying can be used by the property owners for rainwater use. In

accordance with DIN 1989, rainwater can be used in house and garden for toilet flushing, washing clothes and irrigation. In addition to the residential water management benefits of retaining and damping runoff peaks, the cistern solution offers additional ecological benefits:

- a) Conserve drinking water
- b) Cost reduction for sewers and wastewater treatment.
- c) Reduction of the pollution load discharge to the discharge system.

The drain outlet from the cistern throttle can be connected to the new stormwater sewers in the development roads.

Figure 1: Cistern installation

In the more densely built area, green roofs are specified for runoff minimisation. Other paved areas must be furnished with permeable coverings. Drains from these properties must also be connected to the stormwater sewers in the development roads.

Fig. 2: Single-pitch roofs with vegetation layer

5.2 Drainage of public/ open areas:

In terms of transportation, public streets and development areas are restricted to a minimum to reduce the impervious degree as much as possible. Streets and path surfaces are connected to the new stormwater sewers. The stormwater sewer discharges directly into the receiving water course (Feuerbach).

Through the consistent use of pervious-friendly material for all of the paths, storage- and living spaces, as well as the use of green roofs and cistern facilities, an impervious degree of just ca. 20% could be achieved in the residential area.

Parameters for the development:

- Catchment area stormwater sewers: 15.3 ha
- Paved area: 3.2 ha
- Pervious paving of streets and paths: 16,000 m²
- Total green roof surfaces: 18,300 m²
- Cistern facilties for single-family homes: 47
- Cistern facilties for multi-family homes: 09

Fig. 3: Infiltration pavement - buildup

6 ECONOMIC COMPARISON

By economic comparison, the stormwater design described above can hold out against conventional stormwater management as well. By conventional construction, the imperviousness of the new development area would swell to over 40%, and centralized stormwater retention would necessarily require 1,400 m³ useable volume. In open cut construction, an area of at least 1,200 m² would be required. The acquisition of the land area alone, which comprises around 4 lots, can finance the construction of the decentralized cistern facilities, as well as the additional costs from the pervious paving and green roofs.

Furthermore, the operational costs of centralized stormwater retention, as well as dropped stormwater fees for the split wasterwater levy, speak clearly to the conceptual design of the stormwater management selected for the new development area.

Comparison investment costs:

Conventional stormwater conveyance with separate sewer system

Land acquistion for centralized stormwater retention:	1,200 m² x 600 €	720,000 €
Investment costs for stormwater retention:	1,400 m³ x 120 €	168,000 €
Additional costs estimated for cross-section enlargement of conduits:		50,000 €
Total costs conventional stormwater discharge:		**938,000 €**

Decentralized stormwater management in new development area

Cistern facilities in single-family homes:	47 x 1,200 €	56,400 €
Cistern facilities in multi-family homes:	9 x 5,000 €	45,000 €
Additional costs for pervious paving instead of asphalt:	17,000 m² x 20 €	340,000 €
Additional costs for green roof: (Substrate depth 12 cm instead of 8 cm)	18,300 m² x 05 €	91,500 €
Total costs decentralized stormwater management:		**532,900 €**

Cost savings investment costs:

Decentralized stormwater management vs Conventional stormwater conveyance: 405,100 €

Even when the complete installation costs for the extensive green roofs of ca. 20 Euro / m² are included in the cost comparison, decentralized stormwater management is still over 100,000 Euro more economical than conventional discharge. And this says nothing of the annual ecological yield from conserved stormwater fees which were introduced to Stuttgart in 2007. The basis for this stormwater fee is the built and impervious land area from which stormwater is discharged into the public sewer system. Measures which serve for natural stormwater management and which reduce discharge into the sewers are rewarded with significant annual fee reductions.

Decentralized stormwater management: Annual savings in stormwater fee

Cistern facilities	8,240 €
Pervious paving	8,400 €
Green roof:	9,040 €
Total savings from decentralized stormwater management:	**25,680 €**

Savings in stormwater fee over 30 years: 770,400 €

Already in 1998, a cost study by the Ministry of Building and Housing in the German state of North Rhine-Westfalia came to the conclusion that green roofs are always more cost effective than gravel roofs, when reduced rates for water retention by green roofs are recognized within the framework of a municipal bylaw.

7 CONCLUSION

With its approach, the building site ‘Hohlgrabenäcker’ could assume a pioneering task in the matter of ecological stormwater management for new building sites in Stuttgart. In doing so, the full effectiveness of green roofs arises through integrated planning. Minor modifications to substrate depth can suffice for cost savings on the order of five-figures (Euro). That green roofs also provide cost savings on heating and air conditioning through their insluative and shading effects, that they improve the urban climate, and that they provide new habitats for plants and animals are further important aspects which, in this case, are bonus.

8 IGRA – THE INTERNATIONAL GREEN ROOF ASSOCIATION

The International Green Roof Association (IGRA) is a global network for the promotion and dissemination of information on green roof topics and green roof technology. IGRA´s services include networking, workshops, conferences and all kinds of public relation work. Please find more information at www.igra-world.com.

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SZENAMO. Szenarien zukünftiger Mobilität älterer Personen

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1 ABSTRACT

Wir sind gegenwärtig mit der Alterung der Gesellschaft konfrontiert. Der Anteil der Menschen über 60 Jahren liegt derzeit bei 23 Prozent und wird auf 30 Prozent bis zum Jahr 2050 ansteigen. Das Mobilitätsverhalten der künftigen Senioren/-innen ist daher von besonderem Interesse. Die Schaffung einer breiteren Wissensbasis über das Mobilitätsverhalten älterer Personen ist erforderlich, um auf zukünftige Entwicklungen reagieren zu können und sicher zu stellen, dass ältere und alte Menschen selbstständig mobil bleiben können.

Anhand der Datenanalyse die im Rahmen der Studie „Lebensübergangsereignisse bei Senioren und Seniorinnen und ihre Auswirkungen auf die alltägliche Mobilität“ erfolgte, konnte das Mobilitätsverhalten älterer Menschen differenziert dargestellt werden. Als ein wesentliches Ergebnis dieser Datenanalyse geht die Bildung von verhaltenshomogenen Gruppen (Mobilitätstypen) hervor, die es erlaubt das Mobilitätsverhalten älterer Menschen und ihre Anforderungen an das Verkehrssystem besser abbilden zu können.

Besonderes Augenmerk galt in der Auseinandersetzung mit dem Mobilitätsverhalten von Seniorinnen und Senioren dem Einfluss der Lebensübergangspunkte Pensionierung und Änderung der Haushaltsstruktur (Übergang vom Mehr- zum Einpersonenhaushalt). Diese Lebensübergangspunkte stellen eine deutliche Zäsur im Mobilitätsverhalten dar. Kenntnisse über die Veränderungen sind somit von zentraler Bedeutung für die Sicherstellung von Mobilität.

Anhand der gewonnenen Erkenntnisse über das gegenwärtige, sehr differenzierte Mobilitätsverhalten der Seniorinenn und Senioren wurden in Form von drei Szenarien mögliche Entwicklungspfade der Mobilität älterer Menschen beschrieben. Die Mobilität älterer Menschen der kommenden Jahrzehnte wird geprägt sein von einer längeren Lebensarbeitszeit, einem höheren Versorgungsbedürfnis und einem deutlich differenzierten Freizeitverhalten.

Älteren Menschen, als einer großen und künftig stark wachsenden Bevölkerungsgruppe mit sehr speziellen Mobilitätsbedürfnissen, kam bisher wenig Aufmerksamkeit zuteil, wenn es um ihre Verkehrsteilnahme geht.

In Verkehrsmodellen fanden die spezifischen Mobilitätsmuster von Senioren/-innen kaum Einfluss. Das Projekt SZENAMO konnte mit den Erkenntnissen über die Mobilitätsparameter und der Bildung von Mobilitätstypen einen Beitrag zur Schließung dieser Lücke leisten.

2 DATENANALYSE

2.1 Ergebnisse der Befragung

Die Befragung im Zuge der Studie „Lebensübergangsereignisse bei Senioren und Seniorinnen und ihre Auswirkungen auf die alltägliche Mobilität“ umfasste ein Sample von 1.500 Befragten über 62 Jahre (750 Befragte aus Wien bzw. dem Burgenland).

- 41 % davon waren Männer und 59 % Frauen.
- 40 % Einpersonenhaushalt, 50 % Zweipersonenhaushalt, 10% Mehrpersonenhaushalt
- 78 % Pensionistinnen und Pensionisten, 22 % Erwerbstätige
- 72,5% städtisch / 27,3% ländlich

Die erhobenen Daten lieferten Erkenntnisse über den Zusammenhang der Mobilität älterer Menschen und den Variablen Alter, Geschlecht, Wohngebiet und Gesundheitszustand.

2.1.1 Alter

Mit steigendem Alter nimmt die Häufigkeit mit der das Haus verlassen wird ab. Gehen ist über alle Altersgruppen hinweg die bevorzugte Transportform. Die jüngeren Altersgruppen geben eher das Auto als präferiertes Transportmittel an. Die jüngeren Altersgruppen bewerten ihre Möglichkeiten das Haus verlassen zu können signifikant besser als die älteren Altersgruppen.

2.1.2 Geschlecht

Ältere Männer geben signifikant öfter das Autofahren als bevorzugte Transportform an, während ältere Frauen öfter die öffentlichen Verkehrsmittel angeben. Ein signifikant größerer Anteil der Männer nutzt mehrmals die Woche das Auto, Frauen nutzen das Auto wesentlich seltener.

2.1.3 Gesundheitszustand

Ein signifikant größerer Anteil der Senioren ohne körperliche Einschränkungen gibt an das Haus täglich zu verlassen. Personen die unter einer motorischen Einschränkung leiden, bevorzugen eher Fahrtendienste und öffentliche Verkehrsmittel. Senioren/-innen mit motorischen Einschränkungen bewerten ihre Möglichkeiten das Haus verlassen zu können signifikant schlechter als Senioren/-innen ohne Einschränkung, oder Personen mit sensorischer Einschränkung.

2.1.4 Wohngebiet

Senioren/-innen aus ländlichen Wohngebieten bevorzugen signifikant öfter das Auto und das Fahrrad als Fortbewegungsmittel, während Senioren/-innen, die im Stadtgebiet wohnen das Gehen und öffentliche Verkehrsmittel präferieren.

Wesentliche Erkenntnisse lieferten die ERA NET Daten auch im Hinblick auf die Veränderungen des Mobilitätsverhaltens nach den Lebensübergangsereignissen.

2.2 Lebensübergangsereignisse

Wendepunkte bzw. lebenszyklusbezogene Ereignisse beeinflussen die Mobilitätsmuster der Menschen. Als wesentliche Ereignisse gelten dabei der Übergang vom Erwerbsleben in die Pension und der Übergang vom Mehrpersonenhaushalt in einen Einpersonenhaushalt.

Die Anzahl der interviewten Personen, die innerhalb der letzten 2 Jahre in Pension gegangen waren, betrug 85 Personen (5,7%). Von einer Änderung der Haushaltsstruktur in den letzten beiden Jahren betroffen und somit alleinlebend waren 94 Personen (6,3%).

2.2.1 Veränderungen des Mobilitätsverhaltens bei Übergang vom Erwerbsleben in die Pension

Senioren und Seniorinnen, die innerhalb der letzten beiden Jahre in Pension gegangen sind, weisen signifikante Unterschiede in der Häufigkeit des Hausverlassens vor und nach der Pensionierung auf. Nach der Pensionierung nimmt die Häufigkeit des Hausverlassens signifikant ab. Pensionierte Personen bevorzugen eher das Gehen, öffentliche Verkehrsmittel und Fahrtendienste, noch Berufstätige vergleichsweise häufiger das Auto. Noch berufstätige Seniorinnen und Senioren bewerten ihre Möglichkeiten das Haus verlassen zu können signifikant besser.

2.2.2 Veränderungen des Mobilitätsverhaltens bei Übergang vom Mehrpersonenhaushalt zum Einpersonenhaushalt

Seniorinnen und Senioren, die in Einpersonenhaushalten leben, verlassen signifikant weniger häufig die eigene Wohnung wie Personen aus Mehrpersonenhaushalten. Alleinlebende bevorzugen eher das Gehen und den Öffentlichen Verkehr, während in Mehrpersonenhaushalten lebende Seniorinnen und Senioren vergleichsweise häufiger das Auto nutzen. Seniorinnen und Senioren in Mehrpersonenhaushalten bewerten ihre Möglichkeiten das Haus zu verlassen signifikant besser.

2.3 Mobilitätstypen

Zur Darstellung der komplexen Strukturen der Mobilität älterer Menschen wurde auf die Bildung von verhaltenshomogenen Gruppen zurückgegriffen. Aus den Daten der ERA NET Befragung wurden anhand von Clusteranalysen drei Mobilitätstypen gebildet: die mobilen Seniorinnen und Snioren, die leicht mobil eingeschränkten Seniorinnen und Senioren und die stark mobil eingeschränkten Seniorinnen und Senioren. Als Parameter wurden dabei Alter, Beruf, Haushaltsstruktur und der Gesundheitszustand (subjektiv und objektiv) herangezogen.

Mobile Seniorinnen und Senioren	**Leicht mobil Eingeschränkte**	**Stark mobil Eingeschränkte**
• großteils berufstätig • großteils nicht älter als 70 Jahre alt • nutzen am häufigsten das Auto • schätzen die Möglichkeiten im Hinblick auf die eigene Mobilität am besten ein • leben überdurchschnittlich häufig in Mehrpersonenhaushalten • verlassen häufiger das Haus.	• großteils bereits pensioniert und gehören den älteren Altersgruppen an • sind relativ zufrieden mit dem eigenen gesundheitlichen Zustand • leiden kaum unter eingeschränkter Motorik • bevorzugen das Gehen und das Fahrradfahren • die Hälfte dieser Gruppe lebt in Mehrpersonenhaushalten	• stellen die älteste Personengruppe dar, und sind bereits zu hohen Anteilen aus dem Erwerbsleben ausgeschieden • sind mit der eigenen Gesundheit weniger zufrieden und leiden auch vergleichsweise häufiger an einer motorischen Einschränkung • höchste Anteile an Personen die Fahrtendienste und die öffentlichen Verkehrsmittel bevorzugen • niedrigste Außer-Haus Häufigkeit • größter Anteil an Personen, die in Einpersonenhaushalten leben.

Fig. 1: Mobilitätstypen aus ERA NET Befragung

Die Berechnungen zeigten, dass sich vollständig Mobile, leicht bzw. stark in ihrer Mobilität eingeschränkte Seniorinnen und Senioren signifikant in ihrem Mobilitätsverhalten unterscheiden. Insbesondere motorische Einschränkungen wirken negativ auf die Mobilität. Diesem Umstand muss im Hinblick auf die Zunahme älterer Menschen, die von einem höheren Risiko betroffen sind an motorischen Einschränkungen zu leiden, Rechnung getragen werden.

2.4 Szenarien zukünftiger Mobilität

Die längere Lebensarbeitszeit, das erhöhte Versorgungsbedürfnis von Seniorinnen und Senioren bzw. die höhere Versorgungsleistung durch Senioren und Seniorinnen und die zunehmende Mobilität in der Freizeit bzw. ein deutlich differenziertes Freizeitverhalten wurden als wesentliche zukünftige Entwicklungen für die Szenarienerstellung herangezogen.

2.4.1 Keep working

Berufstätigkeit hat einen starken Einfluss auf das Mobilitätsverhalten älterer Menschen. Mit einer steigenden Lebenserwartung muss das Pensionsantrittsalter ansteigen. Von der wachsenden Zahl älterer Personen werden deutlich mehr länger arbeiten.

Aufgrund der längeren Lebensarbeitszeit und der höheren Motorisierung unter den Berufstätigen ist davon auszugehen, dass die Wegehäufigkeit zunehmen wird, da länger der verpflichtende Arbeitsweg zurückgelegt wird. Ebenso werden Wegelänge und Wegedauer zunehmen. Dazu trägt vor allem der hohe Anteil am MIV im Berufsverkehr bei, ebenso wie die zunehmende Motorisierung der Frauen und die längeren Pendelwege in die Stadtzentren.

Zu erwarten ist, dass der PKW Anteil unter den Erwerbstätigen weiter zunehmen wird. Erwerbstätige Senioren/-innen werden den PKW ebenso nutzen wie jüngere Erwerbstätige und durch die längere Erwerbstätigkeit finanziell länger in der Lage sein die Kosten für die Motorisierung aufzubringen. Vor allem ältere Frauen werden öfter über einen eigenen PKW verfügen können. Der Anteil an Arbeitswegen unter den Senioren/-innnen wird zunehmen und damit der motorisierte Berufsverkehr. Die flexiblen Arbeitszeiten der älteren Erwerbstätigen werden zu einer regelmäßigeren Verteilung des Berufsverkehrs beitragen. Die

Abnahme der erwerbstätigen Bevölkerung insgesamt wird zu einem geringeren Verkehrsaufkommen zu den Stoßzeiten führen.

2.4.2 Keep caring/ Keep being cared for

Hinsichtlich des Gesundheitszustandes, der Wohn- und Lebenssituation der älteren Menschen und der daraus resultierenden Möglichkeiten mobil zu sein bzw. der Risiken nicht mehr selbstständig mobil sein zu können, geben die Senioren/-innen ein sehr heterogenes Bild ab. Es ist zu erwarten, dass mit der ansteigenden Lebenserwartung die Anzahl an gesundheitlich beeinträchtigten Senioren und alleinlebenden Senioren (vor allem Frauen) zunimmt. Neben der Zunahme an pflegebedürftigen Senioren/-innen, wird auch die Anzahl an (jüngeren) Senioren ansteigen, die mobil und gesundheitlich nicht/kaum beeinträchtigt sind. Diese Senioren werden, wenn sie aus dem Erwerbsleben ausgeschieden sind, oftmals die wegfallenden Arbeitswege durch Versorgungswege (Pflegetätigkeit, Fahrtendienstleistungen, Betreuung) substituieren.

Ältere und weniger mobile Senioren/-innen werden eine geringe Außer Haus Mobilität aufweisen und auf die Mobilität anderer (Pflegedienste) angewiesen sein. Es wird ein steigender Bedarf an Fahrtendiensten bei immobilen Senioren/-innen gegeben sein.

Jüngere und mobile Senioren werden eine konstant hohe Außer Haus Mobilität aufweisen. Die

Ziele werden sich eher auf den Nahbereich konzentrieren. Die unternommenen Versorgungswege werden die wegfallenden Arbeitswege substituieren.

Hinsichtlich der Verkehrsmittelwahl wird Gehen die wichtigste Fortbewegungsart der Senioren/-innen darstellen, allerdings wird die Nutzung des PKW stark zunehmen.

2.4.3 Keep recreating

Freizeitwege stellen neben Versorgungswegen den wichtigsten Wegzweck der Senioren/-innen dar. Die längere Nacherwerbsphase wird zu mehr Freizeitmobilität führen. Mit der Zunahme der Senioren steigt auch der Anteil ihrer Wege im Freizeitverkehr an, wobei zwischen Nah- und Fernfreizeitmobilität differenziert werden muss. Mit zunehmendem Alter sinkt die Anzahl der Freizeitwege. Der Fußwegeanteil ist bei Nah-Freizeitmobilität hoch. Der Anteil der PKW-Fahrten im Freizeitverkehr sinkt mit dem Alter. Die Freizeitmuster jetzt 30-50-jähriger werden beibehalten und die Freizeitmobilität der künftigen Senioren darstellen. Die mobilen und leicht mobil eingeschränkten Senioren werden einen hohen Wegeanteil im Freizeitverkehr aufweisen. Sie werden dabei häufig den PKW nutzen. Die stark mobil eingeschränkten Senioren werden ihre Freizeitaktivitäten vermehrt im Nahbereich unternehmen. Geführt werden wird für diese Gruppe sehr wichtig sein, was zur steigenden Anzahl an motorisierten Freizeitwegen der Senioren ebenfalls beitragen wird.

3 VERKEHRSMODELLIERUNG

Verhaltensorientierte Verkehrsnachfragemodelle bilden immer öfter die Basis für verkehrspolitische Entscheidungen bei den relevanten Akteuren auf Länder- und Bundesebene sowie in privaten Planungsbüros. Diese Modelle gehen davon aus, dass Bevölkerungsgruppen mit ähnlichem sozio-ökonomischen Hintergrund ein ähnliches Mobilitätsverhalten aufweisen.

Die Gespräche mit Experten haben gezeigt, dass Verkehrsmodelle zum jetzigen Zeitpunkt vor allem eingesetzt werden, um die Wirkungen von Infrastrukturmaßnahmen auf das Gesamtsystem abzubilden. Künftig wird vor allem die nutzergruppenspezifische Verkehrsangebotsplanung und Verkehrssicherheitsanalysen an Bedeutung gewinnen.

Ältere Personen werden in bestehenden Verkehrsmodellen bis dato nur unzureichend berücksichtigt. Eines der wesentlichsten Erkenntnisse der Experteninterviews, ist es, dass die bis dato vorherrschende Differenzierung in eine Gruppe über 60 jähriger, nicht erwerbstätiger Personen mit, und eine Gruppe ohne PKW dieser sehr heterogenen Altersgruppe nicht gerecht wird. Die stärkere Differenzierung dieser Altersgruppe scheiterte bis dato an der Verfügbarkeit entsprechender Daten. Vor allem das Mobilitätsverhalten der älteren Personen konnte bisher mit den vorliegenden Daten nur unzureichend, bzw. nur in zu allgemeiner Form, abgebildet werden.

Ziel der Bearbeitungen im Projekt SZENAMO ist es, die Anwendungsmöglichkeiten der Projektergebnisse in verhaltensorientierten Verkehrsnachfragemodellen zu evaluieren.

Der Schwerpunkt lag aufgrund der dafür besonders geeigneten Daten aus der Studie „Lebensübergangsereignisse bei Senioren und Seniorinnen und ihre Auswirkungen auf die alltägliche Mobilität“ auf der Entwicklung von verhaltenshomogenen Mobilitätsgruppen für die über 60-jährigen.

Mit der Einteilung in mobile, leicht mobil eingeschränkte und stark mobil eingeschränkte Senioren/-innen (siehe 2.3), kann eine deutlich bessere Differenzierung der älteren Personen in verhaltenshomogene Gruppen erzielt werden.

Ein Workshop mit Experten aus dem Bereich der Verkehrsmodellierung kam zu dem Ergebnis, dass der Aufwand, bestehende Verkehrsmodelle um die entwickelten verhaltenshomogenen Gruppen und den dazugehörigen Modelleingangsdaten zu erweitern, relativ hoch ist. Eine Berücksichtigung der Erkenntnisse macht laut Expertenaussage nur bei der Neuerstellung bzw. geplanten Aktualisierungen von Verkehrsmodellen Sinn.

Für den Aufbau eines Verkehrsmodells für die Ostregion durch den VOR sollen daher die Erkenntnisse des Projekts SZENAMO einfließen. Um den Implementierungsprozess zu erleichtern, wurde ein Leitfaden erstellt, der im Detail auf die Anforderungen von Modellen und die Möglichkeiten der Verwendung unserer Daten eingeht. Dieser Implementierungsleitfaden steht allen Interessierten zur Verfügung.

4 CONCLUSION

Das Projekt Szenamo leistet einen Beitrag für eine sichere, barrierefreie und sozialverträgliche Mobilität der älteren Gesellschaftsmitglieder.

In zukünftigen Planungen und Modellierungen kann auf die detaillierten Datengrundlagen über die spezifischen Mobilitätsbedürfnisse älterer Personen zurückgegriffen werden, um den Senioren/-innen entsprechend der Größe ihrer Gruppe mehr Gewicht bei der Verkehrsplanung und der Verkehrsmodellierung zu verleihen. Die Erkenntnisse über den Einfluss der Lebensübergangsereignisse auf das Mobilitätsverhalten dienen der Sicherstellung von Mobilität bzw. dem längst möglichen Erhalt selbstständiger Mobilität als Beitrag zur Lebensqualität der Senioren/-innen.

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Territorial indicator system as a tool for evaluating territorial strategies

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1 ABSTRACT

Evaluation is a main challenge for every territorial strategy. Objectives are often defined in abstract terms, leaving space for different interpretations, which is an obstacle to a fair evaluation. This is certainly true for the Territorial Strategy of Navarra (ETN), an autonomous region in Spain. The ETN envisions the future territorial development of Navarra, based on the principles stated in the European Spatial Development Perspective (ESDP) to Navarre, defining some strategic objectives and a numerous set of directives. Based on this strategy, spatial plans (POT) are currently being elaborated for the five sub regions of Navarra.

The ETN contains a set of indicators in order to measure the evolution of regional territorial development until the year 2025. However, in practice, these indicators only give some general insights in the accomplishments of the strategy. This is why a new indicator system is being developed, which incorporates the objectives of the spatial plans, and enables decision makers to identify the results of their interventions. Not only does the system respond to the need of measuring tangible results, it also aims at integrating indicators from different policy domains into a regional territorial information, sustained by a Spatial Data Infrastructure (SITNA/IDENA).

2 INDICATORS AND TERRITORIAL STRATEGIES - A COMPLICATED MARRIAGE

Territorial strategies are usually produced by nations, regions or other territorial entities in order to design a common vision on the future development of the area in consideration. Despite the differences across countries and regions, due to different planning systems and varying degrees of involvement of different sectors of government such as economic development, social issues, housing or environment, most strategies share two common characteristics: integrality and translation into maps.

Indicator systems are put in place to evaluate the results of a certain strategy. In general, the more tangible the objectives of a strategy or plan, the better they can be measured by an indicator system. However, territorial strategies tend to be rather abstract due to the need to combine many interests in some overarching concepts such as for example polycentrism, territorial cohesion, accessibility or landscape quality. This makes the development of an indicator system for territorial strategies rather complicated.

On one hand, this situation has not to be dramatized. Spatial plans often play a role of provoking visionary views on the future of a territory, and visions can exist of concepts or dreams for a better future, which do not necessarily have to be translated in understandable bits and pieces to be implemented in every corner of the territory. On the other hand, the design of an indicator system for a territorial strategy has in many cases proven to be an exercise of compromising spatial planners to translate their general principles into workable objectives, which in turn forced politicians to express their ideas into real choices (de Vries, 2009).

Putting an indicator system together requires a profound understanding of the goals of territorial policies, a wise translation of these results into tangible results to be achieved, and the organization of the data flows and analysis to get to a useful product. In this article we explain the process of elaborating territorial indicators for territorial policies in the region of Navarra, where we are currently undergoing all of these aspects.

3 TERRITORIAL STRATEGY OF NAVARRA - IN SEARCH OF SYNTHETIC INDICATORS

The main policy document on territorial development in Navarra is the Territorial Strategy of Navarra (ETN), approved in 2005 (Navarra, 2005). This document is based on six principles, combining the three pillars of the European Territorial Development Perspective (ESDP) (polycentrism, accessibility and management of natural and cultural heritage) with the three pillars of sustainable development (competitiveness, social cohesion and environmental sustainability).

The ETN proposes to monitor territorial development based on these six principles, and includes synthetic indicators to measure its progress, both of the region itself as well as in comparison to Spain. Every indicator is calculated out of a combination of 10 to 20 variables which are considered to be crucial for the principle to

be monitored. For example, accessibility is measured by different variables like proportion of population with access to high speed internet, accessibility by high way, and so on.

Since the approval of the ETN, two evaluations have been carried out (OTN 2008, 2010), and two problems have flourished. Although the synthetic indicator system seems convincing in putting one value for every principle, the numbers do not connect to politicians and citizens' real life. For them, an increase of polycentrism from 0,52 to 0,56 doesn't have any meaning, let alone that this would lead to policy adaptations. The second problem is the difficulty to maintain this indicator system in time, due to changing data availability and definitions. And if one variable changes or is missing, a time comparable synthetic indicator cannot be produced.

4 A NEW PROPOSAL: INDICATORS OF TERRITORIAL POLICIES

The need for more tangible indicators as stated in the evaluations has become more urgent as the subregional spatial plans in Navarra (POT) are about to be approved (Navarra, 2009). These plans are a translation of the ETN into decisions on the distribution and management of territorial amenities at supramunicipal level. This is why the Territorial Observatory of Navarra has proposed a new indicator system which combines the general development goals of the ETN with the need for tangible results as expressed in the POT.

The most important function of the indicator system is the translation of the objectives of ETN and POT into numbers that express a wishful development. The question is not putting a fixed number as a targeted objective, since this is a political task, if desired at all. It can neither be said that any development is exclusively to be contributed to territorial policies. However, putting indicators which express "wishful development" enables an open debate about the convenience, priority, and compatibility of different objectives and their impact on territorial development.

To illustrate what we mean we explain briefly two examples. A clear objective of territorial policies is to reduce damage caused by flooding. A way of doing this is the assignation of flood risk areas and attributing some land use regulations. Therefore, the indicator system will measure the number of new houses constructed in flood prone areas of a certain risk. This way, planners can keep track of real developments and see to what extend these are in line with their policies. However, this does not necessarily mean that planners have failed if new constructions in flood prone areas are increasing. There might be a number of reasons that this has happened (shortage of land, river side development, or even shortcomings in the definition of risk areas), and measures might have been taken to reduce vulnerability.

A second example is rural development, being an integral part of spatial plans in Navarra. An important objective of the territorial strategy of Navarra is to strengthen the agricultural sector, and at the same time to promote diversification of rural economies, decreasing the percentage of persons working in the primary sector. Both objectives are not immediate results of spatial planning, but territorial decisions indirectly influence economy trends, such as investments in infrastructure or information services. In this case, given existing type of policies, the indicator - dependency on agricultural sector - allows stakeholders to evaluate the indicrect results of these interventions.

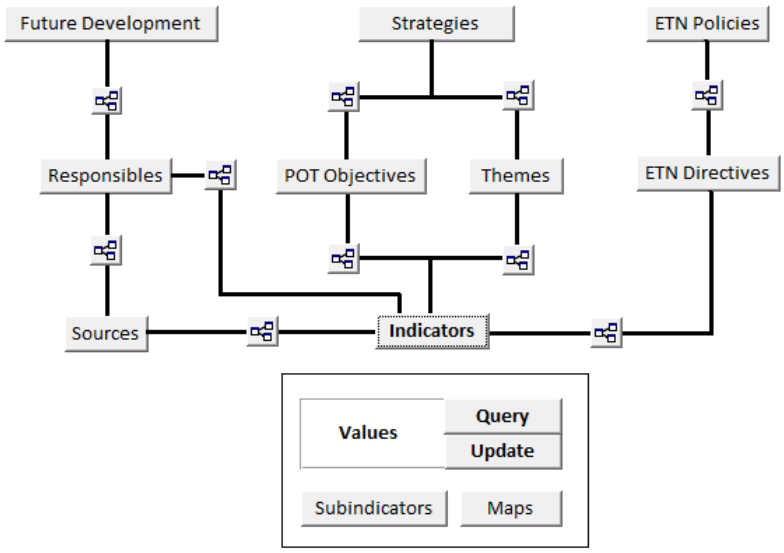
The examples illustrate the need for the second function of the indicator system: the contextualization of the observed trends. Numbers in themselves are useless, if they are not explained in a wider context. Questions like comparability with other regions, degree to which the number in particular explains a greater phenomenon, the way policies are having an impact are fundamental to increase the usefulness of the indicator. In our products we try to balance between a synthetic system and the need for explanatory texts.

5 THE PRODUCT

The system envisioned to be in place by summer 2010, consists of two different outputs: a website and a biannual publication or evaluation report.

The website is the main communication platform of the indicator system, and is meant for different types of consults. In the first place, visitors will be able to access most actual version of all indicators, as the system will continuously be updated with the latest data files available from other institutions. But it will also be possible to have easy access to the most relevant objectives of the different territorial policy documents, and the way these objectives can be evaluated by the indicators included in the system. At medium term, temporal and geographical queries should be available. And in any case, all indicators will be accompanied

by explanatory sheets which shortly address the questions raised in the previous section on comparability, explanatory power of the indicator, and policy impacts.



In order to achieve a wider impact, every two years a document will be published named "Sustainable Development in Navarra", in which a snapshot of the system will be given, organized according to the main themes which are of importance for territorial policies of the region.

6 ORGANIZING THE DATA FLOW – INPUTS FROM OTHER INSTITUTIONS

As territorial indicators are very diverse, the system relies to a large extent on data available in other institutions. In this paragraph we describe shortly the way we are working in order to achieve a data input flow as efficient as possible.

One of the first decisions in the conceptual design phase of the indicator system is to use existing data, rather than producing totally new data layers. That strategy takes into account the high degree of data availability in the region. In this way, maintenance will be assured as well as production costs are kept relatively low.

We briefly characterize the diversity of our data suppliers. The Territorial Information System of Navarra (SITNA) is our main source of information. Navarra has a rather unique concept of a corporate system in which different data suppliers put their data available to users outside their own institution. However, many more data are needed. A next step is to access Spatial Data Infrastructures (IDENA, IDEE). Unfortunately, results so far are relatively small, since these systems are still under construction, and data sharing is not on top of the list of priorities of most institutions. Other source of great importance are the Statistics Institutes (IEN, INE), geographic institutes (IGN), governmental departments (Agriculture, Cadastre) and public and private companies (TRACASA, ESRI). At European level, networks and agencies like ESPON and EEA are important sources, although we try to confine national and European data gathering as much as possible to existing indicator systems as those published by the Sustainability Observatory of Spain (OSE, 2009).

Data suppliers vary greatly in the way they are focussed on data management, and as a result, many difficulties have to be tackled. One of the main issues is data availability. Lack of certain data can lead to slight modifications of an indicator, such as the case of compactness, which originally would be calculated by number of housing units per building, but will now be calculated by number of housing units per parcel. A second issue is privacy policies, which sometimes hamper the calculation of an indicator at the desired scale level, as for example in the case of number of enterprises per industrial area. Time series constitute a recurrent issue, since many suppliers do not maintain outdated information, or just produce a data file for one particular project, without maintaining the data up to date. As a result, indicators do not all have the same update frequency. Some are updated every year, others might only be available every ten years, like data based on census information (of example secondary homes).

A second issue is data quality. Data used to calculate a particular indicator might originate from studies with different levels of accuracy. For instance, flood areas are derived in a large period, with different methods and inputs depending on the obtaining year. In that case, indicator is calculated for every possible year any

time the flood area is updated. In that way, you could still compare indicators between different years. Older versions of the indicator values are kept and are related to the newer version for comparison purposes.

Finally, different data formats and their difficulties to integrate external data files into the indicator system constitute another challenge. Every supplier uses different formats (ACCESS, XLS, SHP, PNG, DXF). Moreover, suppliers often change their data model, changing field names, type of data, etc. Both aspects are dealt with in the enterprise GIS explained in the following section. As far as possible, data suppliers are asked to deliver their data according to an input data model based on the first import experience in order to prevent changes and avoid reprogramming import routines.

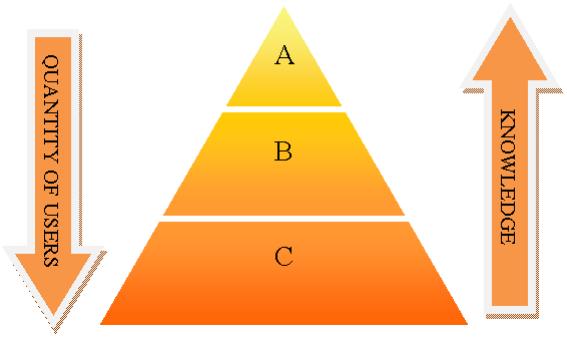
7 ENTERPRISE GIS

The large data volume and the complex analysis needs required by the indicator system makes the development of an enterprise GIS system a vital operation. In this section, the conceptual design of this system is explained.

The goals of the enterprise GIS are to optimize, to standardize and to automate processes of data acquisition and maintenance, territorial analysis, calculation of indicators and sharing of results. In order to achieve these goals, attention is paid to five essential parts of the system: users, data storage, work flow, metadata, and output.

In the first place, the system has to serve three levels of users defined as shown in the image below (increasing upside down by number of users and decreasing the same way by knowledge required to use the information provided by the system): (A) Indicator system architects, consisting of scientific staff involved in the conceptual evolution of the indicator system, and GIS staff responsible for the technical implementation and maintenance of the system and the calculation of indicators. (B) Planning experts, being decision makers and technical advisors using the outputs of the system for making, implementing and evaluating spatial plans. (C) General public interested in the progress of their region and their living environment.

Depending on the user level, users will access to the system through different applications (see applications section below). In the same way, permissions to read, to write and to modify concepts and values will depend on the user level.



A second issue is data storage, which is being organized according to four different data tiers, in order to respond to the complicated environment in which the indicators are being developed. To illustrate this environment, some issues are mentioned here, like different versions of geographical zoning in time, different time series according to data sources, or combinations of data sources for the calculation of one indicator. Moreover, other projects carried out in the Observatory are intimately related to the indicator system, since they both derive from the same base data, and contribute by proposing the adaption of existing or the inclusion of new indicators. Therefore, data storage beyond that required for the indicators is a must.

The four data tiers which are currently being developed should deal with these issues:

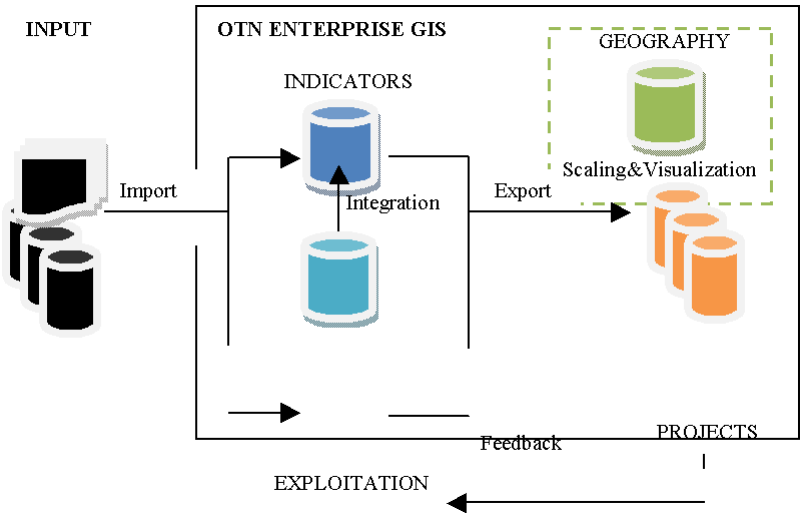
- The geography tier stores those layers used to produce the indicators according to the geographical units defined in the conceptual model, like administrative units of different scales, flood prone areas, urban areas, economic hot spots etc. These layers are also used to produce maps for reports. All the historical versions of these zonings are maintained by version management.

- The indicator tier is used to store the conceptual model of the indicator system, the input data required to calculate every indicator (apart from geography), and the resulting indicator values. As with the geography tier, all historical data is maintained by version management. Additionally, tables within this tier are designed according to a vertical storage model. This means that one record represents just one indicator value, in one moment of time, on one scale level (see figure). More conventional table formats, for example those in which values for different years are stored in different columns, offer less flexibility, since changes in input models, geographical zoning definitions or the proper indicator calculation model can not be dealt with, as opposed to the vertical tables proposed in this data tier.

Nombre del campo	Tipo de datos
ID	Autonumérico
Indicator	Número
Date	Número
Scale	Número
Value	Texto
User	Texto
User_date	Fecha/Hora

Image 1. Fields in the only indicator values table within the system.

- The exploitation tier is used to store inputs needed for territorial analysis carried out within the Observatory which are not necessarily part of the indicator system. This tier includes three types of table using a mixed vertical/horizontal approach for the table design. Firstly, catalogue data keep record of all layers stored in this tier. These data follow a horizontal approach as there is no need to track changes (mostly new layers declaration). Secondly, input data are those exploitation data which are directly imported from external sources into vertical tables. This is done to isolate these data from changes in inputs, to improve data maintenance and to take into account the temporal aspects. Opposite to the indicators tier approach, there is one vertical table per theme (cadastral uses, housing per parcel, companies and workers) to account for the diverse data models and scales involved. And thirdly, exploitation data is transformed from vertical to horizontal tables to assure a proper connection to the graphic layers in the geographic tier within the GIS system. This is the only redundant information within the system at the purpose of maintaining high performance both on import and maintenance procedures (vertical tables) and on data exploitation (horizontal tables).
- The project tier is introduced to avoid overloads to the exploitation tier. All intermediate data which is needed or generated for analysis purposes (derived from exploitation tier) are stored within a specific database per project rather than in the exploitation tier.

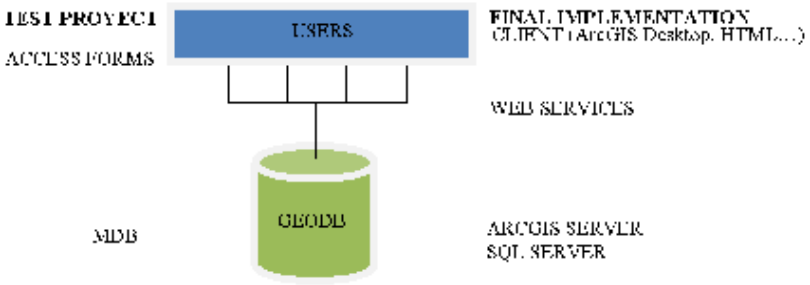


In the third place, users and data storage come together in an organized way, according to different work flows as shown in the image below.

- Imports: inputs are loaded to the indicators or exploitation tier depending on the current and foreseen use of the information. To avoid redundancy, a choice is made in which one of the tiers data is imported.
- Integration: exploitation data can evolve towards a new indicator. In that case, data will be transferred to the indicator tier. In the same way, data used to calculate indicators could be derived to generate new information at the exploitation tier.
- Export: the territorial analysis carried out at OTN require very specific inputs, so detailed that they would be useful for just one project and thus making it unnecessary to store them at the indicator or exploitation tier. All intermediate data which is needed or generated for analysis purposes (derived from exploitation tier) are stored within a specific database per project rather than in the exploitation tie
- Feedback: results from territorial analysis worth sharing with other projects are placed into the exploitation tier or even in the indicator tier through integration.
- Scaling&Visualization: all the indicators calculation, exploitation tasks and analysis within projects are obtained at a specific scale (regional, sub regional, local...) by using layers in the geographic tier as base data. These layers are then used to represent results in maps and reports.

In order to keep track of all information in the system, metadata is being assigned to all tiers. In the geography tier metadata delivered by the data supplier is used. For the indicator tier metadata of every indicator is made up by the conceptual framework of the indicator system. The person responsible for data harvesting and indicator calculation is stored together with the harvesting procedure (web service, download, petitions, and time schedule) and calculation steps. Within the exploitation tier metadata is made up of the catalogue elements describing the layers included in this tier. For projects data and processes are described in the project specific documentation whereas metadata is not regularly stored at this tier as it constitutes a too detailed level of data.

And finally, the system has two kinds of outputs. On one hand there are the regular maps and reports, not only related to the biannual report on territorial development, but also in many other products like territorial observations, advisory reports, European projects, development projects etc. On the other hand, client applications are being developed such as the indicator website. At this moment, emphasis is being put on the development of the conceptual model, data storage and paper outputs. Once this phase is being concluded, attention will shift towards a more efficient platform development and the development of web clients, as shown in the following graphic.



In any case, the system design allows clients easy access to a complex set of information, from any point of view (monitoring of strategic objectives, time series of a particular phenomenon, geographical comparisons at different scale levels, or comprehensive overview of all data related to a particular issue). Interestingly, the system also allows for keeping track of the evolution of the conceptual model. This flexibility is a base condition for expanding the system in the near future towards a real corporate system in which different governmental departments share their indicators.

8 CONCLUSIONS

This short overview of an experience of territorial indicator development in Navarra shows the complexity of such an endeavour. In this section we want to highlight some lessons learned so far.

Developing indicators for territorial policies require serious involvement and even some courage of politicians. Indicators can scare off certain administrations, since they might show undesired tendencies for which they can be criticized. In Navarra we opted for a middle road, taking the objectives of territorial policies as a reference for indicator development, but not selling these indicators as absolute measurement of success. It still remains to be seen if this will be accepted. However, it is a way to stimulate debate about the real goals of territorial policies and interventions needed to reach them.

Another issue is the danger of overload of information. In this indicator system, we try to stress the importance of both the facts, the explanation behind those facts and their relation to existing policies. Only if the indicators are put into a wider context, the risk of abuse will be reduced, and the chance of receptiveness of the politicians will improve.

The data harvesting, transformation and storage is a large effort which cannot be underestimated. In spite of all modern interoperability guidelines like INSPIRE and emerging Spatial Data Infrastructures SDIs), data availability remains low and quality and format is still diverse. In an ideal world, SDIs should take over large part of the data gathering and transformation processes which is now carried out by the Observatory. On the other hand, demands from initiatives like the Territorial Information Systems can inspire further development of regional and national SDIs.

An aspect that needs more attention in the development of SDIs is the inclusion of statistic information and makes them geographically available at different aggregation levels, allowing for instance dynamic aggregations. Indeed that would first require the definition of a European standard for Territorial Development Indicators and levels of aggregation.

Finally, we want to emphasize that the indicator system presented in this paper is a GIS-driven approach aimed at standardizing data gathering and treatment, obtaining comparable results with a high level of flexibility in order to incorporate adaptions to the indicator systems and changes in data input. A vertical data structure and extensive version management have proven to be crucial to reach this flexibility.

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The Austrian Sustainable Building Certificate for buildings and city districts

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1 ABSTRACT

In 2010, the Austrian Sustainable Building Certificate is being implemented in Austria. Starting with eight pilot-projects with office-buildings, the certificate will be available for housing, education buildings, industrial buildings and also for city-districts. The certification-process provides a sustainability-rating-tool which shows the overall sustainability performance of the building or the city-district. On a more detailed level it shows the performance in over 50 single sustainability criteria. Thus using the rating tool in the concept and planning phase, it provides a compass to lead the way to more sustainable buildings and more sustainable city-districts.

2 BACKGROUND

2.1 General

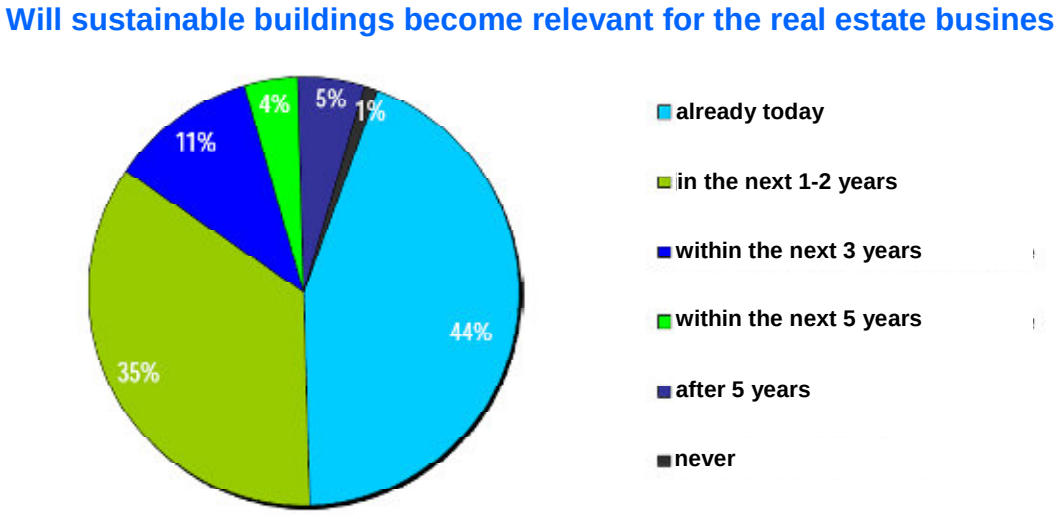
The following reasons demand sustainibility activities in the real estate sector and construstion industry:

- Climate change
- Shortage of ressources (above all: oil)
- Land-consumption
- Collapse of the real estate industry

The construction and real estate economy accounts for estimated 20% of the overall economy in western europe. A change in the sustainibility performance has teherefore a big influence on the sustainibility of the whole economy[1].

2.2 Trends in the real estate industry

Sustainable buildings become more and more relevant. A survey among 400 leading senior managers in real estate firms or real estate divisions of large firms, comes to the conclusion, that almost 80% of the interviewee consider sustainable buildings already relevant for the real estate business. The following illustration shows the details:



Source: Survey among 400 leading sen. managers in real estate firms or RE-divisions of large firms. CoreNet Global & Jones Lang LaSalle, January 2008.

Figure 1: Relevance of sustainable buildings fort he real estate business

[1] Estimation by Ward Miller, denkstatt, Leed-Auditor

The crucial factor for more sustainable buildings is to take the whole lifecycle into account. All relevant aspects of sustainability in the fields of economy, ecology and society in the whole lifecycle of the building have to be considered. The following image shows the relevant phases of the lifecycle of a building.

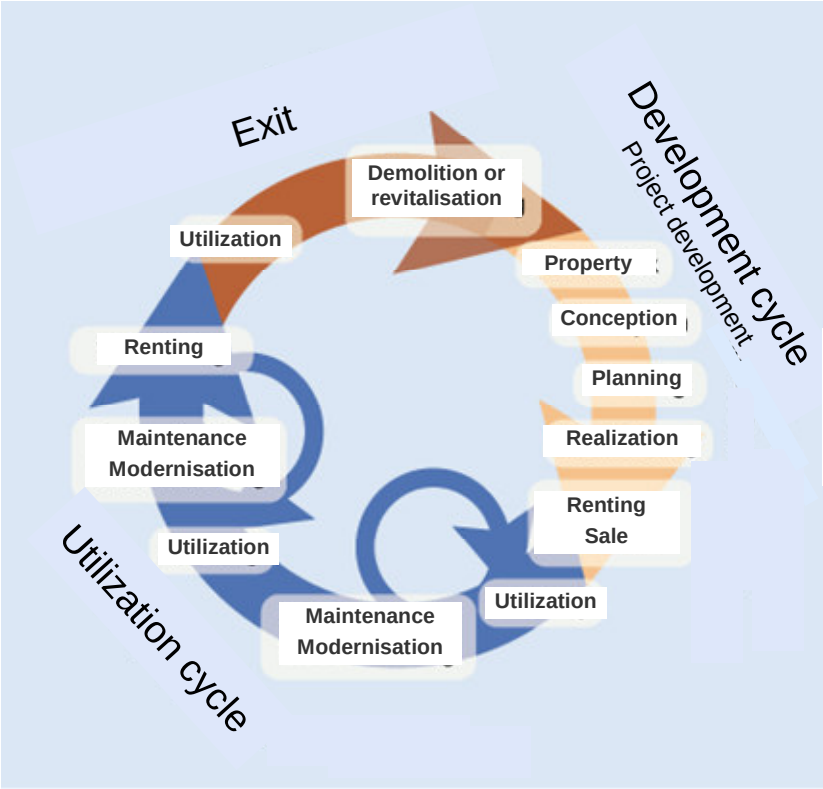


Figure 2: Lifecycle of a building[2]

Especially the lifecycle costs can only be influenced at the very beginning of the conception and planning process. Around 50% of the costs can be influenced in the conception and planning phase, around 25% in the conception phase. It is important to realize, that only 15-20% of the lifecycle costs occur in the planning and construction phase, 80-85% occur in the utilization phase. Up to 50% of the costs in the utilization phase can be reduced by sustainable planning[3].

To help builders and planners to consider all relevant aspects of sustainability, and to support investors in identifying real estate with stable value, several sustainability rating systems, labels and certificates are available. The following image shows a selection of these systems:

The most favored systems in Europe are BREEAM, LEED and the DGNB. With the Austrian Sustainable Building Certificate (ÖGNB), the DGNB-system is now being adapted for the Austrian conditions and requirements.

3 THE AUSTRIAN SUSTAINABLE BUILDING CERTIFICATE FOR BUILDINGS

3.1 Why the Austrian sustainable building certificate (ÖGNB)?

The ÖGNB is an assessment system of the 2. generation. The ÖGNB provides the most comprehensive verification of the sustainability of a building. It is ideally adopted to the Austrian and European building culture. The ÖGNB process follows the legal regulations and the planning practice in Austria. Verification

[2] T. Bohn, T. Harlfinger, J. Ringel (ed.); "Real Estate Business"; Leipzig 2008, Urban Management Script
[3] Cp. Bruhnke, J. Ringel (ed.); „Facility Management"; Leipzig 2008, Urban Management Script

documents can be taken from the common planning process. The economic performance of the building is, among ecological aspects, equally assessed. The performance of the building - and not single measures – are assessed. The certification system is continuously developed and considers technical, social and international developments.

Systems like LEED or BREEAM don't cover completely all aspects of sustainability. The ÖGNB fills the gaps. The following figure shows these gaps.

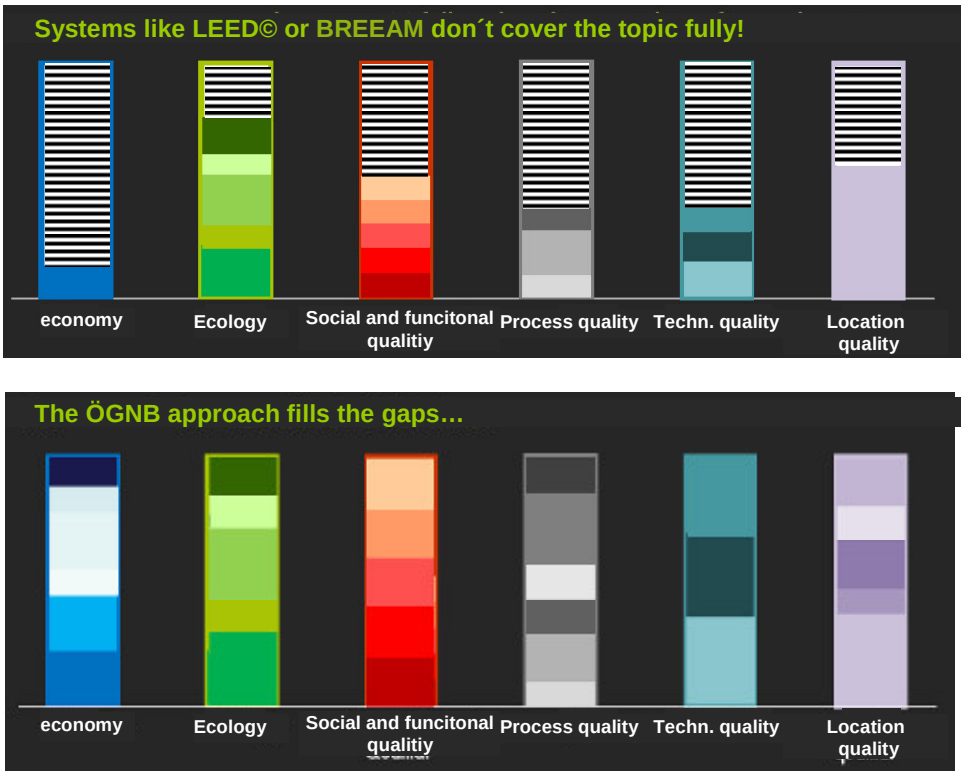


Figure 3: Comparison of the sustainibility range of different certificates for sustainable building[4]

3.2 The ÖGNB-method

The ÖGNB is a transparent, comprehensible assessment system, developed from practical experience. It defines the quality of buildings in a comprehensive way and allows a systematic valuation for auditors. A user friendly software solution supports and visualizes the documentation and assessment process. Diverse building types can be valued through different system options. The valuation considers 6 fields of criteria:

- Economical quality
- Ecological quality
- Social quality
- Technical quality
- Process quality

With the valuation matrix the sustainability of the building is assessed with 50 sustainability criteria. Each criterion can achieve max. 10 points. The significance of the criteria is weighted from 0 to 3. The result is given in the percentage of the overall degree of sustainibility performance):

50% = ÖGNB bronze; ≥ 65% = ÖGNB silver; ≥ 80% = ÖGNB gold

The performance in the several criteria is presented in the following figure:

[4] Source: German Sustainable Building Council (DGNB)

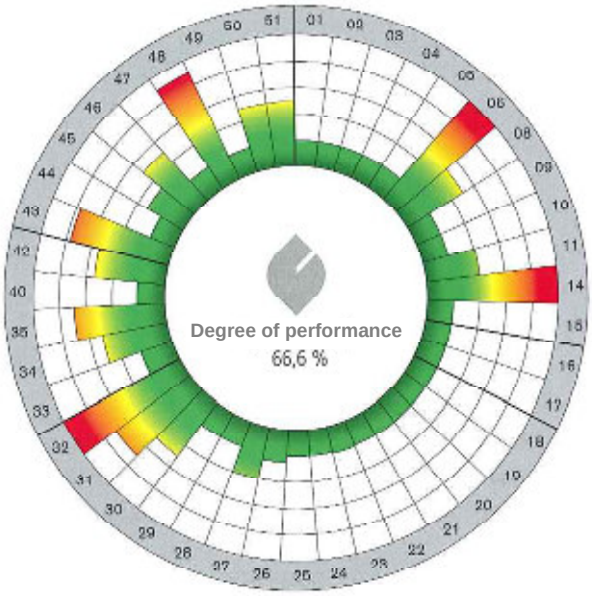


Figure 4: Sustainability performance diagram[5]

Used in the conception and planning phase the system provides a sound planning tool for improved and integral planning.

4 THE AUSTRIAN SUSTAINABLE BUILDING CERTIFICATE FOR TOWN DISTRICTS

The same method is currently developed for city districts. A set of around 90 criteria covers all aspects of sustainibility in urban planning and provides also an integral planning tool.

At the moment, more detailed information about this ÖGNB-system type is not available. At the REALCORP in May, the information will be provided.

5 CONCLUSION

The real estate market demands planning tools and certificates to improve and prove the sustainability performance of buildings. With the implementation of the Austrian Sustainable Building Certificate an integral planning-, rating- and certification-tool is available in Austria and will be available in other countries. The development of the system type “City-districts” will provide an integral planning-, rating- and certification-tool for sustainable urban planning and sustainable urban management.

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[5] Source: German Sustainable Building Council (DGNB)

The City Planning Cadastre System of the city of Moscow as a tool for sustainable urban development

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The goal of creation, implementation and functioning of the city planning cadastre system (SPCS) of the city of Moscow is provision of all the stakeholders (regulatory bodies, investors, construction organizations, private builders, citizens etc) with relevant, trustworthy and legally valid information for decision-making, planning of investments, designing and supervision over the city development from the city authorities and society.

SPCS is mounted on the unified state cartographic base of Moscow supplied by the specialized city enterprise – the Trust for Geologic, Geodesic and Cartographic Works (MosGorGeoTrust).

The information presented by SPCS includes the data about current state and utilization of the city territory, city planning regulations, construction and architectural projects under way, worth of separate urban areas. At present SPCS contains more than 40 information resources registered in the Unifies Registry of Information Resources and Systems of the city. These are, in particular: schemes of functional (end use of an area), construction (height and density of housing) and landscape (arrangement of the ground surface) zoning of the Moscow territory; map of city planning regulation lines; data on the Moscow natural complex including historical and cultural monuments; conservations zones.

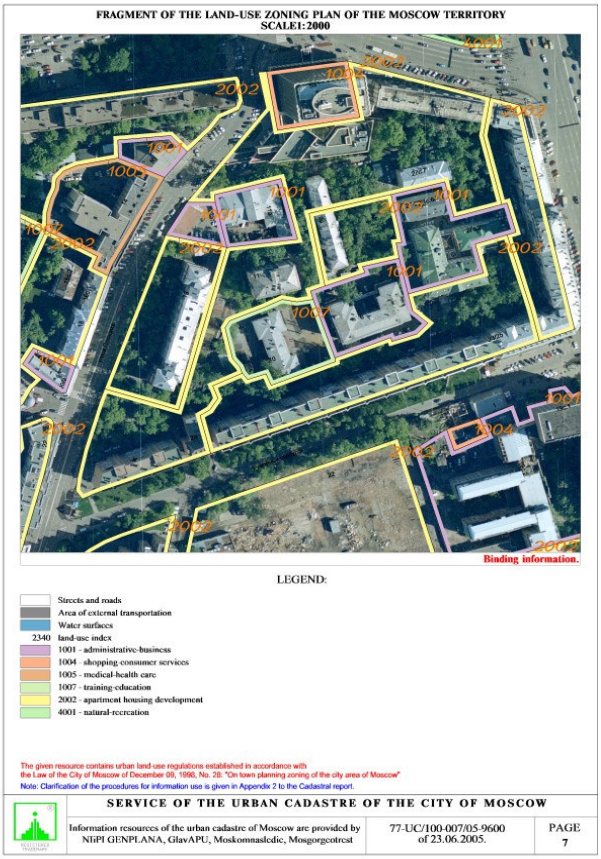

Fig 1. Fragment of building zoning

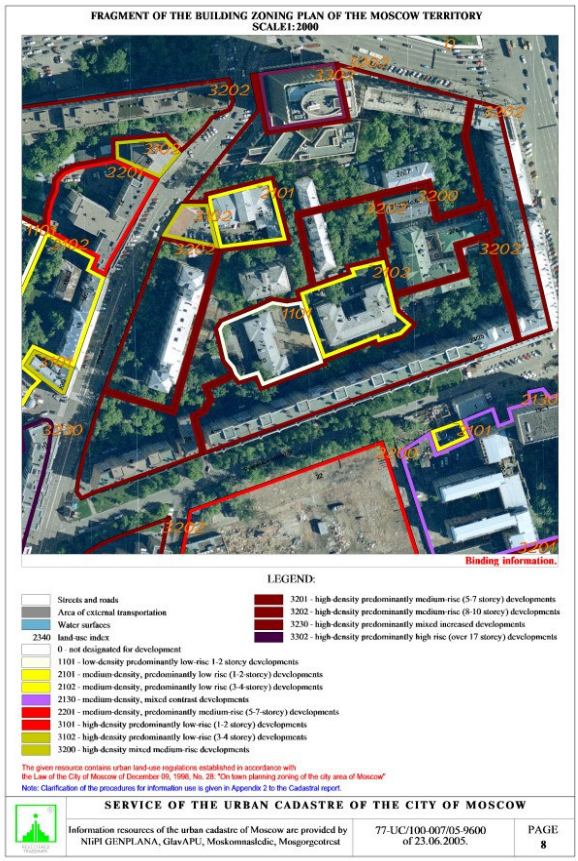

Fig.2 Fragment of functional zoning

SPCS also contains the data on underground engineering network (including diameters, capacity and material of pipes) and a lot of other useful information. Under the existing variety of ownership patterns on the urban territories established by the Russian Land Code, SPCS becomes capital instrument ensuring sustainable and transparent management of urban development of a city of any size.

Choosing the strategy of the city planning cadastre development the Moscow government proceeded from the following priorities:

- maintenance of optimal balance between the interests of the city and the society;

- preservation of historical image of the city;
- strict observation of sanitary and ecological regulations;
- upgrading and development of engineering and transport infrastructure;
- improvement of the investment climate due to increase of awareness of potential investors and creation of economic inducements for investments in real estate;
- perfection of democratic mechanisms of the city management by way of involvement of social organizations and eminent public figures into decision-making process and supervision over implementation of the decisions taken.

Today SPCS is a computerized information system operating according to the principle of "one window". This means that all the information is given to an applicant in one organization – Urban Cadastre Service of the city of Moscow in the form of unified document (cadastral report) and following the standard procedure established by the city administration. Cadastral report is available both in paper and electronic form.

Usage of the city planning cadastre information is obligatory. It means that any decision concerning allotment or utilization of a land plot in the city is taken by the city authorities with consideration of the data held in the cadastral report.

SPCS embodies the principle of equal access to the information resources. This means that any legal or natural person gets the cadastral report on even terms. During 8 years of operation SPCS has served more than 20 000 applicants and no one has ever been turned down.

Input, verification, storage and delivery of the city planning cadastre information have been materialized with the help of up-to-date information technologies on the base of high-duty computer system. Graphic information is processed on the basic platform "Microstation" and semantic data – on "Oracle" base. Application technologies have been worked out by the specialists of the Urban Cadastre Service. Information database of the Urban Cadastre Service contains over 80 MB of information that enables to prepare cadastral report for any part of the city territory within several hours.

8 year practice of SPCS application in Moscow has allowed to avoid the most expensive errors in municipal development – the errors in city planning. That contributed to rational utilization of budgetary funds, accelerated development of the urban infrastructure and in the whole – to the improvement of the quality of human life in Moscow. Application of SPCS in many respects determined positive changes in the architectural and historical appearance of the city, allowed to preserve many objects of cultural heritage.

Apart from ensuring systematic and sustainable development of the city the city planning cadastre plays important role in improving technological effectiveness and administration efficiency, coordination of activity of different institutions on the metropolitan territory. The experience of creation and operation of SPCS in Moscow has been successfully applied in a number of Russian cities such as Iakutsk, Surgut, Sochi.

SPCS of Moscow has gained international acknowledgement having won the title of "good practice" in 2004 at the contest, which is held every 2 years by the UN Human Settlements Programme (UN-HABITAT) with the view of revealing the best initiatives in formation of favorable and sustainable environment. In 2004-2006 SPCS of Moscow had been exhibited at the annual international fair "Expo Real" in Munich where it had always evoked great interest from the city authorities and business circles both of Germany and other countries.

In the Summary of the International Expert Group Meeting held in October 2005 in Moscow under the aegis of UN-HABITAT and devoted to innovative land tools it was mentioned that SPCS of Moscow is unique and has no counterpart in the world. From the other hand this system is universal and can be adapted both to big and little cities worldwide.

The Impact of the Modal Split on accessibility in urban areas

Wolfgang Rauh

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1 ABSTRACT

This paper deals with accessibility in large urban areas. A simple indicator of accessibility for a certain location is the number of people who are able to reach this location from their doorstep within a certain time. Based on data on average traffic speed, modal split, transport performance and population density fom 46 large metropolitan areas the impact of the modal split of urban travel on average accessibility is examined. It turns out that accessibility within urban areas is largely independent of the modal split. Moreover the effect of modal split on average traffic speed seems to be compensated by differences in urban population density in a way that accessibility remains constant.

2 ACCESSIBILITY WITHIN LARGE URBAN AREAS

2.1 Access is the purpose of the city

Despite all the obvious disadvantages of life in cities the continuous growth of large urban agglomerations is a world-wide phenomenon. The main asset of such agglomerations is a high degree of accessibility. It can be assumed that accessibility is the dominant force behind the development of urban agglomerations. Accessibility is crucial for the level of productivity reached by businesses located within the urban area (PRUDHOMME & LEE, 1999). To put it quite simple: Easy access to multiple places of activities such as work, shopping or entertainment is the purpose of cities. Therefore it is an important question, how the main asset of cities – accessibility – is affected by the modal split of urban travel.

2.2 Measuring Accessibility

To analyze accessibility it has to be defined and measured. Based on the so called 'isochrone concept' a very simple indicator of accessibility can be defined as a function of travelling speed and population density. This indicator 'A' is proportional to the number of residents who are able to reach a certain location within a certain time (20 minutes for example). This number depends on the size of the catchment area (indicated by average speed of urban travel 'V' squared) and on the population density 'D' within the area:

(1) $A = D * V2$

The average speed of urban travel 'V' is calculated by dividing total transport performance of all modes (person kilometres) by total travelling time of all modes in person hours:

(2) V = Total performance of urban travel / Total travelling time

2.3 Increased speed does not increase accessibility

Transport related data of 46 metropolitan areas in four continents (KENWORTHY & LAUBE, 2002) and corresponding data on urban densities (KENWORTHY, 2005) can be used as an empirical basis to analyze the relation between accessibility and a variety of transport characteristics. As expected, the average speed of urban travel declines strongly with increasing percentage of non-car modes (see figure 1). That however does not mean that high modal split of car travel results in high accessibility. This is because of an effect which can be shown by comparing average speed of urban travel[1] with population density (see figure 2). It turns out that in average the population density 'D' falls almost exactly with the second power of the average speed of travel 'V':

(3) D = Constant * V-2

If equation (3) is entered in equation (1) a surprisingly simple result appears for the indicator of accessibility:

(4) A = Constant * V-2 * V2 = Constant

This means that in fact metropolitan areas all over the world, despite huge differences in their urban transport systems, have a relatively similar level of accessibility. Obviously accessibility remains largely unchanged if the average speed is increased by increasing car use and by introducing urban motorway networks. It seems

[1] own calculations based on data by Kenworthy and Laube (2002).

that the effect of rising average travelling speed is almost exactly compensated by falling population density due to urban sprawl.

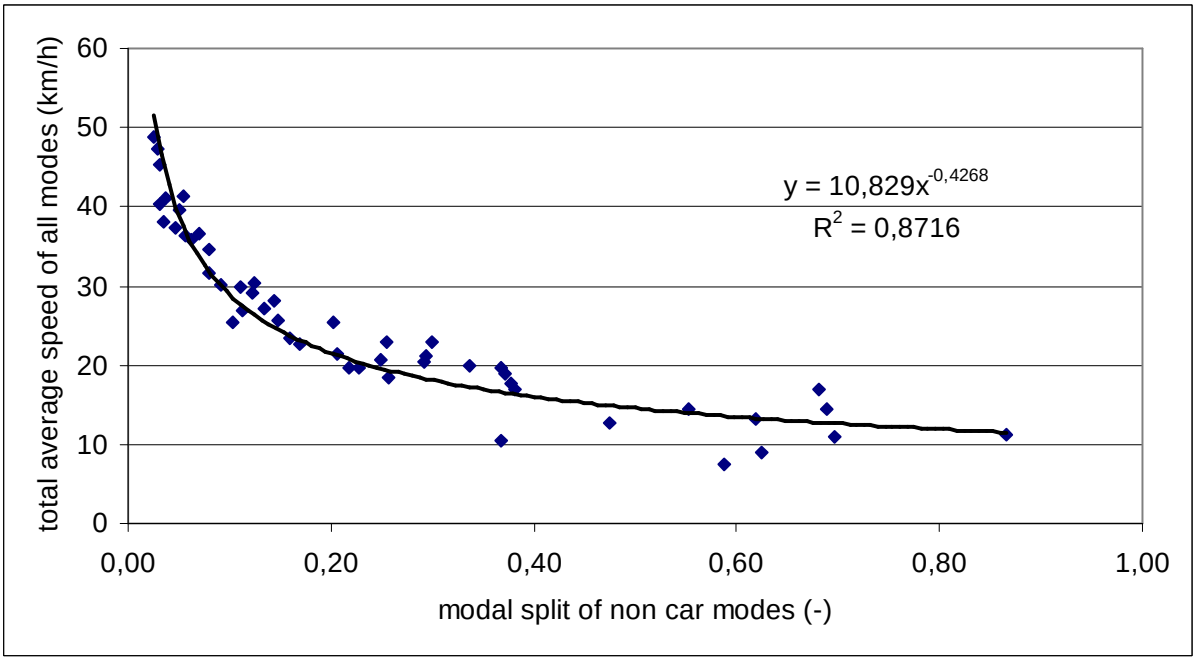

Fig. 1: Correlation between modal split and average speed of urban travel

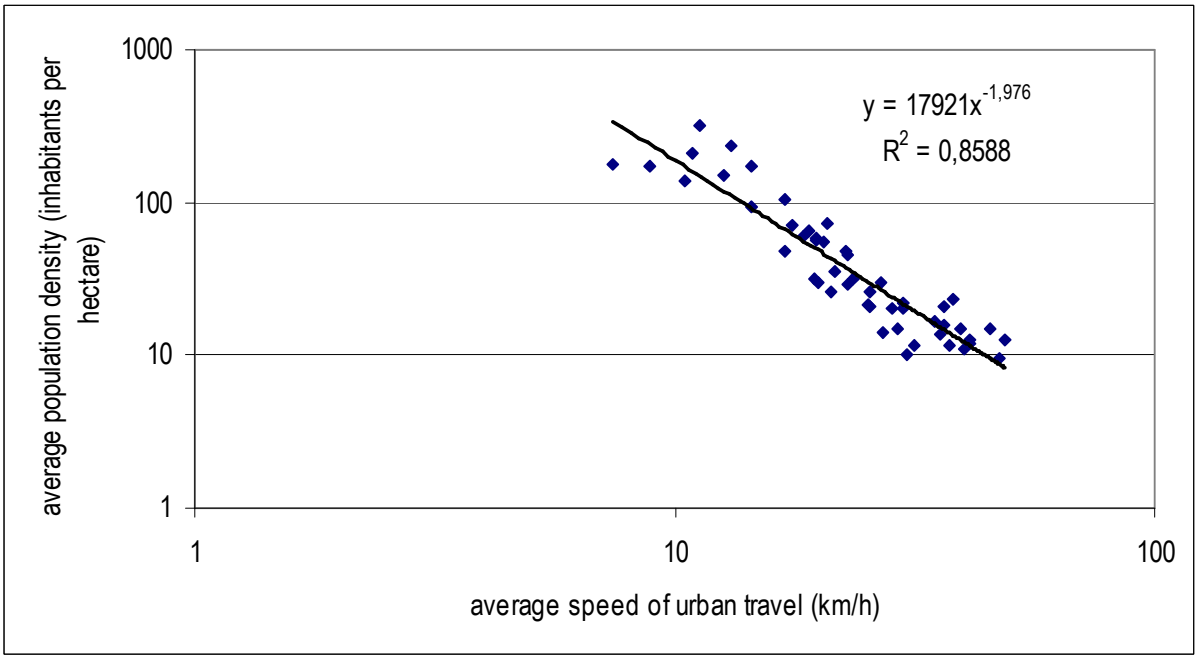

Fig. 2: Correlation between average speed of urban travel and population density

3 INTERPRETATION AND FURTHER CONSIDERATIONS

3.1 Modal split affects density and vice versa.

There is obviously a link between modal split, average speed of travel and population density. It is quite plausible, that increasing the modal split of car traffic will increase the average speed of travel. But what exactly is that mechanism which causes population density to fall as soon as the modal split of the car rises? Two typical conclusions are often drawn from the results of this mechanism. One is that speed – which is a result of private motorisation – is the immediate cause of urban sprawl. The other is the assumption that people have an overwhelming desire for in single family homes which makes them move to low density suburbs.

3.2 Accessibility and the Process of Suburbanisation

Contrary to popular belief it is neither an insatiable demand for single family homes nor the speed of cars which literally "drives" people out into the low density suburbs. It can be shown that it is quite simply congestion caused by car traffic which is the limiting factor for the density of cities (RAUH, 2008): Given a a certain population density and certain modal split within the urban area, only a very limited variation of congestion is possible, depending on the quality of traffic engineering and on the extent of urban motorways (hence the scattering of speeds observed in Figures 1 and 2). As soon as congestion in high density urban areas causes accessibility to fall below the level of accessibility in low density suburbs, residents and businesses will start to move to the latter.

4 CONCLUSION

Shifting urban travel from public transport to the private car will increase the average speed but in effect it tends not to increase accessibility. By adapting their infrastructure and their spacial structure to a given modal split, large metropolitan areas on different continents generally reach a similar level of accessibility. This means in practice that large low-density metropolises with an extended network of urban motorways tend to provide about the same level of accessibility to urban residents and businesses as smaller sized high density urban areas equipped with a dense network of subways, streetcars and buses. From an economic point of view both types of cities are equivalent, as long as they provide the same level of accessibility at the same total cost of urban travel. The cost to be considered is mainly the private cost of travel plus the public funds spent on transport infrastructure (road and rail) and on public transport. In which type of urban area the total cost of urban travel is in fact lower – the low density motorway city or the high density subway and streetcar city – should be subject to more intense research.

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The Mobility Pass for Residential Real Estate – an Instrument to Calculate Mid- and Long-Term Mobility Costs of Real Estate Decisions

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1 ABSTRACT

The "Mobility Pass for Residential Real Estate" offers the possibility to calculate mid- and long-term costs (in terms of money, time, CO2 emissions, accident risk) associated with the place of residence to be evaluated. It concentrates on both the real estate buyers or tenants and the real estate market. It applies where traffic and "forced" mobility occur and where the place of residence is chosen, and it offers a positive contribution to more conscientious mobility behaviour. The development of a „Mobility Pass for Residential Real Estate" is part of the research programme "ways2go", financed by the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT) as the programme owner (Programme management takes over the Austrian Research Promotion Agency - FFG). The stand of research and development of a "Mobility Pass for Residential Real Estate" is at the beginning. Therefore this paper is seen as an introduction to the complex themes, which will be evaluated within this research project.

2 INTRODUCTION: THE CHOICE OF RESIDENCE AND THE EFFECTS

About 10 % of the population living in Austria is moving every year from one apartment or house to a new one, in 2008 that was about 875,000 persons. The choice of a place of residence is usually an important, long-term decision requiring a high level of investment capital. It is no exaggeration to say that the choice of residence or place of operations is one of the most important decisions for people and firms. With this in mind, such decisions should be considered together with their consequences. Moreover, such local decisions provide the basis for mobility behaviour as it is illustrated by the Table 1 below:

Maturity	Relevant Traffic Decisions
Short-term	- The usage of a vehicle for ways to go - Location of flexible objectives (for example shopping, leisure)
Mid- to long-term	- Location of inflexible objectives (for example workplace) - Vehicle ownership - Location of residence

Table 1: Maturity of relevant traffic decisions of households (Source: Bauer U., Holz-Rau Ch., Scheiner J. in "Standortpräferenzen, intraregionale Wanderungen und Verkehrsverhalten – Ergebnisse einer Haushaltsbefragung in der Region Dresden", Page 267)

The broad mid- and long-term consequences of local decisions are not well calculated by most people. All too often, decisions are made based on a real estate object that appears attractive from the standpoint of price and living qualities without considering the consequences associated with long commuting times or "forced" mobility both for work and leisure travel.

When buying a car, it is commonplace for people not only to consider the price, but also the mileage figures. The "Energy Pass for Real Estate" is an important instrument in Austria for improving conscientiousness in terms of operational costs and environmental impacts of housing. With the "Mobility Pass for Residential Real Estate", a tool will be developed that will allow users to realistically assess the mid- and long-term effects of choosing a place of residence. The target audience is on the one hand, the buyers or tenants – people seeking a residence – and on the other hand, the real estate agents who can offer a higher level of service quality.

3 OBJECTIVE OF THE RESEARCH AND DEVELOPMENT OF A "MOBILITY PASS FOR RESIDENTIAL REAL ESTATE"

The "Mobility Pass for Residential Real Estate" focuses on a holistic view of the relationship of the object (location of residence) and subject (person or household). Mobility patterns based on the individual lifestyle

of a person will be determined within the research project. Starting point of a "forced" mobility is the location of residence. From there the trips to workplace, school, training places etc. are examined with the "Mobility Pass for Residential Real Estate". Furthermore, individual facts of the person, like his/her lifestyle, living and mobility habits and of course the size of family, will show the detailed mobility costs. If there is no possibility of a detailed specification of the person, the mobility habits has to be figured out on the basis of sociodemographic characteristics and statistical facts.

The analysis of the components of the "object" will contain informations of the real estate, like size of the residence, the category (house/apartment, rental/ownership etc.) and especially the travel connections. As far as it will be possible, the Mobility Pass will show different locations of residence with the probable mid- and long-term consequential mobility costs. The advantage or disadvantage of residential real estate will be given for a transparent mobility.

Figure 1 shows the components of the "Mobility Pass for Residential Real Estate":

Figure 1: Examined components of the „Mobility Pass for Residential Real Estate (Source: CEIT Alanova, own illustration)

The Mobility Pass examines social and spatial characteristics. Because there are different influences on the traffic behaviour of a person (for example: the composition and size of the household or the net income), these characteristics will be considered in the estimation of the mobility behaviour of a person. On the other hand, the mobility behaviour depends on the location of residence and on the distances and numbers of trips to different facilities (work, school, kindergarten, buying, leisure, etc.). The location-based (= spatial) characteristics again influence the choice of transport and of course the owning of a car or the regular usage of public transport. These ratings influence the mobility costs, such as in term of money, time, CO2 emissions and also a possible accident risk, which the "Mobility Pass of Residential Real Estate" will illustrate for a positive affecting on the mobility behaviour.

Traffic inducing trends, like the increasing rate of suburbanisation or the increasing numbers of cars per household, will be gathered and therefore be part of the research project.

3.1 What will be the aims of the "Mobility Pass for Residential Real Estate"?

The "Mobility Pass for Residential Real Estate" can be seen as an instrument for influencing the mobility behaviour, which is chosen consciously. It will function as a support, an incentive for better mobility behaviour and as a service for real estate agents. And it will show the user (buyer/tenant) his/her mobility patterns, which are depended on his/her housing situation and mobility habits. The relationship between the

selection of location and the mobility behaviour will show the effects to time, costs (money), environment (CO2 emissions) and the accident risk.

Further aims of the "Mobility Pass for Residential Real Estate" will be:

- To design an instrument for the individual need of an adjusted residential-location
- An advice for changing mobility behaviour
- An orientation for tenants and purchaser, when buying a house or an apartment
- A marketing instrument for the real estate industry/real estate agents
- More integration of the "mobility" subject into the evaluation of real estate

3.2 State of the Art

There are already basic approaches which calculate mobility costs (in term of money). These tools are a good basis for developing a "Mobility Pass for Residential Real Estate". It will contain some of the basic approaches, but extend the state of art in research through the use of a more holistic point of view.

A good example for an existing calculator of residential- and mobility costs is the "WoMo" (Wohn- und Mobilitätskostenrechner) calculator. This online-tool was designed for the metropolitan area of Hamburg, Germany, and is a free online tool. Transparency and information of the residential and mobility costs are the main objectives of this tool. The consequences of the individual mobility patterns are neglected, but will be shown by the "Mobility Pass for Residential Real Estate".

3.3 The Developing of a Tool called "Mobility Pass for Residential Real Estate"

The "Mobility Pass for Residential Real Estate" will be designed as a free online IT-Tool with the components of a geographic information system (GIS). The users are supposed to be real estate agents and persons, who want to buy or rent a new house or apartment. A possibility to implement the tool is with My SQL or PostgreSQL (SQL stands for "Structured Query Language"). This language allows running complex queries on a database. It also provides a means of creating databases. Many database products (like MS Access) support SQL, so an updating with actual data is very easy. These features can be useful for the "Mobility Pass for Residential Real Estate". That way, for example, real estate agents could actualize the prices of the residential real estate on their own. MySQL and PostgreSQL are freely available open sources Relational Database Management System (RDBMS) that uses Structured Query Language (SQL). MySQL is an essential part of almost every open source PHP application. Good examples for PHP/MySQL-based scripts are phpBB, osCommerce, and Joomla.

PostgreSQL supports a large part of the SQL standard and offers many modern features:

- complex queries
- foreign keys
- triggers
- views
- transactional integrity
- multiversion concurrency control

Also, PostgreSQL can be extended by the user in many ways, for example, by adding new data types, functions and operators. These host languages could be useful to develop the online-tool "Mobility Pass for Residential Real Estate" because of their individual and flexible applications.

The actual research is to develop two modules of the "Mobility Pass for Residential Real Estate". The first one will deliver different scenarios of residence locations and based on this, the possibilities of reducing mobility costs (in terms of money, time, CO2 emissions and possible accident risk). In this case, the "Mobility Pass for Residential Real Estate" will be a support to save mobility costs and on a long term effect it will achieve sustainable mobility patterns by changing the awareness people. The target group of this module will be the general public. The second module is similar to the first one, but is specially designed for

real estate agents. As a result, they can offer a better service to their customers. Therefore, a professional version will be developed where real estate agents can update facts and data themselves.

4 CONCLUSION AND OUTLOOK

The evaluation of the actual consequential costs of residence decisions is very complex and depends on living situations and it can be assumed that the mobility portrait changes over the usage period of the real estate object. The transparent presentation of consequential costs of locational decisions such as induced mobility costs, environment impacts, time and accident risk will be the final output of the "Mobility Pass for Residential Real Estate". In this manner, the "Mobility Pass for Residential Real Estate" should encourage consideration of the total costs of locational decisions. With its support, already at the selection of location, it addresses the roots of many current traffic problems and should contribute to a more conscientious mobility. Applications for the calculations of the costs associated with mobility reflect an evaluation of mobility in general and not the mobility behaviour of individuals. This behaviour is nevertheless in the forefront along with an evaluation of the place for residence. In order to present this relationship, a multimodal consideration and modelling is necessary. The „Mobility Pass for Residential Real Estate" is modular so that over the time it will be possible to add new models or improve existing ones. In this manner, the online-tool can always keep up with current research. Consideration of the favorability of the local and the object-related components of the Mobility Pass and the development of custom mobility passes can increase the awareness of more sustainable mobility patterns and habits.

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The Potsdam Housing Market: A GIS-based Spatial Analysis using FOS

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1 ABSTRACT

Housing in Potsdam varies from flats in redeveloped prefabricated high-rise buildings to apartments in historical townhouses to condominiums in Germany's first gated community. Increasing demographic development and a stagnant public housing sector generate potential for spatial conflicts. For the time being in-depth GIS-based spatial analysis of the housing market lacks. This article analyses spatial trends and distribution patterns of the Potsdam housing market, using geostatistical methods implemented in free open-source geographic information systems (FOS GIS). To assemble a spatially differentiated picture of the housing market, methods such as spatial interpolation techniques and spatial declustering are applied. The analysis presented here is based on a representative sample of recent housing market data from 2009. The study provides a basis for discussion of a generic approach to housing market analysis based on free open-source geoinformation systems.

2 INTRODUCTION

Today the benefits of GIS for the real estate sector are undisputed. Application of GIS in this sector is, however, far from being state-of-the-art. Until a few years ago not even major players in the real estate sector applied GIS analysis in their business (Borchert 2006). Frequently the application of GIS in real estate portals[1], e.g., is still limited to illustrate real estates traded. Currently, a trend can be observed to link real estate portals with real estate online mapping services (as provided in google maps, bing maps etc.) to so called geo mashups.This development can be considered a clear indication ofthe rising acceptance of GIS in the real estate sector. At the start of this new decade one finds that GIS in real estate is applied in research as well as in the evaluation of sales and for marketing purposes (Borchert 2006). However, the use of GIS in the real estate sector, especially in real estate management, often does not reach beyond the management and visualisation of real property. The existing potential of geographic information systems for GIS-based real-estate analysis, whether proprietary or FOS based, is thus not made full use of.

This paper presents a FOS GIS based housing analysis of the city of Potsdam. It proposes a process chain of a FOS-GIS based real estate analysis focusing on the housing market (section 3). In the second part of the analysis the drafted proposal is implemented (section 4); preliminary results of the analysis are presented in section 5. . Potsdam, a city of some 153,000 inhabitants, is the regional capital of the federal state of Brandenburg and the former residence of the Prussian kings. Neighbouring the national capital Berlin in the southwest, Potsdam is part of the Greater Metropolitan Area of Berlin. Located in an environment of great touristic value (UNESCO world heritage), the city benefits from its favourble location, resulting in positive demographic development which, in turn, stimulates the housing market.

3 FOS GIS-BASED PROCESS CHAIN FOR HOUSING ANALYSIS

When it comes to usability and functional range free open-source geographic information systems have reached a degree of maturity in the last decade that makes them a competitive alternative to proprietary GIS-systems. Similar software capabilities and usability of FOS GIS, no software license fees and direct access to the source code compared against high acquisition and maintainace costs of commercial GIS-systems make FOS-GIS systems an obvious choice for GIS-based real estate analysis. Steiniger and Bocher (2009) provide an overview over existing open source GIS developments. The FOS-GIS based process chain suggested here consists of three modular process components. In all three components the base rent per square meter[2] is used as the most important indicator for the detection of housing market trends. As will be seen a range of FOS GIS has been employed in the study discussed here. This has been done to use the best functionality for the solution of a particular problem available in the FOS GIS under review. To be able to do so is another

[1] Relational database system based online marketplace for the trade of real estate property
[2] High variable service charges and heating costs are not considered in the suggested process flow

major advantage of FOS GIS over proprietary GIS the cost of which generally limit software use to one product.

3.1 Component 1: Visual interpretation and descriptive statistics

This component focuses on existing trends and tendencies in the housing market. Trends are analysed by geovisual analysis, i.e. localizing, identifying and interpreting the spatial distribution of the housing markets supply and demand situation in GIS maps. Housing sites usually are presented as individual points (geocoded by x and y co-ordinates). Visualisation of the spatial distribution presents housing sites by classifying the base rent per square metre and the calculation of a simple histogram to identify the distribution of base rent is suggested. Fast calculated descriptive statistics provide a first overview of the status quo in the housing market.This component facilitates as a quick assessment of present housing market conditions. It thus provides a starting point for further in-depth GIS-based analysis.

3.2 Component 2: Generation of spatially interpolated surfaces

This component deals with the generation of interpolated surfaces and the rating of administrative levels in respect of their relevance to the housing market. In addition, techniques of spatial declustering are applied in order to produce a spatially differentiated picture of the prevailing trends in the housing market. A main goal of the second process component is the definition of independent (disaggregated of administrative boundaries) real estate sub-markets.

3.3 Component 3: Intersection with ancillary data

This component facilitates the augmentation of housing data with ancillary data, such as socio-economic or demographic data, zoning or actual land use data. Combing these data in various ways allows for a progression from an analysis of trends to a GIS-based oberservation of the existing housing space.

4 PROCESSING REAL ESTATE DATA

To assess its validity the above workflow has been applied to the housing market in Potsdam. For this purpose large data sets of the nationwide German real estate portal Immobilienscout 24 from 2009 were used. The workflow was implemented with the FOS-GIS systems SAGA GIS,OpenJUMP, Quantum GIS and GRASS GIS.

4.1 Data source, data preprocessing and spatial site selection

It is a truism that GIS-based housing analysis requires data about the housing sector. Nevertheless, only a few data sources to analyse the housing market exist (BBSR 2009) -despite the significant social and economic relevance of the housing sector in Germany. About a decade ago real estate portals started to record spatial information on objects for sale and rent in the housing and industrial estate market.If accessible, this data is a valuable statistic basis for GIS based housing analysis. In the present analysis a database extract of the above-mentioned real-estate portal Immobilienscout 24 was used as base data. The dataset consists of approximately 1.4 million housings on offer. Database excerpts of “real estate” databases usually consist of geocoded data (point data with x and y coordinates) that can be processed in GIS systems. Each entry to the database consists of 63 attributes, such location (x and y coordinates), base rent per apartment with and without service costs, living space in square metre, number of rooms, year of construction, purchase price etc.

GEOX	GEOY	address	living space (m²)	rooms	construction
207310	2493456	Am Springbruch	77,36	4	1890
207243	2493458	Am Springbruch	77,36	4	1982

Fig. 1: Spatial Database (Clip of database table)

A first inspection of the dataset reveals some inconsistencies (missing entries, wrong field types) in the data. Thus the data had to be preprocessed which included data cleaning and updating. This has been done by using the open source database managment program Open office base..Additionally field types etc. had to be adopted for further processing in GIS. To perform this operation the FOS GIS OpenJUMP is employed, as

this is the only FOS GIS software allowing to change field types. Existing point data are then geocoded in Lambert Conformal Conic (WIGeoEU) which had to be recoded from to Universal Transverse Mercator (Datum WGS 84, Zone 33 North) for this study. The gdal library implemented in GRASS GIS 6.3 was used for this data transformation. The original database includes records for 4000 housing offers in Potsdam. Preprocessing eventually has reduced this database to a datasetof 1600 individual points in Potsdam which can be used for further analysis. This study database is then subjected to spatial site selection. Only districts with 20 or more individual points were used in the following analysis. Randomized sampling of the data was done, using the Quantum GIS plugin Ftools. Spatial correlation was tested by calculating the semivariance in SAGA GIS.

4.2 Visual interpretation, descriptive statistics and spatial declustering

In this phase of the analysis techniques discussed in section 3.1are applied to the Potsdam housing data. First the data is visualised in Quantum GIS using 4 classes (quantiles) of base rent per square meter, next basic descriptive statistic was build to get a first impression of the trends in the Potsdam housing market.

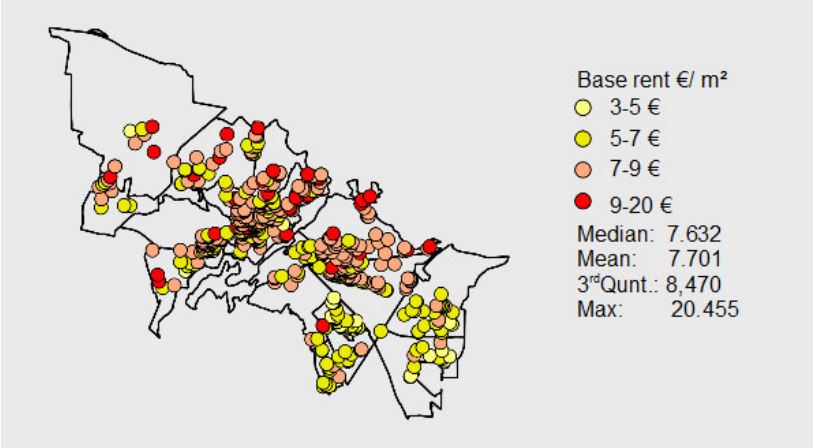

Fig. 2: Potsdam built-up area: base rent of individual points of housing offers

Measurement of statistical parameters, such as mean value, standard diviation or regression, are not reliable a priori, as existing housing data might not be representative of the whole housing market. Spatial declustering techniques help to remove the effects of clustering. Thear are different approaches to declustering, de Smith et al. (2006) provide a useful survey of the existing techniques. In this study we applied a global estimation of the mean by polygonal declustering. Each data point is weighted according to the weight of the respective Voronoi polygon. The influence of clustered points on the global estimation of the arithmetical mean is reduced according to their lower spatial relevance. Using the preprocessed data points, Voronoi Polygons have been calculated using the GRASS GIS command v.voronoi.area. The value (base rent per square meter) of each data point is then weighted by the size of the corresponding Voronoi polygon. The global mean of the base rent per square metre calculated by descriptive statistics is 7.7 €/m², the estimation of the mean by polygonal declusteringis slightly lower and averages 7.2 €/m².

4.3 Generating housing market trend surfaces

Based on the randomized data points interpolated trend surfaces of the base rent per square meter have been generated in a consecutive step. To do so various interpolation techniques of the FOS GIS GRASS GIS and SAGA GIS have been applied. Spatial interpolation techniques estimate values from a limited number of sampling points and create continous surfaces from point data following Tobler´s first law of geography (Tobler 1970) which says that everything is related to everything, but objects closer in space are also closer with respect to their attribute values. A multitude of interpolation methods exist, see Albrecht (2007) and de Smith et. al. (2006) for an overview of existing methods. In this analysis the deterministic approaches of IDW (Inverse Distance weighted) and Spline together with the stochastic, geostatistic method of Ordinary Kriging have been applied. Both SAGA GIS and GRASS FOS-GIS provide functionalities for spatial interpolation. While Kriging methods are available in SAGA GIS, GRASS GIS provides spline interpolation functions. IDW is the method of choice when a quick generation of surfaces is required. One major disadvantage of IDW, however is the potential occurence of bulls eye effects that cause the data not to be

extrapolated (de Smith et.al. 2006) Spline interpolation is computationally intensive, but results are more accurate and the surfaces generated are smoother. To generate a trend surface with maximum flexibilty and accuracy the use of Ordinary Kriging is recommended. In Ordinary Kriging the relationship of all data points and the influence of each point on each other point is calculated (Albrecht, 2007). Ordinary Kriging has applied using SAGA GIS. SAGA GIS allows the construction of a variogram. Unsampled point values are estimated by calculating the linear weighted average of neighboring points.Weights are determined by a fitted variogram (de Smith et. al. 2006). In the present analysis linear regression regression has been used as variogram model.

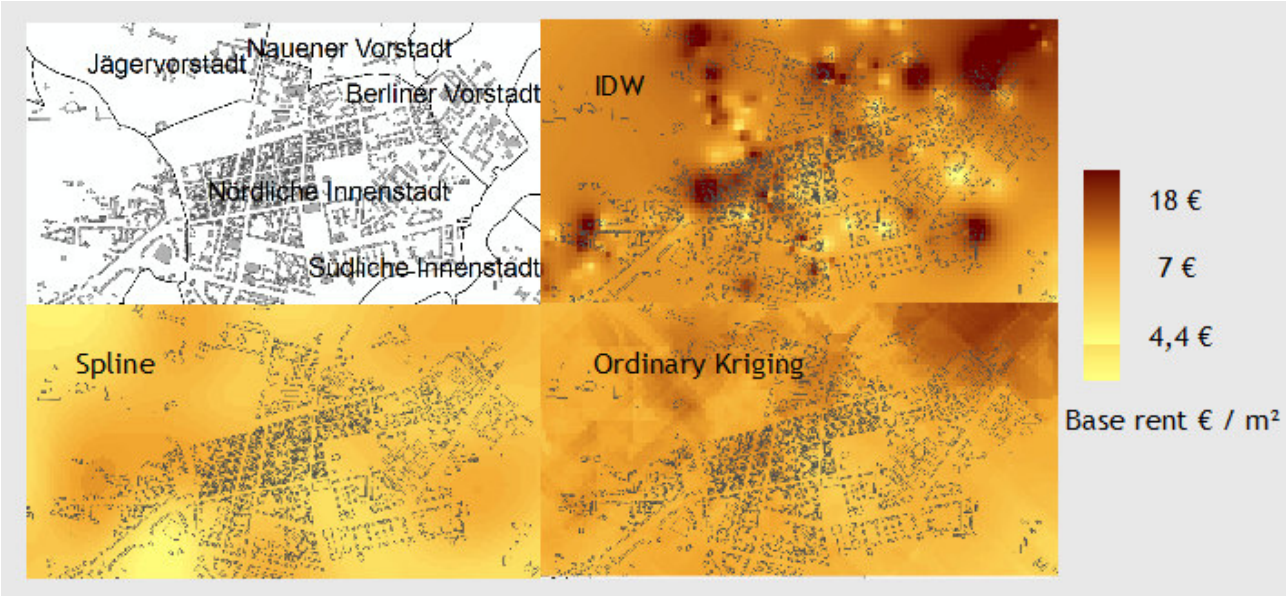

Fig. 3: Subset of the investigation area and comparison of 3 interpolation methods. Strong bull eye effects can be observed in the IDW example.

As has been mentioned above (3.3) ancillary data was introduced into the analysis. The types of built up area inPotsdam has been mapped according to the Brandenburg zoning plan. A total of 8 classes of building zones (residential area, commercial and industrial area, mixed area, touristic sites, public infrastructure) have been mapped. Mapping was performed by interpreting satellite and orthophoto imagery from 2006 -2009. The resulting data were then combined with building blocks extracted from the OpenStreetMap (OSM) project which provides free geographic data. In a subsequent step the class residential area has been subdivided into further subclasses of housing types and combined with socioeconomic data in order to get from a trend analysis to a GIS based oberservation of the housing space (see section 3.3). Finally, the interpolation results of Kriging have been merged with the OSM building blocks to mask all geo-objects with no relevance to the housing market.

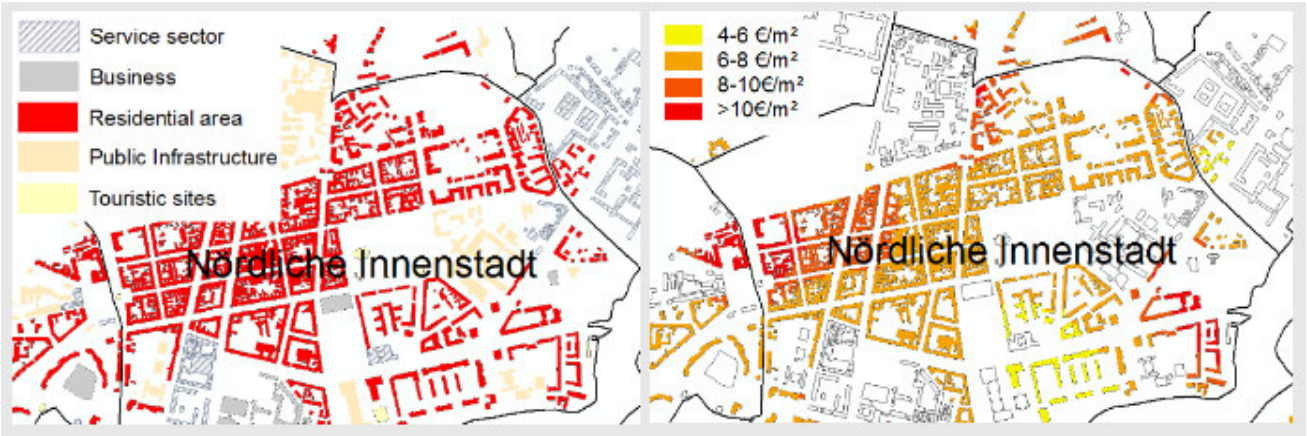

Fig. 4: Settlement structure and interpolation results intersected with identified with building blocks identified as housing.

5 TRENDS IN THE POTSDAM HOUSING MARKET: FIRST RESULTS

5.1 Investigation area Potsdam

The need for a GIS-based housing market analysis, as presented in this contribution, is evident when considering Potsdam´s position as the second most expensive place to live in East Germany after Berlin (TLG Properties 2009).

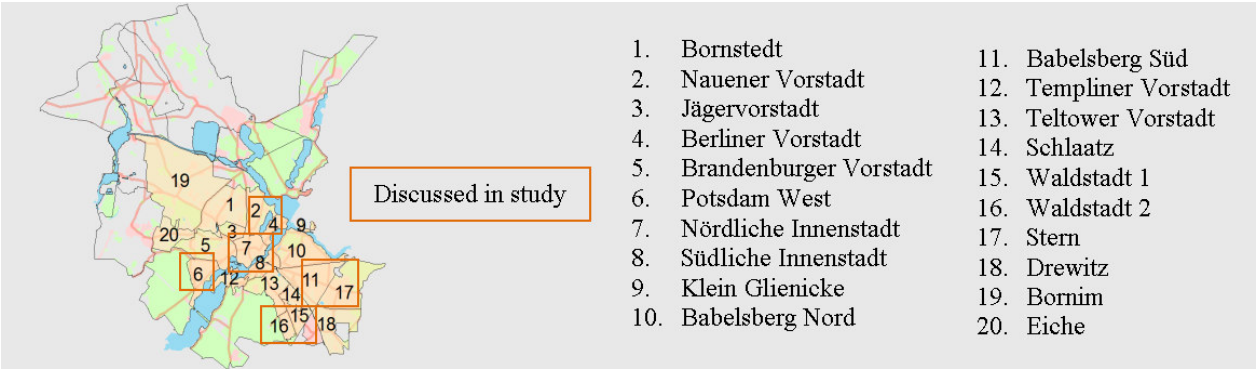

Fig. 5: Administrative division of Potsdam, city districts under investigation (orange rectangle, discussed in section 5.2)

5.2 Preliminary results

In Potsdam the range of the interpolated base rent per square meter, using the ordinary kriging method, varies from 4,88 € to14 €/m². Major differences can be observed between the southern districts of Waldstadt, Schlaatz and am Stern on the one hand and high base rents in Babelsberg, in the Innenstadt and the Berliner and Nauener Vorstadt quarters on the other. The average base rent per square meter calculated by using techniques of spatial declustering (see section 4.2) averages 7.2 €/m² . The global mean for a four-room apartment of about 90m² averages 1,076 €/m² , the global mean for a two-room apartment of about 65 m² averages 490 €/m² excluding service costs. Extreme values for four-room apartments can be observed in the Jaegervorstadt and Berliner Vorstadt districts, where apartments of a size of about 160 m² have been offered at prices of exceeding1600 €/m² without service costs. Low base rents of 4 to 6 €/m² can be found in the Potsdam-West district, particularly in Zeppelin Strasse, where the residential area mainly consists of prefab buildings built by East Germany in the 1970s. In the northern part of Potsdam-West base rents per square metre are much higher, up to 9 €/m². Spatial patterns of particular interest can be found in Babelsberg. In recent years in Babelsberg North and South a substantial amount of reconstruction of old buildings can be observed. Very high base rents per square meter have been found in the eastern part of Babelsberg with strong clusters at the border of neighbouring Griebnitzsee district as well as in a corridor on the railway line dividing Babelsberg North and Babelsberg South, i.e. up10 €/m². The highest base rents per square metre in the area under investigation is found in the Innenstadt district and the touristic centre (Durch Quarter), as well as Berliner, and Nauener Vorstadt with up to 11€/m² .

6 CONCLUSION

This paper presents a GIS-based housing analysis using FOS GIS. The study demonstrates clearly that such analysis is feasible yielding results that compare to to of commercial GIS. To conduct this FOS GIS analysis, a generic workflow was designed and evaluated by using Potsdam real estate data. Because of its generic nature the processing chain presented here can similarly be employed in spatial planning or municipal administraition and related tasks. The first results of this ongoing project indicate that additional ancillary data and reference data of different observation periods are required to progress from an analysis of current trends in the housing market to a fact-based prognosis of future real estate developments. First steps have already been undertaken to channel the study into this direction.

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The theme of the Catastrophe in the Information Society

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1 ABSTRACT.

During several eras (the Second Empire in France, around 1900 in Vienna, between the two World Wars and nowadays) Opinion has been influenced by three groups: Optimists, Pessimists and Analysts. We find a kind of social theory on Optimism in the book "Jacques Offenbach" written by the German sociologist Kracauer. Concerning Pessimists, they wish the Catastrophe because they believe in the "world to subvert". Analysts provide realistic analyses which are ignored. They have little influence.

According to the German sociologist Tonnies, we have to distinguish "opinions" and "The Opinion". The last is more structured, stable and is slowly educated.

Concerning cities, the hope is that the Analysts will educate "The Opinion". Are involved these analysts who insist on equilibrium (in particular when environment is concerned) and reject the "world to subvert". This will save cities being like in the vision of the Austrian writer Hermann Broch: the place where the masses expect the pseudo-ecstasies promised by demagogues.

2 INTRODUCTION.

Often in the past, Opinion has been influenced by three groups: Optimists, Pessimists and Analysts. We give four examples: Second Empire in France, Vienna around 1900, the era between the two World Wars and … nowadays. While a catastrophe approaches, Optimists diffuse cheerfulness and announce happiness, Pessimists wish another catastrophe than the real one (which will occur), Analysts are realistic but without any influence.

To analyse Optimism as a social phenomenon, we shall use the theory of the German sociologist Siegfried Kracauer on Offenbach. Pessimists are understood as those believing in the world to be subverted. Concerning Analysts, we give several examples. One of them is the German sociologist Ferdinand Tonnies who was convinced that there is a stable opinion one can educate.

Nowadays the three groups are active on Internet. We should favour the sites which provide analyses and educate the Opinion in the sense of Tonnies, the stakes being obviously Peace and to Save the Planet.

3 THE THREE STREAMS INFLUENCING OPINION.

Let us present the three streams during several eras in this table:

	Optimism	Wished catastrophes (Pessimists)	Analysts
Second Empire	Offenbach	Revolution Counter-revolution	Maurice Joly(1) Victor Hugo(2)
Vienna around 1900	Johan Strauss	Imperialism	Robert Musil(3) Hermann Broch
Era between the two World Wars	Jazz, movies (Charlie Chaplin)	Revolution Counter- revolution	Ferdinand Tonnies Jacques Bainville(4) Walter Lipmann(5) Karl Kraus(6)
Nowadays	Medias, singers	Fundamentalism	Ecologists

(1) He is the author of the "The dialogue in Hell between Machiavelli and Montesquieu" a lampoon against the Second empire. It is a realistic analysis of it. This text was plagiarized in the famous fake the "Protocols of Zion".

(2) The famous French poet was also a political man who plotted against the Second Empire and must go into exile. He wrote lampoons against the regime.

(3) The Austrian novelist described the contradictions of Society at the time of the Austrian Empire in decline. His famous novel is "The man without qualities".

(4) The French historian criticized the Versailles Treaty and announced hard times for France, around 1920. His vision of France having Poland as a unique ally, Germany being a strong foe, was prophetic.

(5) The American writer criticized the Versailles Treaty and politics in USA in the twenties, arguing that Opinion is omnipotent, but not rational (the citizens do not fully understand politics, even if they are informed about it).

(6) The Austrian journalist criticized journalists using "phraseology". In other words, he denounced propaganda by Press. According to him journalists were the cause of the catastrophes in the 20 th century, the first World War, the Nazism

Hermann Broch, an Austrian writer, coined the term "cheerful apocalypse" to describe the Austrian Empire around 1900. We present some of his theories later in the article.

We explain why Tonnies was a realistic analyst later in the article.

Now, we shall examine the features of the three groups in detail.

4 A SOCIAL THEORY ON OPTIMISM.

Using the description of Paris at the time of Offenbach by Kracauer, we give the list of the necessary conditions of Optimism:

- A place and a milieu. Around 1850 in Paris, there was Le Boulevard. Here the milieu was made up of rich idle persons, adventurers, beginning artists, celebrities, businessmen … Paris was the place of the good taste. The decisions on success or failure of operettas, plays, novels … were taken here and accepted in the world. Later there were Vienna, Hollywood … Today there is the West Coast. Probably this kind of place is irreplaceable. Medias and Internet are a sound box.
- Technologies. It was electricity at the time of Offenbach (it was used to illuminate the decors of operettas). In Vienna around 1900, technology allowed the Press. Of course, the era between the two world Wars was the era of movies. Today there are TV and Internet.
- Adjuvant. In Paris at the time of Offenbach, it was women, even if alcohol and drugs were not unknown. Later, alcohol and drugs have their role.
- Cultural genres. There were operettas, balls and concerts, then movies viewed in cinemas. Today it is songs and musical videos, which can be loaded on Internet. Also, rhythm is needed. From the Offenbach's galops (gallops) to modern beat, through waltzes, jazz and movies, always speed comes with gaiety.
- Talents. We quoted Jacques Offenbach, Johan Strauss and Charlie Chaplin. Today the cultural industry is very much sophisticated. Talents are detected. Songs and musical videos are diffused through Medias and Internet. There are plenty of names of famous singers.

Optimists provide oversight, dizziness …and pleasure. They bring a social satire which is funny and innocuous. At the time of Offenbach, one laughed at the jealous husband and the authoritarian father (Love always overcoming obstacles at the end). Today, any sign of Order and Norm is ludicrous. It is the free personal whim which triumphs. The main theme concerns the Ego: desire, successes, failures … (to show individual failures does not go against Optimism, since failure is only the inevitable other side of success). The collective dimension is only evoked as a décor: places, styles, ambiences … The Ego is only in two states: presence and euphoria, or absence and decline.

5 WHO ARE THE PESSIMISTS?

A "philosophy for action" inherited from the 19 th century is expressed by the characters of the novels of André Malraux. The world is understood in terms of antagonistic forces: those of progress and those of reaction. Action is inevitable. One cannot remain a sage who does not participate in events. One commits oneself. One chooses one's side, and one has to win the antagonistic forces. It is a kind of trial. Only the outcome shows who was right and who was wrong (the sociologist Karl Mannheim has described this belief, concerning Socialists and Communists). Arthur Koestler, in his book "The Yogi and the Commissar" has shown how the "heroes" of his time oscillated between action, logics and interest in Society and in changing it (the Commissar) and spirituality, intuition and interest in the Self (the Yogi).

The Pessimists wish the Catastrophe because when the world has been subverted, one rebuilds a better society.

Let us present some of these choices:

	Subversion
Culture	Outstanding men benefit from the events of their time to create new styles and values (Nietzsche)(7)
Technology	Destructive creation (Schumpeter)
Tradition	Community returning to its authentic tradition (Spengler)
Politics	Extreme left and extreme right

(7) The Nietzsche's teacher, the Swiss historian Jacob Burckhardt, praised the Renaissance in Italy putting an end to the civilization of Middle Ages (creative destruction).

Today one cannot wish a Catastrophe. The stake is to maintain and restore equilibriums. One cannot believe that a better society will emerge from the subverted world.

The stakes and failures for cities have been defined differently in the past:

	Stakes for cities	Failure
18 th century	Reason	Barbarism
19 th century	Utopia	Disorder
20 th century	Progress	Regression
21 th century	Equilibrium	Destruction

6 AN EXAMPLE OF A REALISTIC ANALYST: FERDINAND TONNIES.

Let us insist on the Tonnies's theories, since he was a realistic analyst on several topics (the behaviour of the working class and the haves not, the Nazis, Opinion…).

According to him, the human being is explained by two contradictory wills, the organic will and the reflexive will:

- The organic will. It exists at the individual level (heredity) and explains subjectivity: habits, memory, and pleasure. Collectively, it is the Community. The organ cannot be separated from the organism. The goal of the organism is to continue its life. The Community strives to survive.
- The reflexive will. It is the realm of desire, knowledge and self-interest. The goal is happiness and satisfaction, the means domination.

Spatially, the Community corresponds to countryside and the village, Society to the city. Society is based on exchange, money and trade.

The opposition concerns many fields: statute /contract, woman and child / man, young / old, people / educated men…

Tonnies announced a catastrophe because of the behaviour of the working class and the haves not:

- The worker does not appropriate the product of his work. Also, he spends the money he earns immediately, to meet the needs of himself and his family. At the opposite, the money the capitalist earns is a means to earn more money. The workers can struggle to increase their wages, which have to be between two levels: the lower level allows the worker and his family to survive, the upper level threatens the existence of the capitalists' profit. Therefore, struggling workers could destroy capitalism. In modern words, Tonnies uses the notion of contingency, concerning social classes.
- In the city, which is necessary to the reflexive will to struggle against the organic will, the haves are the hostages of the haves not. The revenge of the haves not is possible (urban riots, revolutions …). There are obstacles: conventions, the state and public opinion.

Tonnies was an opponent of the Nazis. According to him, the political evolution of Germany in the thirties was catastrophic.

Tonnies has written a book on Opinion. He denounces the "traffic of opinions", opinions being like goods which can be bought (he cites examples in the German press around 1910).

He considers two kinds of opinion:

- The Opinion is like a deliberative assembly which votes and takes decisions. It is stable and long lasting. It accepts innovations but after an education, which is slow and uneasy.
- Opinions are in a fluid, "gaseous" state, transient, submitted to fashions and adverse to innovations.

On this topic also, Tonnies uses the notion of contingency. Let us recall what Arthur Koestler wrote about modern science in "The Yogi and the Commissar": there are "levels of systematization" in physics, biology and sociology. The upper level is free and the lower level is dependent (as in the case: molecule / cell / organ / body). If the upper plan is free and the lower plan dependent, Opinion cannot be influenced by anybody or any group. It is the kind of hypothesis chosen by Walter Lippmann: the short-sighted dictatorship of the Opinion. The opposite hypothesis is that Opinion can be easily educated and is shaped by knowledge. The Tonnies's theory is between the two hypotheses: to educate Opinion is possible, but slow and uneasy.

7 CONCLUSION

As Tonnies, the Austrian writer Hermann Broch has described people in cities who are threatened by catastrophes, the recourse being "education".

They are in a "crepuscular state", due to the atomization of values and the complex choices to make in the modern society (in the field of knowledge, for instance). The result is a sentiment of wrench and even panics. Demagogues influence them, promising "pseudo-ecstasies" provided by "victories". The city is the place of rationality, apparently only. The reality of the city is shown by technology, sport and game. The means accumulated in the city are used to achieve the "victories" promised by demagogues. The city is "Promethean" and continues to accumulate means. The "Rural Revolution" (Virgil, Rousseau, Tolstoy) never happened. The distance between the city and Nature increases. In the cities, individuals accept their culture, but without participation in it, as a frozen convention.

To avoid the catastrophic influence of demagogues Broch proposes recourses. Surprisingly, his model comes from Religion. Religion proposes a few clear, simple values. It allows an "expansion of the Ego" when the world is known and the role of the Ego in it is understood ("gain in irrationality", opposed to "loss of rationality" in the crepuscular state). Broch proposed techniques to educate people: examples are the "depreciation of victory" and the "respect" (when the demagogues wish adulation).

Today, that we call "maturity of Opinion" is of paramount importance. Let us take the example of the world summit on the climate change in Copenhagen, in 2009, which was a failure. In the two countries which were responsible for the failure, USA and China, Opinion is not mature. It is for reasons which are … more similar than dissimilar. In the two countries, one wants unfettered economic growth because it allows consumption and leadership in the world, but USA wants to preserve it and China wants to keep it as a possibility.

The three "streams", Optimists, Pessimists and Analysts, are visible on Internet. If one is scandalized, let us recall the parable by the French specialist of Medias Pierre Schaeffer: the monkey in the mirror. A monkey does not recognize itself in a mirror. In the same way we do not want to recognize Society in the Medias, even if Medias reflect Society.

Now, what can we do?

We could not add to the existing confusion and favour (promote) particular Internet sites.

According to Arthur Koestler in "The Yogi and the Commissar", since modern science has accepted "levels of systematization", we should avoid confusion (that is to say, to use a reasoning which is relevant at some level to deal with a topic which concerns another level). If all the "laws" of Opinion are not known, we know some ones:

- Individual opinions do not add

- Opinion changes, but often its changes are brutal and unpredictable
- There is no privilege of knowledge, since Opinion is submitted to passions (because of national interests, political interests, economic interests …).
- Etc.

All we could do is to favour particular Internet sites which deal with crucial stakes, in an objective way, while applying rules allowing discussion.

Let us cite two examples:

- <WWW.manicore.com>. The site of Jean Marc Jancovici is on the future of energy and the stakes of climate chan1ge.
- <www.ipcc.ch>. This site presents the works in prospective of the Intergovernmental Panel on Climate Change.

Also, cities are concerned by stakes like climate change. They often implement "green" policies (in fields like public transport, buildings …). They can manage Internet sites where the principles which justify these policies are displayed.

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Toward Sustainable Development in Cities: A Case for New Spatial Decision Support Methods in Urban Planning

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1 ABSTRACT

In the current environment of rapid global change the role of sustainable development in cities become even more important. In addition to the traditional concerns of combating sprawl, congestion, and pollution we also need to rethink our carbon footprints and the settlement impacts of a contracting global economy that is sure to change the very paradigm in which we plan.

If traditional methods (and their underlying assumptions) are becoming increasingly suspect, it is clear we need not only to consider new ways to define the problems we face but also seek better ways to solve them. This includes the infrastructure of cities. Manuel Castells' "network society" (Re: M. Castells: The Information Age, Oxford 1998) suggests that the world is no longer hierarchically organized or territorially arranged, but functions on a new "borderless" network of economy and society. This reality has not been fully brought down to the city scale in terms of how day-to-day planning is undertaken.

A city's network of connections and interactions is particular to its range of activities for a given population, location and land-use profile. Traditional development models continue to struggle with capturing how that particular environment will react to changes. Planners must not only consider community characteristics, environmental impacts, but also consider spatial behavior itself (Re: Reginald G. Golledge, Robert J. Stimson: Spatial Behavior, New York 1997).

It is fair to say that for sustainable development we need new management and planning tools to better define appropriate measures and policies. Despite best efforts many transport and land use policies implemented at the local level have not helped to improve conditions.

Land use and transport are two essential ingredients of urban sustainability and policy making, any decision taken in one area directly impacts the other. Current work on sustainable mobility suggests a need for new management and planning tools to define appropriate measures and policies. Such tools generally consist of analytical frameworks, mathematical models and economic evaluation constructs. In many instances, the resulting transport and land use policies that have been implemented at the local level have not helped to improve conditions. There are also examples where they have failed to maintain existing levels of sustainability.

The point here is that traditional planning methods will need to change to keep up with profound changes in the culture and economy of cities. Possible alternatives are not so far away. (Re: Ian Bracken: Urban Planning Methods, 2007). One such area of potential help is threshold analysis.

The purpose of this paper is to underscore the increasing need for policy makers to understand that a relevant decision making process requires a support of proper methods of urban research and coordinated strategic actions. Introducing the new methodology policies will keep policies "under review" and help them remain relevant to changing circumstances.

2 INTRODUCTION

In the current environment of rapid global change, population growth, changing economies and social preferences, cities face enormous problems. The ability to achieve stable sustainable development is an ongoing and difficult challenge. The role of transportation and mobility in cities become even more important. Cities located near target markets with well-developed infrastructure (particularly transport and communications), and being physically attractive or having a unique cultural identity usually take advantage of regional or national development priorities and globalization.

The purpose of this paper is to underscore the increasing need for policy makers to understand that a relevant decision making process requires a support of proper methods of urban research and coordinated strategic actions. Introducing new methodology will keep policies "under review" and remain relevant to changing circumstances.

Fig. 1: Cities of San Francisco, Athens, Amsterdam, Gdansk

3 TOWARDS SUSTAINABLE DEVELOPMENT OF CITIES

Sustainable development is often used as one of the „magic terms“. In the most countries sustainable development is related to two major problems: poverty and degradation of natural environment. Solution to the first problem requires actions to restructure domestic economies and improving social conditions of living, second requires a reversal in the deteriorationof natural recources (Re: J.Kozlowski: Towards Planning for Sustainable Development, 1999). There are many coflicts seen between these two problems especially when economic growth relies on the exploitation of natural recources.

The development does not need to be necessarily equated with growth and is often understood as realization of specific social and economic goals calling for stabilization, reduction, change of quality or creation of new uses, buildings, elements. When there is no growth the development may occur. When there is a need for progress there will be a need for development. Sustainable development must consider the lowest economic, ecological and social costs. The complexity of urban environment and unpredictability of planning indicate a need to establish princeples and working tools effectively addressing the environmental threats. New planning tools must consider contemporary urban growth and development patterns, then the role of transport and mobility in cities as a backbone of the city structure.

3.1 Urban Growth and Development Patterns

Urban growth is a result of a combination of many factors: geographical location, natural population growth, rural-to-urban migration, infrastructure development, government policies, corporate strategies, and other major political and economic forces, including globalization very differently in the countries and regions of the world (Re: UN-Habitat report: “State of the World’s Cities 2008/2009, Harmonious Cities”).

Fig.2: Berlin, Alexanderplatz

The population and urban growth change urban development patterns in space. The biggest average annual rate of population growth of 2.5 per cent characterizes developing countries, while nearly half of the cities in the developed world grew less than 1 per cent annually. Urban growth patterns are different for countries and continents. For example in Asia urban populations of large cities are shifting or relocating to suburban locations or satellite towns linked to the main city through transport networks. In Latin America and the Caribbean - the most urbanized regions in the developing world, one-fifth of the region’s urban residents live in cities of 5 million populations. In North America, the patterns of growth and decline are not homogenous. One-fifth of cities declined in size while similar number of cities grew at the high rate between1990-2000. European cities except large metropolitan areas, in general, are not growing any more.

3.2 The Role of Transport and Mobility in Cities

Today urban mobility is a key concern in cities of both developed and developing nations and impacts the livability of cities. Motorized urban transport has become a hot topic among policymakers, planners and environmentalists who are seeking ways to minimize its negative effects, like traffic congestion or air pollution. New travel and activity patterns require new approach to traditional transportation planning methods that need to keep up with profound changes in the culture and economy of cities.(Re: Ian Bracken: Urban Planning Methods, 2007).

Effective and reliable transport systems are crucial for the functioning of the post-industrial economies, yet such systems generate significant negative externalities like air pollution, noise vibrations, energy consumption, and emission of greenhouse gases and loss of open space. It is proved that reducing CO2 emissions from the transport sector is much easier than cutting those from the building sector. However it is promising, that any new approach that involves a change in vehicle technology or a shift to different mobility technologies and techniques can be implemented in a relatively short time. Transport, therefore, is a very important element in our race toward sustainable life on earth. Documents of EU: The Green Paper 'Towards a new culture for urban mobility", Report on "Action Plan on Urban Mobility" and reports and analysis of UN: "State of the World's Cities 2008/2009, Harmonious Cities" laid the emphasis on the steering transport policy towards sustainable mobility.

3.3 Urban Mobilty Land Use and Transport

Land use and transport are two essential ingredients of urban sustainability and policy making, any decision taken in one area directly impacts the other. These two main components together with social, environmental and economic factors are combined in a planning and the decision making process. Planning for sustainable land use and transport requires an integrated view of the interactions between them. Land use and transport with those interactions are often used as the first fundamental levels of planning, modelling the future city development that in consequence implicit social, economic and environmental outputs. This is the easiest way to plan and measure the changes in the urban environment. Ian Bracken discribing aspects of spatial organisation in formulating the city planning policy indicates three directions of analyses that should be undertaken: patterns of locations of particular types of urban activities in the area, flows between different parts of the indicated area, effects upon the environmrent caused by these locational patterns and flows of people and goods (Re: Ian Bracken: Urban Planning Methods, 2007).

Fig. 3: Portland, Oregon

A city's network of connections and interactions is particular to its range of activities for a given population, location and land-use profile. This is also true for transport connections and mobility in the city. The fuel efficiency of public transport, improved regulations, construction of environmentally friendly mass transit systems are the most immediate sustainability gains of today urban transport and mobility policy (Re: M.Jenks, R.Burgess: Compact Cities - Sustainable Urban Forms for Developing Countries, London, 2008). The processes of economic, technological and social change, globalization and internationalization of the cities has a dramatic impact on the nature of production, capital flows, trade, passenger travels and activity patterns (Re: Reginald G. Golledge, Robert J. Stimson: Spatial Behavior, New York, 1997). Furthermore, we are experiencing increased mobility, new waves of international migration, changing structure of households, increased life expectancy, and better public participatory in decision making. Democratic and social changes affect decisions and the nature of behavior of modern urban society. The changes of transportation technology, time and cost of travel have shrunk time-distances. Innovations in computer and telecommunications technologies became new electronic challenges in the information age.

4 SPATIAL DECISSION SUPPORT METHODS

Urban planning reflects the diversity of the spatial development. There is a debate about their relevance and application within the rapidly changing and increasingly complex environment. A permanent wide gap between the conceptual models of spatial behavior and the practical planning tools which have succeeded in developing theoretical advances. With the new theoretical backgrounds there should be much more attention paid to translate the very latest theoretical notions into practical tools. A number of developments in travel behavior analysis have introduced many new concepts and models.

4.1 New Planning Paradigm?

Traditional planning methods need to change to keep up with profound changes in the culture and economy of cities. There are many parallel and analogous developments in urban planning that reveal interesting methodologies, mixed land use, travel patterns, demand estimation and forecasting (Re: Ian Bracken: Urban Planning Methods, 2007). Regarding urban planning as a continuous adaptive process that requires involvement of many actors in the society, planning process must integrate three components: activities engaged by planners in order to intervene in the urban system, policies, that communicate or guide this activities and outputs or consequences of these activities that should influence the revision of policies. Policies are crucial for decision making process. Planning process is essentially a matter of continuous implementation of policy and adaptation, places plans, policy documents and programs in the role of "means" not "ends". Day-to –day decision making often lead to longer term inefficiencies and conflicts.

Understanding planning policies is to know the loss and benefits of implementing them. All policies vary across space, formulated and enacted can have different effects in terms of the time span. Formulating policy packages requires the implications of the different packages to be analyzed through simulate on models. In practice the simulation models can be used to support the formulation of policy packages and strategies for sustainable mobility.

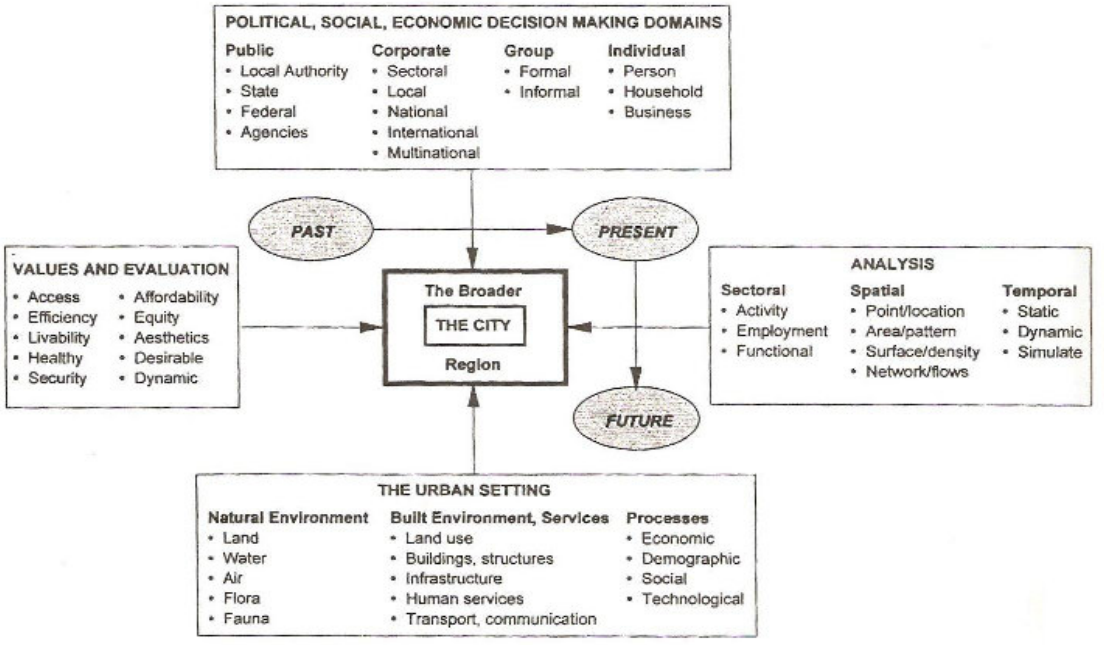

Fig. 4: A spatial-analytic framework for evolution and performance of a city (Golledge, Stimson, 1997)

4.2 Support Methods in Decision Making Process

Decision making process is defined (Golledge, Stimson, 1997) as a set of strategies that guide decision making behaviors such that they appear to cover many possible scenarios. In all problem-solving disciplines like spatial planning are more than one alternative approach can be used to achieve answer or solution to a problem. It is good to choose the best theory or model, still in restricting situations, practice or economy may dictate that a particular type of model is selected a priori for considered outcomes.

Decision making process on the macro level is more complex. In the city as a system multitude of past, present and future decisions create and share dynamic environment. There is a complex set of trends,

concerns, processes that need to be addressed to planning for the future development, growth and management of a city. A spatial analytical and decision making frameworks should be appropriate to investigate the city and to evaluate its potential evolution over time. These can be achieved by implementing strategic planning and developing strategies, plans, policies and projects. Executive decisions made by the city authorities are based on facts as objectively verified statements and values – statements of preferences, currency of politics (Golledge, Stimson, 1997). SWOT analysis can be very useful. Methods of supporting spatial decision process are based on complex and interdisciplinary analyses taking into consideration the existing factors. Decision making support methods usually use computer programs, individually designed algorithms and available data. Such tools generally consist of analytical frameworks, mathematical models and economic evaluation constructs. There are decision-simulation models (integrated models of urban land use, transport and economic factors), optimal location models (threshold analysis), simulation models (scenarios, Decision Support Systems – DSS, AIS, GIS).Decision Support Systems (DSS, AIS, GIS) are designed to bring a knowledge base and data to solve specific problems.

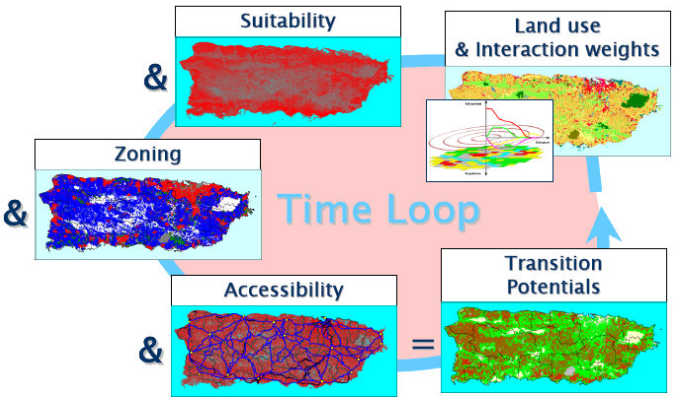

Fig. 5: Xplorah Model.

Xplorah is an example of decision-simulation model designed for Puerto Rico, an analytical instrument supporting integrated spatial planning. Xplorah is based on a Decision Support System (DSS), developed for Public Policy Research Center of the Rafael Hernández Colón Foundation (RHCF) and Graduate School of Planning (GSP) by the Research Institute for Knowledge Systems- RIKS. Xplorah as an integrated tool makes use of quantitative models to describe physical, economic, social and environmental processes, but also makes the feedback loops linking them. The primary goal of the system is to explore the effects of (alternative) policy options on the quality of the socio-economic and physical environment.

ORION is a decision-simulation model popularized in the city of Wroclaw, Poland. The ORION model (Optative Repartition in an Opportunities Network) was created by Tadeusz Zipser and developed by his research group. Orion is an operational model derived from the paradigm of spatial decisions. Observed spatial patterns of urban development confirm that structural solutions are generated by complex system. It is assumed that the urban system consists of two subsystems: territorial and human activities. Model is based on elements of the subsystems allowing a simultaneous allocation of the various activities in city or region.

Among other methods supporting spatial decision process, defined as decision-simulation models is ILUMASS (2002–2006) funded by the German Federal Ministry of Science and Education. The objective of ILUMASS was to implement a fully microscopic model of urban land use, transport, and environment, developing and testing individual microscopic models and the interfaces between them.

Threshold analysis developed by Boleslaw Malisz in the 1960's in Poland are simple methods of optimal allocations activities in the city that considers rational use of all options, natural and man-made. Discussed first are the spatial limitations that arise during the process of development of city structures. Malisz's method helps select the best solutions that limit barriers and impede the process of planning with the lowest threshold costs.

5 CONCLUSION

Current work on desirable sustainable development suggests a need for new management and planning tools to define appropriate measures and policies. Such tools generally consist of analytical frameworks,

mathematical models and economic evaluation constructs. In many instances, the resulting transport and land use policies that have been implemented at the local level have not helped to improve conditions.

Traditional models continue to struggle with capturing how that particular environment will react to changes. To stay relevant in a changing paradigm, models need to consider new modes of movement that often involve uncertain assumptions. Planners must not only consider community characteristics, environmental impacts, but also consider spatial behavior itself (Re: Reginald G. Golledge, Robert J. Stimson: Spatial Behavior, New York 1997).

Spatial decision support methods are very useful in the process of urban planning, they can bring a knowledge base and data, describe physical, economic, social and environmental processes, and support the formulation of policy packages and strategies. A relevant decision making process requires a support of proper methods of urban research and coordinated strategic actions to find suitable answers while there is scientific or technical complexity. Processes of spatial changes fuelled by economic and demographic developments supply and demand both in terms of quality and quantity can be represented in models. Planning tools can better define appropriate measures and policies on urban sustainability and climate change. There is no model or method that can replace human decision process and there is no one universal tool that can be applied to variety of places. Complexity of environment requires a change of traditional planning methods. Using various methods and models can provide better urban research and coordinated strategic actions.

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VeGIS – Tool for the connectivity between traffic models and geographic information systems

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1 ABSTRACT

VeGIS develops concepts and technical solutions for the synchronization of data between traffic models and geographical information systems (GIS).

Test routines contribute to the quality improvement of traffic-related data concerning traffic information systems as well as to traffic development plans and subsequently developed technical plans. The project generates a basis for a continually expandable and better maintainable set of data relating to transport and mobility.

2 PROJECT DESCRIPTION

Due to a lack of resources, current transport development plans and corresponding transport models and the data contained therein are not maintained at the necessary degree but are, at best, updated only when demand arises. However, a continuous maintenance of similar but non-identical sets of data usually only occurs at regional departments responsible for Geo-information. This maintenance will be additionally reinforced with the development of a uniform traffic graph for Austria (GIP.at). Planning data accumulate within traffic development plans. Yet, despite the fact that they would be useful for calculations and traffic information they will not be part of the Austrian-wide traffic graph, where a special extent or conclusions are concerned.

Within VeGIS, concepts and technical solutions for the synchronization of data between traffic models and geographical information systems are developed. Based on the graph integration platform, GIP, and traffic development plans magnitudes from traffic models are identified that are relevant for users of GIP. Vice versa, GIP data are examined to establish to what extent their continuous maintenance would facilitate the creation and continuation of traffic development plans. The project is based on findings from previous projects – especially VIP Vienna Region, integrated road and path network Styria and GUARD – and takes into account ongoing activities with regard to quality assurance of traffic planning actions (Qualivermo).

A bi-directional data transfer, allowing a mutual illustration of two road networks with different net granularities, is designed on the basis of heuristics for “net matching”. Test routines are developed to assess consistent and routing-compatible transport networks, for one or more transport modes (pedestrians, cyclists, cars and trucks).

Depending on the problem, different graduations of the net granularities (accuracy of illustration and depth of the net) are required for a transport model. In the outer sector of an investigation area complex junctions, like roundabouts or level-free intersections are simplified in the illustration as individual nodes to reduce the data preparation and calculation time. By contrast, tight tolerances, e.g. necessary within the planning area with an exact modelling of the geometry of the lanes, are not present in GIP. For this purpose, the design of a multilevel net topology coordinated with the planning task and the geographical location is essential, whereas, at the same time a burden on the basic data of GIP should be avoided.

Furthermore, a method is designed facilitating the illustration of net efficiencies and planning scenarios as not yet realized measures within GIP, in order to provide typical GIP users with planning data too.

By integrating traffic model data in GIP, VeGIS contributes to the smooth utilization of data from traffic development plans, also for sectoral technical plans like e.g. clean air plans and environmental compatibility assessments. Linking further spatial data to the net graph (e.g. traffic cells) is an equally important requirement as the possibility to depict planning variants and scenarios in geographical information systems with variable read permission and accession depth.

The detailed work conducted within VeGIS comprises:

2.1 System Analysis

Within the system analysis the different systems-theoretical concepts of geographical information systems – especially the graph integration platform (GIP) – and usual traffic modelling software will be worked out.

The applications use different methods to represent graphs and their spatial characteristics and attributes. Graphs inside the GIP satisfy several important criterias such as net connectivity and routability. Therefore the GIP structures are particularly suitable for traffic models.

The former projects VIP Vienna Region and Integriertes Wegenetz Steiermark used the INTREST interface for data transfer. This solution allows only a data flow out of the GIP but not back. VeGIS develops a bi-directional data exchange interface which needs detailed definitions about the different options of data transfer. Special cases are e.g. changing attributes along the street segments like speed restrictions or the number of lanes requiring an automatical splitting of segments.

The system analysis figures out the approach to solve problems and to find decisions to develop the bi-directional interface. The output of this work will be a technical and graphic representation of an information model which shows and describes the relations of the system elements to each other and the technical opportunities for the bi-directional data transfer.

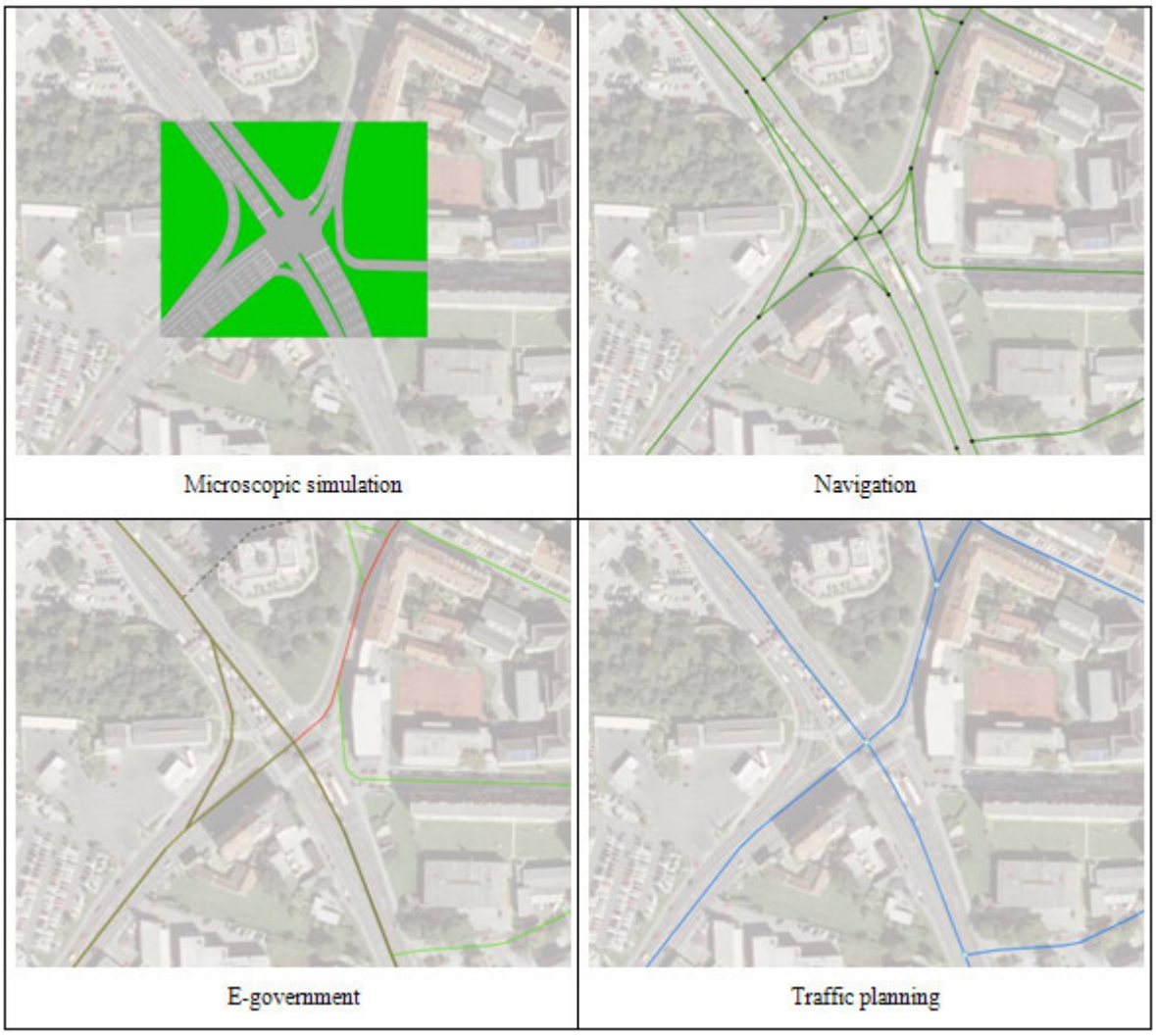

Fig. 1: Different granularities of a junction

2.2 System Conception

The system conception develops the transformation specifications for the new interface. The focus is on figuring out a sensible and technically feasible basis of decision-making by considering the framework requirements. The output will be a representation of all relevant work flows and processes from the user's point of view. After enabling the data transfer from GIP to the traffic modelling software and back it is necessary to define and show the conditions, options and system limits for both transformations.

2.2.1 Definition of the Organisation Model

The organisation model makes clear

- which framework requirements are necessary for a successful bi-directional information transfer between GIS and traffic planning models
- which data flows are possible and sensible and
- which technical basics must be created for this exchange

2.2.2 Definition of the Application Procedures and the Transformation Model

One of the challenges in VeGIS is to transform network elements into different granularities. The first step is to define the transformation rules on a concept level. A practical example is to reduce a complex roundabout into a simple junction or to unify parallel links with different traffic modes (bicycle and pedestrian/ car and public transport) to one link which includes all these modes. A special focus is to maintain the original IDs for reference purposes also in case of merged or splitted links.

2.2.3 Definition of the Exchanging File Formats and Interfaces

Based on existing interface definitions (INSPIRE – transportation draft, INTREST) an addition is necessary to develop the VeGIS interface with the following requirements:

- Exchanging of partial network graphs
- Creating a bi-directional reference of graphs in different systems
- Creating references of elements with different granularities
- Updating information

2.3 System Development

The heart of VeGIS is to develop the system interfaces for a bi-directional data transfer. Based on the theoretical fundament of the system conception the existing data model will be extended by further functional mappings – higher and different granularities on junctions and links, new elements like traffic cells and its connections to the path network in geographic information systems. Development of routines for data exchange between GIS and traffic modelling software considers special requirements like user acceptance as well as the handling of big data volumes.

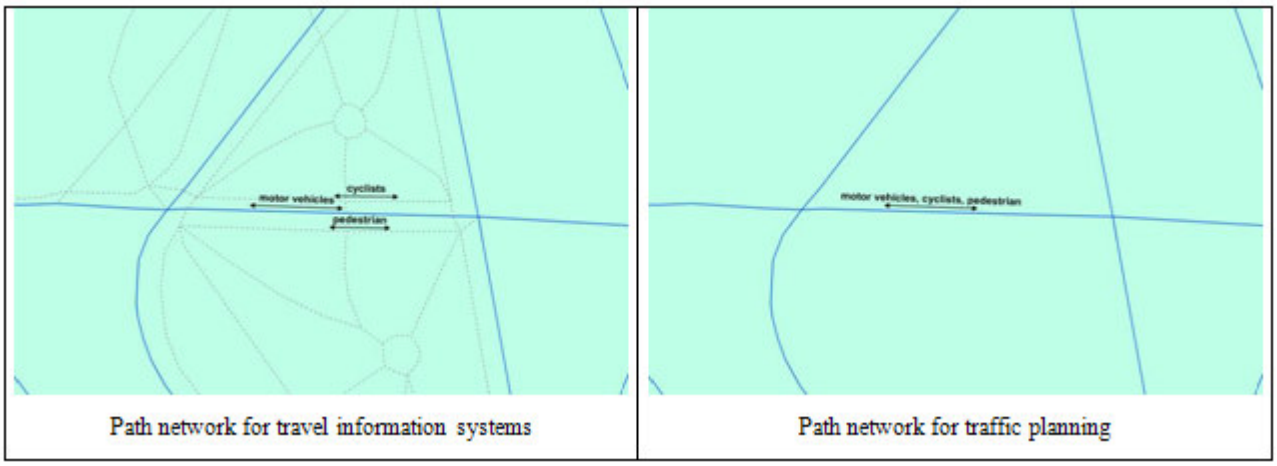

Fig. 2: Different granularities / reduced networks / transformation of traffic modes

2.4 Test Cases

For raising the user acceptance and figuring out the practicability test cases with different conditions will be defined.

2.4.1 Traffic Model Vienna

The municipality of Vienna, department for transport planning, maintains a detailed traffic model for the Vienna region. The model is detailed inside the City of Vienna and sketchy in the surrounding area (Lower Austria) There is also an existing harmonised Geodata infrastructure – GIP Vienna Region – for the region Vienna/ Lower Austria/ Pannonia.

In this test case map matching methods for a bi-directional data transfer on road sections with different granularities will be tested.

2.4.2 Integriertes Wegenetz Steiermark (Styria)

Several departments of the municipality of Styria and the city of Graz are working with the graph integration platform and maintain one intermodal road- and pathnetwork with all relevant modes – pedestrian, bicycle, cars, trucks, trains, tram, busses and some special modes.

In the project GUARD a monodirectional automatically data transfer from GIS into a traffic model was practised by integrating an entire network. Because of wrong transformations during this process some manual adaptions were necessary. This test case should show which manual steps can be eliminated by automation and which not.

2.4.3 Traffic Model Tirol (Tyrol)

The State of Tyrol neither has a maintained traffic model nor the system of Graph Integration Platform (GIP) in use. Currently the GIP will be implemented and an area-wide traffic model for Tyrol is planned. Therefore the road network graph in the existing Tyrolian GIS system (TIRIS) will be matched with further commercial data (TELEATLAS) to get a complete graph. This graph will be used to build the Tyrolian traffic model.

3 CONCLUSION

According to the GIP system VeGIS stimulates the development of a harmonised data pool for traffic model relevant structures and attributes. The GIP will be extended with regard to these special requirements. Countinuously filled and updated by traffic models data can be maintained in a geographic information system (GIS). Otherwise a part of the integrating data is important for the GIS user. Redundant maintaining of information will be reduced effective. Data can flow back from GIS to traffic models everytime. By harmonising the data and implementation in GIP a never seen transparence in traffic models is developing and the common acceptance of traffic models is rising. Up to today traffic models often are “black boxes”. Advanced traffic models deliver better results which avoids wrong decisions in infrastructure investments and high costs.

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Visions of Liveable Cities? Der UNESCO-Weltkulturerbestatus als Potenzial für nachhaltige Stadtentwicklung

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1 KURZFASSUNG

Der Welterbetitel ist zu allererst ein internationales Instrument des Denkmalschutzes, das den materiellen und immateriellen Denkmalwert um seiner selbst willen schützt. Weniger durchdacht ist die Tatsache, dass die UNESCO-Welterbekonvention die Weiterentwicklung ihrer historischen Städte explizit anspricht und um die Alltagsrelevanz des Welterbes für die lokalen Stadtbewohner wirbt. Nur wenige Praktiker und Wissenschaftler sprechen in diesem Zusammenhang den Querschnittcharakter des Welterbestatus für die Stadtentwicklung an, der unter Umständen soziokulturelle und wirtschaftliche Wirkungen bedingen kann.

In diesem Beitrag wird erörtert, in welchen Bereichen der nachhaltigen Stadtentwicklung der UNESCO-Weltkulturerbe-Status theoretisch als Entwicklungsimpuls diskutiert wird, in welchen Bereichen er praktisch unter welchen Bedingungen positive wie negative Resultate zeitigt, und inwiefern er letztlich in einer kooperativen Stadtentwicklung zum Lebenswert einer Stadt beiträgt.

2 PROBLEMAUFRISS[1]

Der Veränderungsdruck auf europäische Städte und Regionen ist hoch: Der Strukturwandel der letzten Jahrzehnte hat in seinen sozioökonomischen Auswirkungen die Bedingungen der Stadt- und Regionalentwicklung gravierend verändert. Der Raum differenziert sich zunehmend in periphere Räume und Metropolregionen. Die Städte sind die Kristallisationspunkte dieser Prozesse. Als Reaktion auf die Veränderungen gilt es, für die Stadtentwicklung Potenziale zu aktivieren für nachhaltige, zukunftsorientierte Perspektiven. Dabei geht es darum, die Stadt und ihren Verflechtungsraum als attraktiven Lebens- und Wirtschaftsstandort zu stabilisieren und zu profilieren. Das Kulturerbe mit UNESCO-Weltkulturerbe-Status kann diesbezüglich ein bedeutsames Potenzial sein. Bisher thematisieren jedoch wirkungsorientierte Evaluationsstudien und Praktiker den Weltkulturerbe-Status vor allem sektoral, insbesondere mit Blick auf den touristischen Wirkungsbereich des Status. Der UNESCO-Weltkulturerbe-Status wurde bisher als strategisches und umfassendes Entwicklungs- und Profilierungspotenzial für die nachhaltige Stadtentwicklung weder hinterfragt noch untersucht (vgl. PwC 2007). Der Praxis fehlt grundlegendes Wissen zu Wirkungen des Welterbe-Status in Weltkulturerbestädten peripherer und metropoler Räume.

Den Weltkulturerbe-Status als querschnittorientiertes Potenzial für nachhaltige Stadtentwicklung zu thematisieren, heißt auch ihn als städtische Querschnittaufgabe zu verstehen, die nur in Kooperation der stadtgestaltenden Akteure geleistet werden kann. Die Stadtentwicklung liegt nicht mehr nur in der planenden „Alleinkompetenz" der öffentlichen Hand (BBR 2005), sondern sie braucht Partner, „strategische Allianzen" (ebenda) zwischen Wirtschaft, öffentlicher Hand und interessierter Bürgerschaft. In Weltkulturerbestädten peripherer Räume unterstreicht beispielhaft der Blick auf die sich verknappenden kommunalen Finanz- und Personalressourcen die Notwendigkeit zu kooperativem Handeln; in metropolen Weltkulturerbestädten ist es die nicht endende Reihung von Welterbe- Konflikte, die auch aus der Uneinigkeit lokaler Akteure resultiert. Bisher fehlt grundlegendes Wissen zu Weltkulturerbe-bezogenen lokalen Akteursallianzen, ihren möglichen Ausprägungen und Bedingungen der Anbahnung (PwC2007a). Studien, die die lokalen Akteure mit ihren differenzierten Motiven[2] und Handlungen bezüglich der Inwertsetzung des Welterbestatus ins Zentrum der Untersuchung rücken, sind nicht bekannt. Der Praxis fehlen daher Ansatzpunkte für die Anbahnung und Förderung neuer Allianzen zu Schutz und Nutzung des Weltkulturerbes.

Mit Blick auf diese Kenntnisdefizite thematisiert der Beitrag den UNESCO-Weltkulturerbe-Status als Potenzial für nachhaltige Stadtentwicklung. Im Zusammenblick wirkungsorientierter Studien zum UNESCO-Welterbestatus werden die potenziellen Wirkungsbereiche für Stadtentwicklung angesprochen und Rahmenbedingungen der Wirkungen skizziert (Kap. 3). Für die Fallbeispiele Stralsund und Wismar

[1] Im Folgenden Beitrag wird ausschließlich das Weltkulturerbe bzw. der Weltkulturerbe- Status betrachtet. Ist vom Weltnaturerbe bzw. Weltnaturerbe- Status die Rede, wird explizit darauf hingewiesen.

[2] zwischen Befürwortung und Ablehnung

werden exemplarisch ausgewählte Status-Wirkungen diskutiert sowie Ansatzpunkte für die künftige Inwertsetzung des Titels für nachhaltige Stadtendwicklung angesprochen (Kap. 4). Der letzte Abschnitt (Kap. 5) wirft Fragen für weitere Forschung zum Weltkulturerbestatus als Potenzial für nachhaltige Stadtentwicklung auf.

Der Beitrag stützt sich auf Ergebnisse eines laufenden Forschungsprojektes an der Technischen Universität Dresden und am Leibniz-Institut für Länderkunde (Dissertationsprojekt), dem Primärdaten in Form von Experteninterviews, standardisierten Bewohnerbefragungen, Dokumenten- und Medienanalysen in den UNESCO-Welterbe-Städten Stralsund, Wismar und St. Petersburg zugrunde liegen[3].

3 DER UNESCO-WELTERBE-STATUS IN WIRKUNGSORIENTIERTEN EVALUATIONEN

Wirkungsorientierte Studien zum UNESCO-Welterbe-Status sind selten (z. B. Scherer 2005). Vor den oben skizzierten Hintergründen gewinnt der Status als Evaluationsgegenstand jedoch an großer Aktualität (Rebanks 2009). So sind in Großbritannien in den letzten drei Jahren zwei größere Auftragsforschungen zum Thema entstanden (PwC 2007, Rebanks 2009). Zum Fundus der Studien ist generell anzumerken, dass Einzelfallstudien und vor allem sektoral ausgerichtete Untersuchungen dominieren. Im Fokus des Interesses steht oftmals der potenziell touristische Wirkungsbereich des Welterbestatus (PwC 2007a).

Dass in der Praxis mit dem Status grundsätzlich auch andere positive Wirkungsbereiche assoziiert werden, greift die PwC-Studie (2007) auf und versucht als bisher einzige Studie holistisch und querschnittorientiert acht potenzielle Wirkungsbereiche des Welterbestatus empirisch fundiert für 17 britische Welterbestätten zu bewerten. Die Bereiche sind “partnership”, “additional funding” und “conservation”, “tourism”, “civic pride”, “social capital”, “education and learning” sowie “regeneration” (PwC 2007). Die Ergebnisse der Studie stammen dabei sowohl aus Weltnatur- als auch aus Weltkulturebestätten; sie werden nicht in Bezug gesetzt zu den Wertprämissen und Handlungserfordernissen nachhaltiger Raumentwicklung.

Die den Tourismus fokussierende Ex-ante-Evaluation zur Bodenseeregion von Scherer et al. (2005) nähert sich dem Thema über das Konzept „Label“. Einem Label werden dabei drei potenzielle Funktionsrichtungen zugeordnet: die Marketing- und Kommunikationsfunktion (Profilierung nach innen und außen), die Institutionalisierungsfunktion im Sinne neuer Kooperationen und Netzwerke zwischen Akteuren (nach innen und außen) sowie die Qualitätsfunktion (Qualitätsanforderungen von innen und außen).

Abbildung 1 verdeutlicht für das UNESCO-Weltkulturerbe-Label, dass auf lokaler Ebene sowohl Akteure der öffentlichen Hand, als auch der Wirtschaft und lokalen Bevölkerung potenziell von diesen drei Label-Funktionen positiv wie negativ betroffen sein können. Die lokalen Akteure können den Status selbst nach ihren Zielen nutzen und/oder von den Welterbe-bezogenen Aktivitäten anderer profitieren bzw. negativ beeinträchtigt werden. Sind also die (aktuellen und potenziellen) Wirkungen des Welterbestatus auf lokaler Ebene zu bewerten, so ist die Vielfalt der lokalen Akteure mit ihren differenzierten Motivationen und Aktivitäten bezüglich der Inwertsetzung des Welterbestatus (Schutz und Nutzung) einzubeziehen. Die Akteurszentrierung wurde in bisherigen Studien jedoch nicht umgesetzt (Rebanks 2009). Für nachhaltige und kooperative Entwicklungsstrategien ist dieses akteursdifferenzierte Wissen jedoch hochrelevant.

Darüber hinaus verdeutlicht Abbildung 1, dass der potenzielle Wirkungsbereich des Welterbetstatus (Urban) Regeneration, d. h. die Vision einer lebenswerten und nachhaltigen Stadt, positive Wirkungen in verschiedenen Wirkungsbereichen wie beispielsweise lokale Wirtschaftsentwicklung, qualitative Innenstadtentwicklung/Denkmalschutz und Identifikation lokaler Bevölkerung voraussetzt. Sollte der Welterbe-Status also ein Potenzial für nachhaltige und zukunftsorientierte Stadtentwicklung sein, so liegt dieses Potenzial in der querschnittorientierten Inwertsetzung des Weltkulturerbe-Status und im kooperativen Zusammenspiel der vielen lokalen Akteure.

[3] In den Fallbeispielstädten wurden jeweils mehr als 20 Experteninterviews mit Vertretern lokaler Verwaltung, Wirtschaft und Bevölkerung, Reviews lokaler Zeitschriften (zwischen Ernennungszeitpunkten und 2008) sowie standardisierte Bewohnerbefragungen mit folgenden Grundgesamtheiten durchgeführt: Stralsund und Wismar je N= 150, St. Petersburg N= 300.

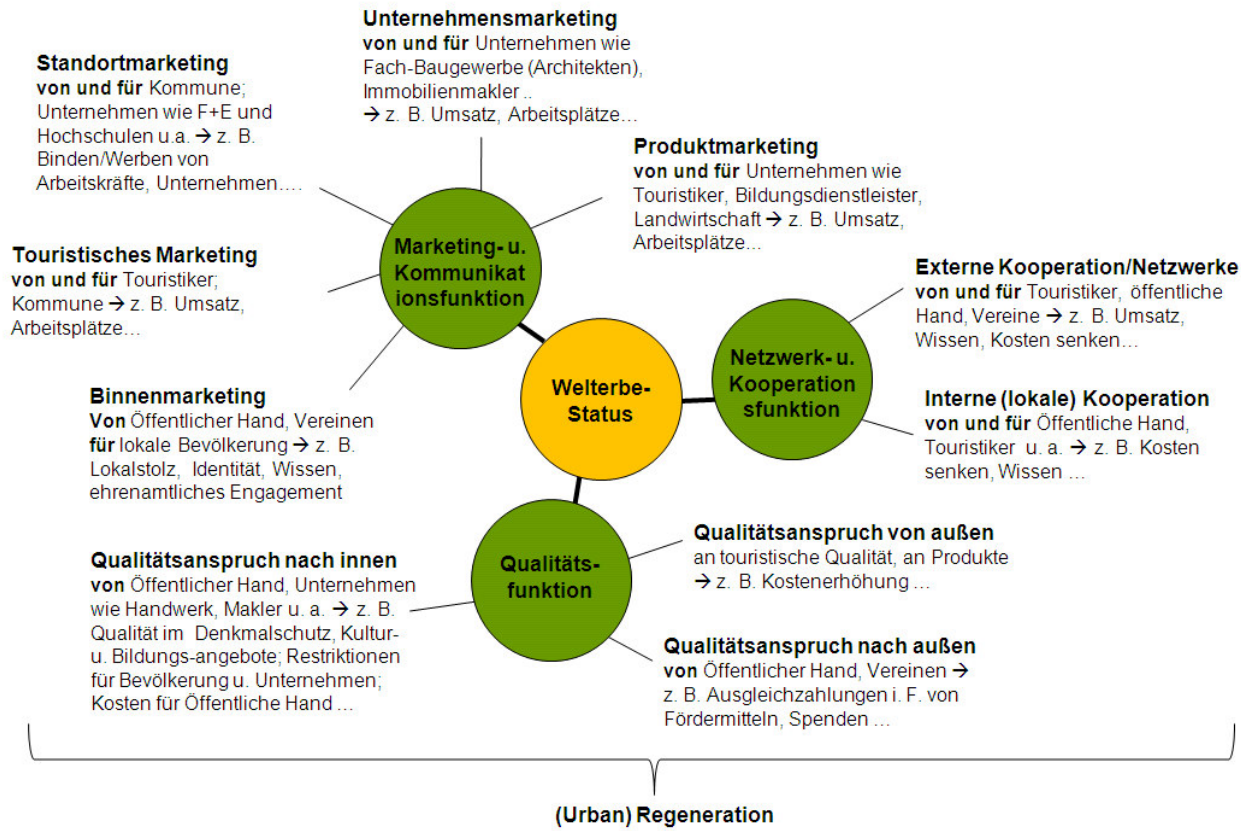

Abb. 1: Potenzielle Wirkungsbereiche des UNESCO-Weltkultuerbe-Status auf lokaler Ebene (eigene Darstellung)

Im Zusammenblick der Studien finden sich keine Verallgemeinerungen bezüglich der Status-Wirkungen in den verschiedenen oben genannten Bereichen, sondern vielmehr „Kann-Aussagen“. Es sind insbesondere drei Bündel von Rahmenbedingungen, die als Erklärungen für die lokale Varianz der Wirkungen bzw. Nichtwirkungen des Welterbe- Status herangezogen werden (Rebanks 2009, Prud’homme 2008, PwC 2007, NordLB 2002, Scherer et al. 2005).

Zum einen ist es die Art der Welterbe-Stätte (Natur- vs. Kulturerbe, archäologische vs. lebendige Stätte, Einzel- vs. Flächendenkmal), die die Wirkung beeinflusst. Dabei werden lebendige Weltkulturerbe-Städte mit weiträumigen Schutzgebieten sowohl als besondere Kristallisationspunkte von Möglichkeiten und Ideen zur Inwertsetzung des Status (Rebanks 2009) als auch als brisante Konfliktherde identifiziert. Zum zweiten sind es die räumlichen Kontexte der Stätten. Es werden insbesondere die Unterschiede zwischen Stätten im städtischen und ländlichen Raum diskutiert. Eine differenzierte Betrachtung von lebendigen Welterbstädten im peripheren und metropolen Raum erfolgte aber bisher nicht. Und zum dritten sind es die lokalen Akteure mit ihren Motivationen und Aktivitäten, die mitbestimmen, ob, wie und warum der Status wirkt (Rebanks 2009). Kernaussage der Studien bisher ist, dass der Welterbe-Status nicht automatisch als Selbstläufer wirkt, sondern dessen Wirkungspotenzial durch das Handeln der lokalen Akteure erst erschlossen werden muss (PwC2007, Rebanks 2009, Prud’homme 2008). Studien, die die Vielfalt lokaler Akteure mit ihren differenzierten Motiven und Handlungen bezüglich der Inwertsetzung des Welterbestatus ins Zentrum der Untersuchung rücken, sind nicht bekannt.

Mit Blick auf lebendige Weltkulturerbe-Städte, als Kristallisationspunkte welterbebedingter Entwicklungen, gilt es folglich, diese differenziert nach ihren jeweiligen Raumkontexten und fokussiert auf die lokalen Akteursgruppen zu untersuchen, um unter der Wertprämisse ‚nachhaltiger Stadtentwicklung‘ querschnittsorientiert aktuelle und potenzielle Wirkungen des Welterbestatus bewerten und differenzierte Entwicklungsstrategien entwickeln zu können.

4 WIRKUNGEN DES WELTERBE-STATUS FÜR NACHHALTIGE STADTENTWICKLUNG – DIE BEISPIELE STRALSUND UND WISMAR

Nachhaltige Entwicklung ist eine „ethisch-normative Vorgabe“ (Hübler et al.2000: IV), die nach dem ausgewogenen Dreiklang sozio-kultureller, wirtschaftlicher und ökologischer Entwicklung (Weith 2002)

strebt. Vielfalt, Vernetzung, Kooperation, Transparenz und erweiterte Beteiligung[4] sind „strategische Prinzipien", die eine „Richtschnur bei der Aufstellung von (Umsetzungs-) Strategien" und bei Handlungen sein können, um abzuschätzen, ob diese der Erreichung von Nachhaltigkeit dienen bzw. ihr zumindest nicht zuwider laufen (Hübler 2000: IV).

Für die Fallbeispiele Stralsund und Wismar wird folgend die Frage angerissen, inwieweit dem Welterbe-Titel aktuell praktische Wirkungen im wirtschaftlichen (lokale Tourismusentwicklung), soziokulturellen (Stolz und Identifikation) und ökologischen Bereich (Umsetzung Denkmalschutz: Ressourcenschonung) der Stadtentwicklung zugeschrieben werden können. Die Hypothesen 2 und 3 deuten an, wo künftig im Sinne nachhaltiger Entwicklung durch Vernetzung, Kooperation und erweiterter Beteiligung Ansatzpunkte für eine verbesserte Inwertsetzung des Welterbe-Status liegen können[5].

Hypothese 1: Seitens der lokalen stadtgestaltenden Akteure (öffentliche Hand, lokalansässige Wirtschaft und Stadtbewohner) werden hohe Wirkerwartungen mit dem Welterbe-Status verbunden. Positive Wirkungen des Status lassen sich jedoch aktuell nur in einzelnen Bereichen nachweisen bzw. kausal plausible rekonstruieren.[6]

Die Wirkerwartungen der lokalen Bevölkerung an den Weterbe- Status sind mehrheitlich sehr positiv. Insbesondere werden mit dem Status positive Effekte bezüglich der lokalen Tourismusentwicklung sowie der finanziellen Förderung des Denkmalschutzes assoziiert. Bei der Stadtplanung und bei Kommunalpolitikern sind es zudem Erwartungen an gesteigerten Lokalstolz und raumbezogene Identifikation bei den Stadtbewohnern sowie weitgreifende Erwartungen an den Status als Instrument der Wirtschaftsförderung und Urban regeneration.

Greift man einige der genannten Wirkerwartungen auf und wagt erste Wirkaussagen, ist mit Blick auf die lokale Tourismusentwicklung abzuschätzen, dass die hohen Wirkerwartungen seitens der lokalen Akteure bisher nicht erfüllt wurden. Die große Mehrheit der interviewten lokalen Touristiker (Beherbungs- und Fuhrunternehmen) kann keinen bzw. kaum einen Einfluss des Welterbestatus auf ihre Unternehmensentwicklung feststellen, weder kurz- noch langfristig. Andere lokal-regionale Großereignisse (z. B. Eröffnung Ozeaneum Stralsund 2008, IGA Rostock 2003) sowie Tourismuslabels wie die „Straße der Backsteingotik" wirkten stärker auf die Reisemotivik der Touristen[7]. Die Auswertung der amtlichen Statistiken zur Tourismusentwicklung lässt keine eindeutigen, positiven Rückschlüsse zu (BBR 2007: 31). Hinzu kommt, dass in den Fallbeispielen Tourismuskonzepte und städtische Leitbilder fehlen (Wismar) bzw. deren Aussagegehalt von den lokalen Akteuren kritisch gesehen wird (Stralsund). Es sind Konzepte, die die strategische Stellung des Welterbestatus als Marketingthema herausstellen und das lokale Handeln der Akteure koordinieren und bündeln könnten. Probleme in der Kooperation der lokalen Touristiker werden ebenso angesprochen, wie die Unzufriedenheit mit und Einschränkungen bei überlokalen Kooperationen.

Mit Blick auf Veränderungen in der Denkmalschutzpraxis durch den Welterbestatus wird hier im Beitrag lediglich die Frage nach veränderten Finanzierungsmöglichkeiten, nicht die Frage nach veränderter Planungs- und Umsetzungsqualität angesprochen. Wie in der Studie zu britischen Welterbestätten (PwC 2007) kann auch für die deutschen Fallstudien ein positiver Zusammenhang zwischen Welterbe-Status und erweiterten Finanzierungsquellen dargestellt werden. Sind in den Statistiken zusätzliche, Welterbe-bedingte öffentliche Förderungen vor 2008, dem Beginn des ersten deutschen Welterbe-Förderung-Konjunktur-Programms[8], nicht extrahierbar, bestätigen jedoch sowohl Verantwortliche auf lokaler als auch auf Landesebene den positiven Stimulus des UNESCO-Titels bei der Vergabe öffentlicher Denkmalschutzmittel. Zudem finden sich auf lokaler Politikebene Aktivitäten und externe Kooperationen, entsprechende öffentliche Zuwendungen einzuwerben. Auf finanzielle Unterstützung der Privatwirtschaft zurückzugreifen, wurde bisher nicht versucht.

Bei der lokalen Bevölkerung löst der Welterbe-Status vor allem Lokalstolz aus, der aber nur für eine sehr kleine Bevölkerungsgruppe auch Bindung an den Wohnort und Anlass für aktives Mitwirken in der

[4] meint Beteiligung über das gesetzlich vorgeschriebene Maß hinaus. Weitere Prinzipien sind Effizienz, Suffizienz, Risikovorsorge, Konsistenz sowie intra- und intergenerative Gerechtigkeit.
[5] Die negativen Wirkungen des Status auf die lokale Ebene werden hier aus Platzmangel nicht besprochen.
[6] Kausalitätsbegriff im sozialwissenschaftlichen Verständnis, vgl. Kelle 2006
[7] Vgl. weitere Untersuchungen zur Bedeutung des Welterbe-Titels auf die Reisemotivik von Touristen: Scherer et al. 2005, Henger 2006, BBR 2007
[8] http://www.bmvbs.de/pressemitteilung-,302.1060623/Neues-Millionenprogramm-zur-Fo.htm

Stadtentwicklung bzw. im Denkmalschutz (z. B. Spenden, Ehrenamt) bedeutet. In lebendiger Erinnerung der Menschen blieb in diesem Zusammenhang das große Bürgerfest, das 2002 zur Übergabe des UNESCO-Welterbe-Plakette in Wismar und Stralsund gefeiert wurde. Ist die Informationsarbeit über den Welterbstatus vor Ort gegeben (z. B. kostenloser monatlicher UNESCO-Brief, Extra- Internetseite zum Welterbe, Welterbemagazin gegen geringes Entgelt, Welterbe-Beirat mit lokalen Multiplikatoren), kam es bisher nicht zu einer Wiederholung eines derartig lebendigen Festes und gab es bisher keine Versuche, lokale Bevölkerung in Welterbe-bezogene Projekte einzubinden.

Hypothese 2: Die aktuell eingeschränkten Wirkungen des Welterbstatus auf die Stadtentwicklung sind zum Teil durch Defizite im Handeln der lokalen Akteure bedingt.

Wie angedeutet, zeigen sich im lokalen Handeln der Akteure zum Teil Defizite bezüglich der strategischen Nachhaltigkeitsprinzipien Vernetzung, Kooperation und erweiterter Beteiligung. Ursache dessen kann sein, dass bis heute unter den lokalen Akteuren – selbst in der Stadtverwaltung - die differenzierten Wirkerwartungen an den Welterbe-Status nicht expliziert und diskutiert wurden. In den lokalen Welterbe-Managementplänen zeigt sich dies beispielweise darin, dass außer für den Wirkungsbereich (baulicher) Denkmalschutz keine Ziele und Maßnahmen formuliert wurden. Wird das Thema Öffentlichkeitsarbeit, das Implikationen für den soziokulturellen Wirkungsbereich „lokale Identität, Bildungs- und Kulturangebote“ hat, in den Managementplänen angesprochen, ist das Thema bis heute nicht strategisch operationalisiert, sondern lediglich situationsbezogen interpretiert und behandelt worden. Die potenziellen wirtschaftlichen Wirkbereiche des Welterbe-Status sind gar nicht thematisiert. Zeichnet sich also in den Köpfen der lokalen Akteure in der Summe der Welterbe-Status als Querschnittpotenzial für nachhaltige Stadtentwicklung ab, bleibt er auf dem Papier und in der Praxis sektoral betrachtet.

Unausgesprochene Zielsysteme und Wahrnehmungen des Status unter den Akteuren erschweren jedoch Kooperationen. Sind Ziele nicht operationalisiert, können sie nicht in gemeinsamen Projekten umgesetzt werden. Fehlt unter den Akteuren offene, fachübergreifende Diskussion zu Möglichkeiten der Inwertsetzung des Welterbe-Status, können ggf. überzogene Wirkerwartungen nicht korrigiert werden. Die Notwendigkeit und gleichzeitig die Defizite bezüglich interdisziplinärer, kooperativer Zielbestimmung ist ein bekanntes Thema Strategischer Stadtentwicklung (Kühn et al. 2010). Auch deshalb ist davon auszugehen, dass die genannten Implementationsdefizite bezüglich der lokalen Inwertsetzung des Welterbe-Status nicht nur auf Stralsund und Wismar zutreffen[9].

Hypothese 3: In den differenzierten Motivationen der lokalen Akteure liegen ungenutzte Potenziale für Kooperationen bezüglich der Inwertsetzung des Welterbe-Status in nachhaltiger Stadtentwicklung.

Lokale Kooperationen für die nachhaltige Inwertsetzung (Schutz und Nutzung) des Welterbe-Status sind für verschiedenste Bereiche und in verschiedensten Formen denkbar und sinnvoll, angefangen beim Sponsoring und Spenden für den Denkmalschutz in Welterbestädten, über die Ausgestaltung von Welterbe-bezogenen Kulturveranstaltungen lokaler bis überregionaler Bedeutung, bis hin zur Anbahnung von EU-Projekten zur Inwertsetzung des Welterbe-Status[10]. Ungenutzte Potenziale für Welterbe-bezogene Kooperationen werden dabei vor allem aus folgenden Gründen vermutet.

Zum einen wurden bisher verschiedene Wirtschaftsbereiche, wie das Handwerk im Baugewerbe, Immobilienmakler oder F+E-nahe Unternehmen bzw. Institutionen bezüglich ihrer Motivationen gegenüber dem Welterbe-Status nicht untersucht und als Kooperationspartner angefragt. Erste Ergebnisse des laufenden Projektes deuten jedoch auf Möglichkeiten in diesen Bereichen hin. Zum anderen wurden bisher lokale Akteure, die insbesondere durch biographisch bedingte Affinitäten zu Kultur und Denkmalschutz – auch in Kombination mit unterschiedlichen Berufsbildern - besonders hohe Welterbe-Motivationen haben, bisher nicht gezielt in konkrete Projekte mit Welterbe-Bezug eingebunden bzw. angefragt. Dabei ist generell zu überlegen, inwieweit die grundsätzlich sehr positive Wahrnehmung und die großen Wirkhoffnungen an den Welterbe-Status (vgl. NordLB 2002, Scherer et al. 2005) bei den lokalen Akteuren in einen konkreten Stimulus für lokale, Welterbe-bezogene Kooperationen umgesetzt werden kann.

[9] Denn Stralsund und Wismar gelten unter Welterbe-Experten in Deutschland eigentlich als „Gute Beispiele“ bezüglich Managementplan und Öffentlichkeitsarbeit.
[10] http://www.regensburg.de/welterbe/regensburg_feiert/hero.shtml

5 FAZIT

Im Beitrag wurde das breite, potenzielle Wirkspektrums des Weltkulturerbe-Status für die lokale Ebene (Kap. 3) angesprochen und ausgewählte Wirkungsbereiche für die Weltkulturerbestädte Stralsund und Wismar diskutiert. Mit Bezug auf die Bewertungsperspektive Nachhaltige Stadtentwicklung wurde dargestellt, dass sich für die strategischen Prinzipen „Vernetzung, Kooperation und erweiterte Beteiligung" zum Teil deutliche Implementationsdefizite abzeichnen – Defizite, die teilweise bedingen, dass aktuell die Wirkungen des Status hinter den Wirkerwartungen der lokalen Akteure zurückbleiben. Die umfassende und integrative Bewertung des Welterbe-Status mit seinen lokalen Wirkungen unter der Prämisse der Nachhaltigkeit steht für die Fallbeispiele Stralsund und Wismar allerdings noch aus. Für die Zukunft deutet sich jedoch an, dass es gilt, den UNESCO-Status auf lokaler Ebene weitaus deutlicher im Sinne einer nachhaltigen, kooperativen Stadtentwicklung in Wert zu setzen, die Implementationsdefizite abzubauen und die Kooperationspotenziale zu erschließen. Mit Blick auf diese Empfehlung/Aufforderung sind aber zwei Fragen noch zu bedenken:

Inwieweit ist theoretisch davon auszugehen, dass der Welterbe- Status in den skizzierten Bereichen Wirkungen entfaltet, die den lokalen Wirkerwartungen gerecht werden? Bisher fehlt den Welterbe-Studien eine theoretische Fundierung ihrer Wirkungshypothesen, so dass anhand mittlerer Fachtheorien die empirischen Ergebnisse der Evaluation nicht diskutiert und theoretisch überhaupt mögliche Wirkhorizonte nicht skizziert werden können.

Inwiefern ist es Welterbe-Städten in wirtschaftsschwachen, peripheren Räumen wie Wismar und Stralsund praktisch möglich, diese Mehrleistungen für die Inwertsetzung des Welterbe-Status zu erbringen? Einschränkungen finanzieller und personeller Art bei der öffentlichen Hand, aber auch bei der lokalen Wirtschaft werden in den Untersuchungen immer wieder deutlich. Damit wird die Hypothese zur ‚räumlichen Relativität' des Weltkulturerbe-Status als Potenzial für nachhaltige Stadtentwicklung formuliert: Zeichnen sich Status-bedingte positive sozioökonomische Entwicklungen in Weltkulturerbestädten peripherer Räume relativ deutlicher und schneller ab als in metropolen Weltkulturebestädten, können andererseits vor allem metropole Weltkulturebestädte die notwendigen Ressourcen aufbringen, um den Weltkulturerbe-Status umfassend in Wert zu setzten und erfolgreich zu nutzen.

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Ways4all: Indoor navigation for visually impaired and blind people

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1 ABSTRACT

The project "Ways4all" is using passive RFID-tags to indentify indoor routes, barriers and means of public transport for visually impaired and blind people. The basis for this project is the tactile guidance system. At all strategic spots inside the building (entrance, platforms, intersections) a passive RFID-tag will be placed into the tactile guidance system. Those RFID-tags send their unique code trough an RFID-reader to the user's smartphone. The smartphone reads the code and sends it on to an RFID-database server where all the tags together with some additional information are saved as location points.

Before leaving the user has to enter his/her destination on the smartphone, by which the server (Gerwei-Method) calculates the optimal route based on the location, the moving direction and the user profile. The Gerwei-Method is a new developed navigation routing software based on a standard routing algorithm.

The smartphone receives real-time routing information (including additional information, like interruptions, delays and platform changes) from the database server. On the smartphone the routing information will be sent in an acoustic way to the blind person (for example through a Bluetooth headset). This way, the blind person gets his/her indoor route instructions from the system.

2 INDOOR NAVIGATION FOR VISUAL IMPAIRED AND BLIND PEOPLE

2.1 situation

Imagine a world without barriers, where all people and particularly people with special needs can enjoy daily life without running into obstacles or problems which undermine their self-determination. This is a dream which could come true within the next years. In Austria the Federal Law on Equality of People with Disabilities (Bundes-Behindertengleichstellungsgesetz – BGStG [1]), which has been in force since the year 2006, is a positive factor towards improving the situation for the visually impaired and blind people. However, barriers related to roads, transportation and transport facilities built before January 2006 have time to neutralize these barriers until the 31 of December 2015. So barrier free public transport for people with special needs is still a dream and not yet a reality.

Currently visually impaired and blind people travel with the help of a white cane, a dog or are escorted by a friend or mobility trainer. With this new law, all passengers and particularly people with special needs will have access to public transport and up-to-date traffic information in a much more simplified way than nowadays. A new individual (indoor) navigation system can raise accessibility to public transport for this group of people. Additionally, the communication between the navigational device and the respective means of public transportation (bus, tram, train and subway) as well as the static/dynamic information timetables should be aimed at increasing the feeling of safe travel. This way the visually impaired and blind people can be self-determined.

At the moment different projects in Public transport and Navigation are using the RFID-technology for routing blind people. Example Projects are 1) Sesamonet, Italy [2] which uses passive RFID-tags and an RFID-reader built in the white cane for a route along the promenade at Lake Maggiore. 2) RouteOnline, the Netherlands [3] which uses active RFID-tags and a hand held reader to find a route at different stations. 3) BIGS, Korea [4] which uses a portable terminal unit and a smart floor (each tile of the floor has a passive RFID-tag). 4) Bus-ID, Germany, [5] uses the RFID-tag for sending public transport information towards a reader and a database. 5) RFID Information Grid [6] which uses the RFID-tag for indoor routing in the Campus. The RFID-tags are programmed with spatial coordinates and information to describe the surroundings. No centralized database or wireless infrastructure for communications is used. 6) Self-contained Sensor System [7] which places RFID readers inside the building. The user will carry his/her own RFID-tag with him/her to capture his/her position. Taking these examples into consideration it can be

concluded that different institutes are researching the use of RFID-tags to make daily life for visually impaired and blind people more enjoyable.

The project “Ways4all” is using passive RFID-tags to indentify indoor routes, barriers and means of public transport.

2.2 Project Goal

The project called “Ways4all” supports blind and handicapped people to find their way, for example inside the train station and to the departing platform by the help of technical equipment. The most important parts of this equipment are the passive RFID-tags, the smartphone and the RFID-reader cane. By establishing a connection between the smartphone and different traffic databases, users are informed of their final destination inside the building (train platform), real time delays in the timetables or platform changes.

The project “Ways4all” started in December 2008. The overall project manager is the University of Applied Sciences FH-JOANNEUM in Kapfenberg, Austria. Project participants are “Wiener Linien”, “ÖBB”, “Transelektronik Messgeräte GmbH”, “Hilfsgemeinschaft der Blinden und Sehschwachen Österreichs”, “Österreichischer Blinden- und Sehbehindertenverband”, “Österreichs Blindenwohlfahrt” and “Österreichische Arbeitsgemeinschaft für Rehabilitation”.

The Project is subsidized by the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT) and the Austrian Research Promotion Agency (FFG).

2.3 Input Internet platforms

Since May 2009 the “Wiener Linien” and the “Verkehrsverbund Ost-Region (VOR)” have offered on their website the program “Qando” which provides real-time timetable information [8]. Users can recall this information through Internet access via their smartphones or computers at home. The program “Qando” offers besides timetables also information about public traffic interruptions, different kinds of online services and also a route planner for Vienna, Lower Austria and Burgenland. The user can obtain information about the arrival time of the train, bus or tramway. The Austrian Train company (ÖBB) offers a similar service with their programme “Scotty”, which connects to the ÖBB-website, where up-to-date timetables or delays of the different trains and busses are available [9].

The project “Ways4all” connects and combines these different timetable systems with indoor navigation software and a guidance system based on RFID-tags and a tactile guidance system.

2.4 Tactile guidance system

The most important part of the project is to develop an indoor navigation system for visually impaired and blind people. The backbone of this indoor navigation system is the tactile guidance system, which is the minimal needed guidance system for the visually impaired and blind people. With this system they can find their way through stations and public spaces. The only problem is that they need to know their way when using this system. If they have not been there before, the tactile guidance system will guide them, but to find the right direction they need extra information to where the system is leading them to. In the outdoor, the GPS software can guide the visually impaired and blind people. In the indoor areas the RFID-tags can help guiding the visual impaired people (see figure 1).

If the system functions properly for the visually impaired and blind people, it will be extended to other user groups like physically handicapped users, parents with a baby buggy, elderly people and tourists. For indoor navigation this group can use QR-Codes, which can be read by any smartphone camera. For outdoor navigation the system will use the normal GPS-software.

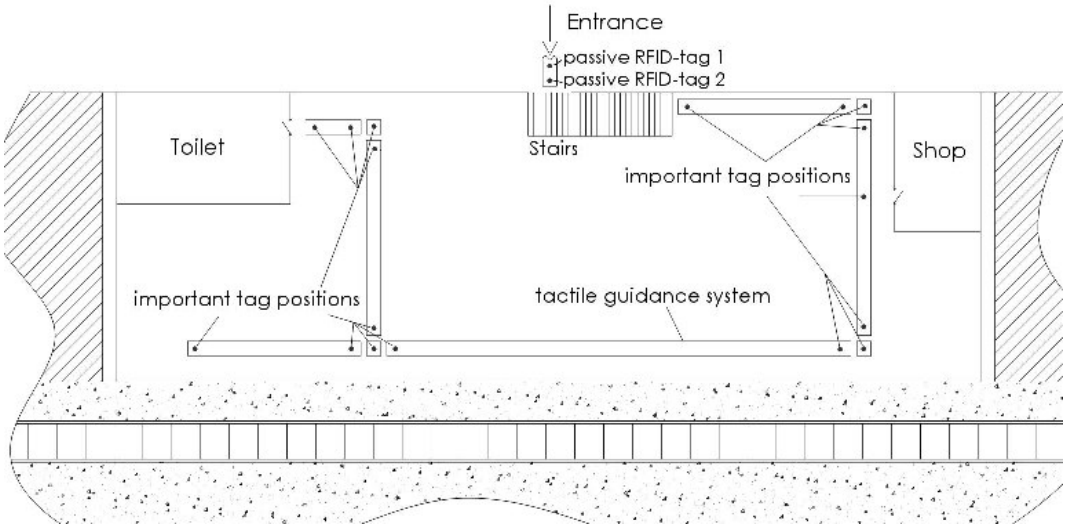

Fig. 1: Routing by tactile guidance system and RFID-tags

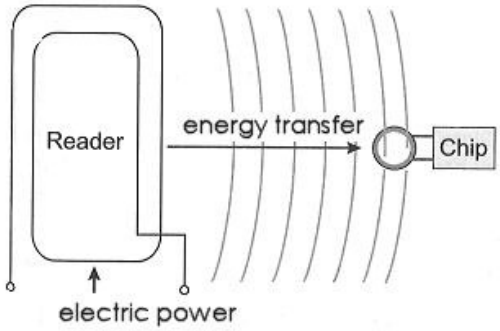

Fig. 2: Transmission passive RFID-tag

2.5 RFID-tags

At the moment the main goal is to develop a routing system for the visually impaired and blind people by using RFID-tags. There are two different RFID-tags; the active and the passive tag. The active RFID-tags have their own energy source (battery) and transmit a signal towards the RFID-reader. The transmission range varies from a few meters to 100 meters. The passive RFID-tag only transmits its signal when a reader comes close to the tag (see figure 2). The magnetic energy field of the reader activates the tag, and the tag uses the energy from the reader itself to transmit its code. The transmitting range of the passive RFID-tag varies from a few centimetres to more than 10 meters [10].

The frequency range from RFID-tags extents form low frequencies (125 kHz), to high frequencies (13,56 MHz), to ultra high frequencies (868 / 915 MHz and 2,45 GHz) and the Microwave (5,8 GHz). A passive RFID-tag can be used in all of these frequencies. The active RFID-tag can be used at a frequency of 13,56 MHz (UHF) upwards. Tests have shown that passive RFID-tags are most suitable for this project as they show fewer interference problems of surrounding materials (like iron, electric cables) [11]. Furthermore, the low frequencies RFID-tags have fewer problems with dirt or water on top of the (built in) tag in comparison with the other frequencies. Finally, the passive RFID-tag is much cheaper than the active tag as both in the cost(s) of acquisition and in the cost of maintenance. The passive tag is placed inside or beneath the floor and will function from this moment on. The active tag has to be changed every few years, when its energy cell is empty.

2.6 RFID navigation

Every RFID-tag has its own unique code which can be linked to the RFID-database. After installing the tags in the database, their location and the position are defined.

At all strategic spots inside the building (entrance, platforms, intersections of the tactile guidance system, etc.) the RFID-tags will be placed into the tactile guidance system. The RFID-tag sends its code to the RFID-reader and the RFID-reader sends the unique code to the user's smartphone. On the smartphone an easy-kept

mobile Java application reads the code and sends it on to an RFID-database server where all the tags together with some additional information are saved as location points. Through the sequence of different RFID-tag codes his/her moving direction is known to the server. In figure 3 the locations of the RFID-tags and the links between these tags are presented. Before leaving the user has to enter its final destination on the smartphone, so the server can calculate the optimal route for this user, based on his/her location, moving direction and user profile (visually impaired or blind person, physically handicapped person, elderly person, etc.). For this kind of routing new navigation software, the so-called Gerwei-Method, which is based on a standard routing algorithm, has been developed. This method uses the special database structure for its routing directions and combines the different location spots to a route.

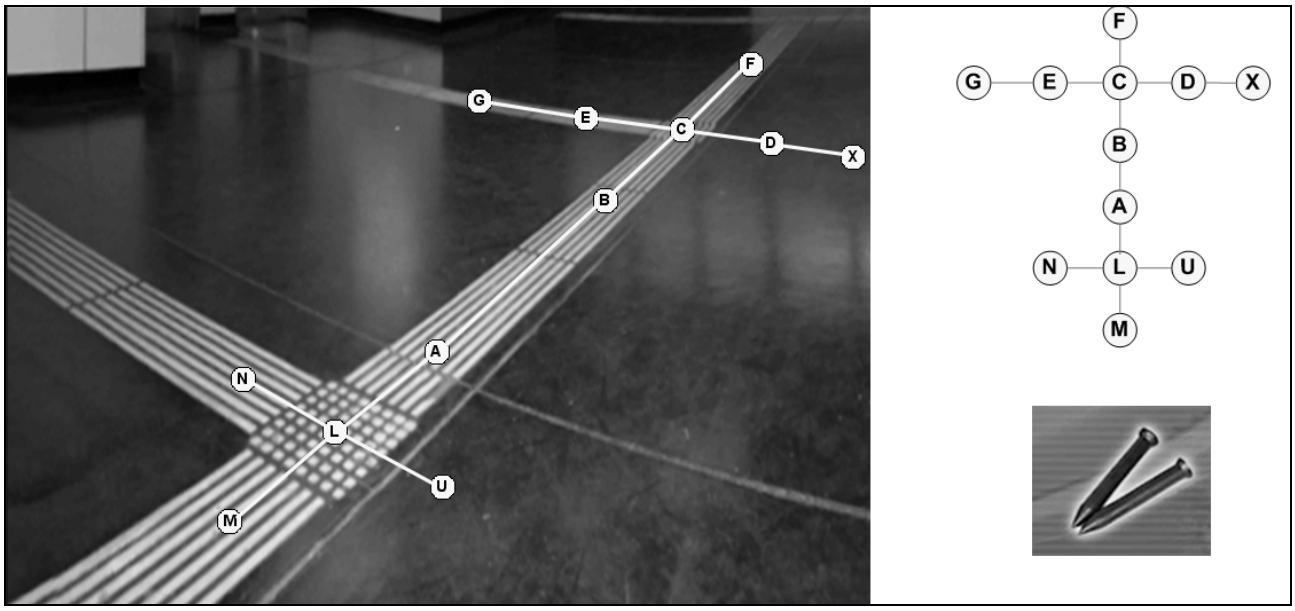

Fig. 3: The RFID-tags structure including the nesecarry links between these tags

The smartphone receives the routing information from the server. The software on the smartphone sends it to a screen-reader inside the smartphone which transmits the information in an acoustic way to the blind person (for example through a Bluetooth headset). The blind person gets from the system route instructions about the way he/she has to take. He/she walks from one reference point (RFID-tag) to the next. The software and database are developed in a way that allows the user to decide between getting just the necessary direction information to the destination or all the information at every crossing. During the routing the user can change this setting. The user can also enter his/her personal preferences for the routing. While one person, for instance, does not mind taking the stairs, others only want to take the elevator to change floors. Each user of this software can personalise his/her user profile, so that for every user his/her preferred route can be calculated.

2.7 Needed equipment

For the routing the visually impaired and blind people will have their RFID-reader and Bluetooth sender built in their white cane. A disadvantage of this is the weight of the stick because of the integrated reader. A second solution would be a shoe-clip where the reader could be placed. He/she just needs a normal smartphone and Bluetooth Headset for the routing. One of the demands of the visually impaired and blind people was that no additional equipment should be invented, but normal existing equipment should be used.

2.8 System functionality

The visually impaired and blind people can plan their trips on the internet platform at home. The necessary information to be entered is the day and time of departure, place of departure, place of arrival and the preferred means of transport. This information will be saved temporarily in the database. After leaving the house the outdoor GPS can guide him/her towards the first means of transport. While travelling, the application will just take the necessary information via the mobile internet access. If the route is changed or the planned route is no longer available, the user can ask for new routing information during the trip. As soon as he/she enters the indoor area, the smartphone will receive the RFID and routing information. If the user

does not want to be online during the trip, he can also download the indoor routing information including the local RFID-database at home and uses it the next day during the routing process. The disadvantage of this is that the real-time information of last minute track changes is then not available.

This system functionality is presented in figure 4.

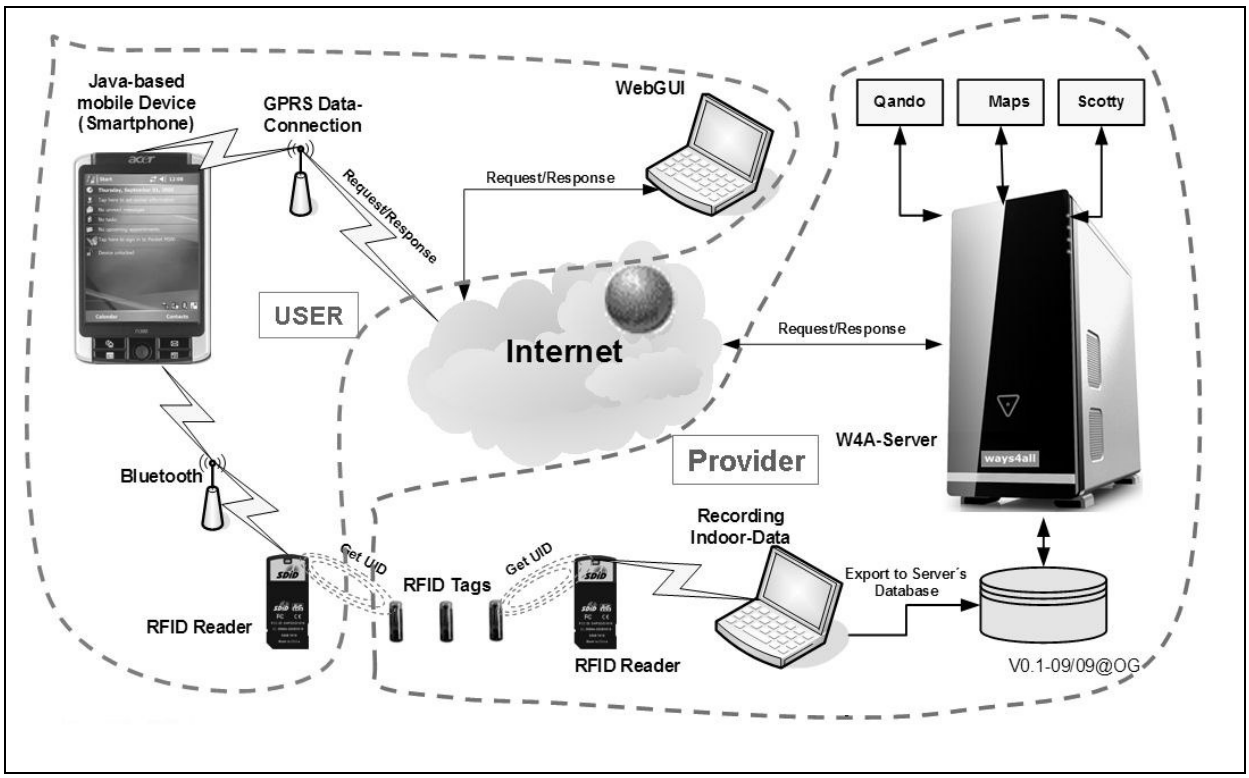

Fig. 4: System functionality

2.9 Quo Vadis

If the blind person is at a tram or bus station where more lines stop at the platform, the project "Quo Vadis" of the "Wiener Linien" and "Transelektronik" can be used [12]. A small 433 MHz transmitter in the vehicle transmits on request of the user which line it is and towards which final stop it is headed. The portable transmitter works like a garage door opener control with the same frequency band. Blind people already use this transmitter to activate pedestrian lights.

At the moment the user needs a separated portable transmitter from "Transelektronik" and "Wiener Linien" to send the request and to receive its answer.

One of the goals of "Ways4all" is to include this separate transmitter in the software of the smartphone, so the user can find his route only by using the software installed on the smartphone (including headset) and the white cane for reading the RFID-tags. The only problem is that no smartphone is equipped with a 433 MHz transmitter. So, using the existing 433 MHz sender is at the moment the cheapest solution. In the first project phase the portable transmitter will be used as a gateway to the smartphone and will be equipped with a Bluetooth chip that sends its information to the smartphone.

2.10 Project test

The project "Ways4all" ends with the equipment and routing test at the Südtirolerplatz in Vienna at the end of 2010. The Südtirolerplatz is being rebuilt at this moment and will be equipped with an underground pedestrian passage which connects the subway and tram to the new central station of Vienna, which is to be opened in 2014. For this project the Südtirolerplatz is a very suitable test area because it is a connecting point for the subway, bus, tramway and train network.

2.11 Alternative to RFID-tags for other user groups

The alternative to the RFID-tags would be the use of QR codes (see figure 5). This would be a visual modification for the indoor area. The other users (tourist, physically handicapped person, etc.) orient

themselves by the guidance system in the form of QR codes. A QR Code “Quick Response" is a matrix code (or two-dimensional bar code) which allows its contents to be decoded at high speed [13].

The user turns the camera on the smartphone to the QR-code to get the requested information. The advantage of this system is that non-blind people could also use this system for their routing and no expensive

equipment is needed. Any smartphone with a camera can read the code after installing the QR-reader software. The information carrier is now a different one, but the guidance system stays identical. The QR code can be milled into the ground or be printed as a picture on the floor. The big advantage of the QR code is that the code can still be read even when the picture is 30 % broken [14].

Fig. 5: QR-code

3 CONCLUSION

The first phase for Indoor navigation for visually impaired and blind people has been made. As soon as the indoor routing and the communication between smartphone and the different means of transportation works, new opportunities may arise to make travelling for people with special needs more comfortable. These new opportunities are for example locating the entrance door with the help of an acoustic sound, telling the driver when he/she wants to exit, or if he/she needs help with getting on or off the transportation. So, “Ways4all” will be input for new projects. The first following project will be the project “Navcom” where communication over WLAN and inertial navigation (navigation with gyroscope and digital compass) will be developed and tested for indoor navigation. Another project is planned were the results of the project “Ways4all” and “Navcom” will be combined and expanded with the QR-Code and Outdoor navigation.

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[12] Wiener Linien GmbH & Co, Roland Krpata: „Quo Vadis, Akustisches Informationssystem: Ein Sender / Empfänger Prototyp, Zur Kommunikation von in ihrer Mobilität eingeschränkten Fahrgästen mit den Fahrzeugen des öffentlichen Verkehrs“; Vienna, september 2009

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What happens to the East-West Cornucopia? Regional development opportunities in Schwechat revisited

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1 ABSTRACT

The fall of the Berlin wall and the EU enlargement raised the stakes for the fringe of the EU. Opportunities were plentiful to reconnect historic links and create new synergies. The Vienna city region was particularly well placed to expand its regional economy through joint ventures with its immediate neighbours, thereby strengthening its centrality as a supra-regional multimodal interchange node. Expanding the future role of Vienna International Airport was just one of the attractive options, while preventing the region from becoming a low value-added logistics destination. Was it a promising vision or just an unrealistic fantasy?

The paper revisits Schwechat's development strategies. It inquires what happened to the initial opportunities of reconnecting its historic eastern ties through the Centrope initiative, the EU transportation network proposals, and the role of Schwechat in Vienna's momentum of urban change. It reconsiders the proposals of the Isocarp Urban Task Force in the light of the global economic crisis and explores Schwechat's chances to become an integral part of a liveable, healthy and prosperous city region.

2 URBAN TASK FORCE IN SCHWECHAT, AUSTRIA, 2007

In June 2007, an Urban Task Force (UTF)[1] of Isocarp[2] was invited by the Municipality of Schwechat and the International Airport of Vienna (VIE) to offer its planning experience and produce ideas from an international perspective on pressing planning issues of a region with great development potential, owing to the demise of the iron curtain.

The key aspects on which the hosts sought the advice of the UTF were transport, innovation and cooperation. In particular, they wanted to harness the existing multi-modal transport infrastructure, while transforming the area from a transport into a knowledge hub, and improve cooperation at local, regional and international levels to that effect.

The main threats perceived by the Schwechat municipality as obstacles to successful development were:

- the risk to become a low value-added logistics node;
- being blighted by through traffic, generated to a great extent by the commuting workforce of the airport and major industries;
- constraints on housing development by aircraft noise, exacerbated by the planned third runway, and by its Vienna metropolitan green belt status.

Conversely, Schwechat saw significant opportunities owing to:

- its location in the buoyant city-region of Vienna;
- its multi-modal supra-regional transport infrastructure of road, rail, air and water; and
- the reconnection with its traditional supra-regional hinterland in Central and Eastern Europe.

The UTF proposed a single bold development scenario as a basis for further strategic planning and implementation at international, regional and local levels[3]. It recommended greater cooperation between the protagonists of the region, and, in particular, between the municipality and the international airport to achieve negotiated development strategies, and to establish new instruments of governance for their implementation. A concrete idea was to combine Schwechat's existing industries and brands, its outstanding transportation networks and its exceptional green spaces to strengthen the competitiveness of its local economy. These physical assets, together with existing links with Vienna's Technical University would

[1] Urban Task Forces, now Urban Advisory Planning Teams (UPAT) are provided by experienced planners. They consist of six senior members of Isocarp assisted by six young local planners. In Schwechat the international team of planners was from Argentina, India, Serbia-Estonia, Netherlands, Spain and the UK.

[2] Isocarp: International Society of City and Regional Planners

[3] Outcome of the Urban Task Force of the International Society of City and Regional Planners (Isocarp) in Schwechat, Austria, 9-17 June 2007, by Judith Ryser, Urban Task Force leader. Isocarp

enable Schwechat to attract, train and retain knowledge workers to advance its own knowledge economy and to contribute to a high value-added airport expansion. The UTF proposed to locate the new knowledge hub as a physical link between the town centre and the airport as part of a polycentric development structure[4].

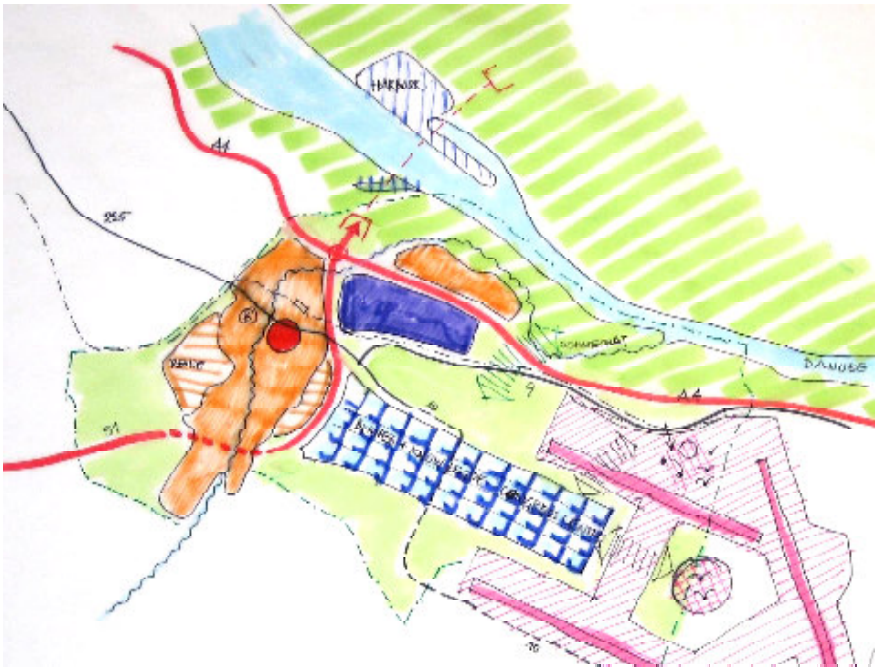

Fig. 1: Isocarp UTF 2007: synthetic visualisation of ideas

2.1 UPAT Evolution

A new initiative of the Isocarp UPAT programme is to revisit selected places and find out what impacts UPATs had on their development strategies. Schwechat is of particular interest as international airports were deeply affected by the global recession and experienced serious development challenges with direct repercussions on the places where they are located.

This paper is proposing a series of questions with the aim to provide a new insight into Schwechat's development strategies in changed circumstances. The questions are based on the objectives and briefing notes which the clients had prepared for the 2007 UTF. They are also put into the context of information currently available in the public domain (internet) about changing circumstances of Schwechat and Vienna International airport. The questions constitute a framework to find out what progress has been made, how the clients may had been obliged to reorientate their objectives due to a changed context, how useful the UTF advice had been, and what it may still be able to contribute at present.

Subsequently, this survey will include interviews with key protagonists, institutions and businesses which play a role in Schwechat's local economy and its future. Further, the original UTF members will be invited to give comments on these findings. This follow-up work has two aims. One is to find out whether and what concrete influences the UTF had on planning of the municipality of Schwechat and on development strategies of the Vienna international airport. The second aim is to provide feedback on the UPAT process (based initially on this pilot assessment) to assess its current uses and provide inputs to longer term objectives.

3 EVIDENCE OF CHANGE IN SCHWECHAT

From information available in the public domain, changes in contextual circumstances are identified which have been affecting the key protagonists and their actions considered by the UTF in 2007. Clearly the unexpected economic recession is hampering the rather bold and optimistic UTF perspective. Nevertheless, such drastic changes are able to throw light on the robustness of longer term scenarios and expose generic development contradictions. They may be usefully studied during periods of stagnation to provide fresh insights towards future development strategies, and UPATs could play a useful role in this process.

[4] op.cit p18, diagram p19

Comparing current development strategies with the visions put forward by the UTF are an experimental step in that direction.

3.1 Vienna City-Region

The Atlas[5] of the regional planning cooperation Vienna, Burgenland and Lower Austria (PGO)[6] which contains Schwechat shows the growth dynamic of the Vienna city-region. It concludes that the city region is forming a contiguous whole of 2.6 million inhabitants (1.67 m thereof in the city) with Vienna growing by 250,000 by 2031. The city region will have reached 3 million population by 2030, mainly due to national and international immigration which the region is well equipped to accommodate. Functional structural changes include suburbanisation away from the high density of Vienna by families seeking home ownership where they can still benefit from the city's facilities due to good road and public transport links. Migration is determined by lifecycles, re-urbanisation being ainly due to young learners and job seekers, not by the elder generations as often assumed. Locational choices depend on land prices, housing costs and availability, less on accessibility. Good schools, social provisions, shops, infrastructure, green areas, job availability, image of the area are other locational attractors. Dormitory towns and extreme sprawl are disliked, although problems might occur in the longer term if population pressures persist.

PGO has also studied relations between the Vienna city region and the Bratislava conurbation[7] and its wider hinterland growing by 400,000 in the next ten years. In the light of the implementation of the Schengen agreement in 2007 this dual city region may grow rapidly and evolve towards greater convergence. There is a proposal to set up a city-hinterland management and information system to foster balanced development, including the preservation of nature with cycle lanes and footpaths. Improving public transport between Vienna and Bratislava is a major concern and its Euro-region status is relevant, especially as the Bratislava city region tends to expand into Austria.

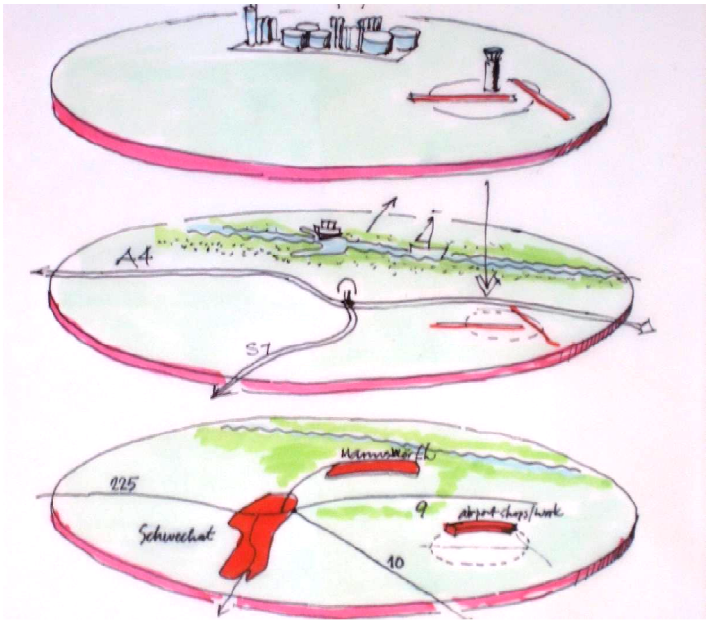

Fig. 2: UTF: interdependent levels of decision making in Schwechat

A regional study of population distribution, economic activities, commuting, and recreation shows the favourable economic position of Schwechat and its overall development potential[8]. However, healthcare and especially its retail is losing to surrounding supermarkets and hospitals which affects the livelihood of the town centre. Conversely the airport contributes to increased tourism.

Contradictions between green belt preservation and housing expansion of Vienna onto Schwechat is not documented in the public domain, despite high commuting to and from Vienna and Schwechat's aspiration to town status by increasing its population from 15,500 to 20,000. The PGO maintains an active role in

[5] H Fassmann,P Gorgl, M Helbrich. 2009. Atlas der Wachsenden Stadtregion PGO (Planungsgemeinschaft Ost).
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regional spatial planning and management, but the degree of cooperation with the lower tier authorities, such as Schwechat is not explicit. For UPATs the generic issue is one of democratic consensus building between vertical layers of governance and reconciliation of objectives which vary with geographic scale.

3.2 Schwechat Municipality

Schwechat's website[9] caters for local demands and services. Its development strategies are summed up in twelve principles with some project proposals.[10] The development plan cannot be easily accessed on-line, but information is available on all aspects on request. There is feedback on Schwechat's demand that the airport should provide extensive ground traffic mitigation related to the third runway.

The tenor after a return of a socialist government (on 14/03/2010) with low participation and reduced numbers is to provide for the needs of all inhabitants of "Schwechat, Industrial Town". They should benefit from a wide spectrum of jobs at the international airport, as well as from Schwechat's efforts to protect the environment and provide social infrastructure for those in need.

Vienna's plans for Kugelkreuz for 4000 high value added service workplaces on land it owns in Schwechat are presented on Schwechat's website. The mayor stresses that the CEIT technology centre and the two education and training colleges he instated in Schwechat are proof of Schwechat's own proactive stance to achieve a high-tech innovative local economy to the benefit of the local community for which Schwechat has installed free wifi. He insists on the need to extend public transport related to this development as contribution to Schwechat's high quality of life in line with its sustainability agenda.

The recession may have toned down Schwechat's ambition of an international, or at least a supra-regional role in the central European growth process. The image projected in its twelve development principles is one of incrementally improving the status quo, rather than one of a radical leap towards the knowledge society.

Keen to balance diverse interests and to cater for all the citizens the mayor did not appear to receive the expected responses to his efforts of communicating and engaging with his constituents. He could mobilise the local knowledge capital to gain greater understanding of such apparent apathy. For UPATs this raises the conflictual issue of gentrification, recipients of its economic benefits and uneven social and spatial repercussions on local society.

3.3 Vienna International Airport and BTS (Bratislava Airport)

Vienna International airport (VIE)[11], privatised in 1992 and owned by the city of Vienna (20%), the regional authority of Lower Austria (20%), airport staff (10%) and share holders (50%) went it alone after its failed cooperation with Bratislava airport to become a powerful international Central European hub. Used by Austrian Airlines as its hub it specialised in Eastern European and Middle Eastern flights, and became an important transit node due to its fast turnaround capacity facilitated by its own ground handling. A new terminal, traffic control tower and third runway were to support its strategy of aggressive expansion, although it did not have the ambition to become an airport city in its own right at the time of the UTF.

The economic crisis reduced air traffic considerably and damaged a number of carriers, including Austrian Airlines. Lufthansa took it over without depriving it of its hub position in Schwechat. Its recovery in 2010, together with that of charters may bring about VIE's revovery before other European airports. While completion of the Skyline terminal is pursued no timetable is published about the third runway. This may revive local resistance, despite previous civic negotiations and environmental impact analyses.

[9] http://www.schwechat.gv.at/fs1/cs1/home/

[10] Sustainable development; commitment to Industry City Schwechat (full employment, balance between residents and workplaces, technical innovation, etc); economic efficiency and value for money, need-based social services, quality standards; anticipation and prevention, healthy cities objectives, regional centre of retail and services, sustainable traffic; help for self-help, foster housing provision, sustainable energy use; social and infrastructure provision for all with attention to special needs; protection of precarious activities and people; balance between different social groups, housing supply, access to jobs and education; foster communication between public sector and citizens, different social groups, the city and the economy; cooperation and coordination of social networks, education, transportation and technical infrastructure at national, regional and local level; comprehensive and active public participation; development within super-regional and international context, social provider of the region, core role for eastern Vienna city region.

[11] http://www.viennaairport.com/

The wholly publicly owned Letisko M R Stefanika Airport Bratislava (BTS)[12] became a budget airline hub with strong seasonal fluctuations. Ryanair has become its main carrier while other airlines ceased their operation, including national ones. BTS suffered a steep decline in 2009 (-23%), especially in domestic flights (-44%), but managed to attract cargo traffic. De facto, BTS assumes the complementary role to Vienna airport which was envisaged during merger negotiations, except that it now faces stiffer competition from VIE for cheap flights.

Austria is still planning to intensify its regional rail network with connections to a new station at VIE airport and links to both Bratislava and its airport, but the latter connection may be less complementary than competitive as VIE, used by a total of 128 airlines, has increased its budget airlines.

The bold UTF proposal to create a synergetic knowledge and technology base of international importance, shared between the municipality and the airport (see figure 1), formed part of the third runway construction. Neither body may have the investment capital, nor the appetite to pursue such an undertaking now. Nevertheless, continuous dialogue between the municipality and the airport would be beneficial for both and perhaps the work[13] carried out for the airport by local authority supported CEIT may constitute such a link. The topics for UPATs are the potential competition between the livelihood of an existing town centre and an independent airport city, as well as the type of governance required to avoid damaging conflicts and duplication and to create synergy instead to the benefit of both the municipality and the airport, as well as the region as a whole.

3.4 Central European Institute of Technology

The Central European Institute of Technology (CEIT)[14] was actively involved in the UTF. This ambitious institution set up by the municipality in 2006 combines education and training, R&D aiming at assisted living, ICT supported planning, and evidence based development strategies for transportation, the environment and spatial economy. It epitomised the driving force which could pro-actively contribute to the transformation of Schwechat from an industrial town into a knowledge society. It has carried out several projects on airport cities, airports and climate preservation,[15] multiple use bus transportation stops, SDI for spatial planning for Plan4all, coordinated CentropeMAPs based on spatial data sets of the Centrope region, and other technology innovations through international cooperation. It makes a major contribution to eSchwechat, eHealth and renewable energy. It is thereby establishing Schwechat as a high value-added research and technology environment for innovative companies. Its education and training activities in technology fields and its links to the Vienna Technical University consolidate its knowledge base.

Its membership of international Living Labs provides broad exposure to its R&D. As it uses the local population as testing ground there is direct local benefit from international cooperation and knowledge exchange. Its contribution of knowledge to the airport is another local link with international repercussions. Its work for Centrope is creating a link to a supra regional political body which could influence development strategies through concrete cross border projects to which CEIT could contribute analytical capacity. CEIT has the potential to cooperate more closely with local industries and the local planning process, and it could give itself greater exposure by linking itself to other information outlets locally as well as nationally and internationally, such as the Vienna Technical University, the EU frameworks of research and technology development and demonstration activities (CORDIS) and, in particular, the new Competitiveness and Innovation Framework Programme (CIP). CEIT could assume a hub function of clusters in targeted fields, such as ICT, with direct benefits to the locality.

CEIT has clearly the potential of intellectual capacity building at local, regional and international level and thus to create vertical synergy which is often the weak link of spatial development strategies. The implication for UPATs is to secure links with such institutions in order to establish some continuity to enhance the effectiveness of their interventions. UPATs could harness their potential more as catalysts between levels of policy and decision making which may be one of their most effective contributions.

[12] http://www.airportbratislava.sk/index
[13] ‚AIRCLIP' research on potential international best practice related to land based activities at airports
[14] http://www.ceit.at/
[15] Airclip, CEIT with TAKE OFF. 2009, for the Austrian Ministry of Traffic, Innovation and Technology

3.5 CENTROPE – Central Europe Region

Centrope[16] created in 2006 comprises 6.5 million population. It is the fastest growing region in Europe with a growth rate only surpassed by South Asia. Supported by the EU InterRegio programmes, it offers the best of east and west for inward investment. For that reason, politicians from sub-regions in Austria, the Czech Republic, Slovakia and Hungary with Vienna at its core have created a body with a decentralised management structure, based on voluntary cooperation and diversity. This enables the partners to pursue pro-active development strategies to their mutual benefit. Centrope was active and ambitious before the economic crisis, also participating in the meta-regional projects of links between the Adriatic and the Baltic passing through the region.

Its 2015 vision[17] focuses on cooperation in science, education and culture. Its assets are a competitive, economic, skilled workforce also for traditional industries, a network of higher education institutions, technological innovation centres with an outstanding technology-oriented R&D capability, an NGO academy, an open and supportive political strategy towards SEMs and inward investment, modern infrastructure, propensity for logistics, and a multimodal efficient transportation network. Its high quality of living environment includes local food production, sustainable waste disposal and energy generation and it attracts tourism as well as knowledge workers. Its marketing builds Centrope's identity while maintaining its diversity. An example is the 'region of 1000 unique features' tourism route[18]. However, language barriers may remain a constraint. Centrope set up a data base with analytical capacity and common strategies for cross border, multi-modal infrastructure development. The complexity of a culturally diverse extra body of decision coordination was an issue, together with national allegiances which may weigh more during recession.

How much of its vision has been implemented is not stated on Centrope's website which does not publish the outcomes of the annual conferences of its political management. News stops with the 2007 conference on 'business location Centrope' and there is neither a follow up of its vision nor its undated 'European courtyard' notion[19]. Newsletter 6 on Economic Area dates of 2007. Not mentioned on the Centrope website is CITT, Centrope's ICT Technology Transfer and its latest EU supported initiative[20] which held its first conference in Vienna in March 2010[21].

Lack of up to date information points to lack of Centrope activities, due to the recession and possibly declining EU subsidies. It points to weakness in governance of cross border cooperation, despite its great potential and the growing trends towards supra- and mega-regional strategies in the USA[22] and also in Europe[23]. Small communes like Schwechat may feel powerless within such a complex, large scale setting, although they could play a crucial role in real life experimentation and implementation. The UTF Centropolis vision with a Freeport in Schwechat would have been such a pilot opportunity. Lessons for UPATs concerns are very large scale development strategies for which there is no obvious political or civic ownership and, more generally, the level of abstraction of meta-regional long term visions.

[16] http://centrope.com/ http://www.centrope.info/
[17] Centrope. 2006. Vision 2015, we grow together we grow.
[18] e.g. Issue No 1: Wine and Architecture. Erlebnisse im Zentrum Europa's
[19] Centrope White Book for Centrope Themeworld. Undated. Arthesia AG CH, for FDI Centrope project (Interreg IIIA initiative).
[20] http://centrope.ceconsult.biz/
[21] Centrope ICT Techology Transfer. 16/03/2010. Vienna. FP& project: capacities –coordination and support action / regions of knowledge. Coordinated by VITE. www.centrope-itt.eu
[22] e.g America 2025, national planning strategy proposed by the Regional Plan Association.
[23] The French Voluntary SCOT regional strategic planning initiative has produced positive results, e.g Loire Valley, Montpellier, Paris region.
Building the European Diagonal was an initiative by the Fundacion Metropoli to create a new mega-region for spatial development strategies. Judith Ryser (ed). 2008. Building the European Diagonal. Fundacion Metropoli

4 UTF SCENARIOS AND THEIR LIKELIHOOD OF IMPLEMENTATION

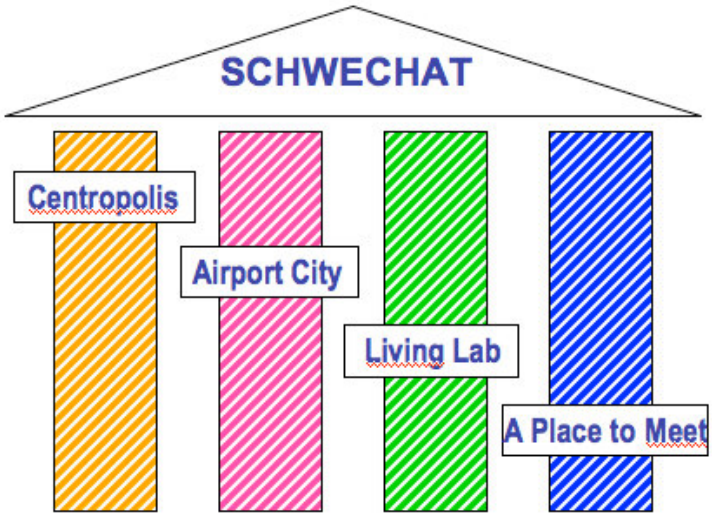

Fig. 3: UTF: four pillar scenarios

Among its twelve principles of city development Schwechat acknowledges the importance of supra-regional and international developments and advocates openness and tolerance towards intercultural and integrative forces which Schwechat is in a good position to shape to its advantage. However, this does not include pro-active pursuits such as the UTF's Centropolis vision which assumed a prominent role for Schwechat in harnessing the central European development potential. Similarly, the UTF's airport-city scenario is far from the priorities of an airport struggling for its recovery.

In the absence of data on new ICT inward investment in Schwechat and CEIT not forming part of the ICTT project of Centrope, Schwechat does not hold a prominent role in the consolidation of information technology in the region by creating clusters and networks of indigenous capacity and promoting them internationally. Schwechat can still harness its local base for its Living Lab activities which have innovation and export potential, possibly as a specialised niche. This activity is underpinned by a number of Schwechat's principles of assisted self-help, small business and innovation support, provision for the disadvantaged, improved communication between social groups and citizen participation. It still means that CEIT would have to become self-sufficient in a viable economic future.

The UTF's scenario with the most local outlook, 'a place to meet', seems to be the most likely to emerge. Most Schwechat's principles comprise a dimension of sustainability, be it for public transport, housing, the environment or social provisions. Also, the municipality has direct powers to implement many aspects towards such a scenario. This includes the revitalisation of the town centre with animation programmes and the involvement of citizens and local businesses, the preservation of the high environmental quality of the towns and villages in the municipality and the open spaces between them, assets which the industrial town image tends to obscure but which are very appreciated by residents, workers and visitors, also from Vienna. This strategy should also include a more forceful effort to provide housing capable of attracting commuters to settle in Schwechat. This objective does not figure explicitly among the twelve principles, except as a target to bring numbers of residents closer to numbers of workplaces. Indirectly, this would solve a series of Schwechat's problems, as it would remove pressure from the transportation networks, reduce pollution and retain more consumers within the municipality to support local services and commerce.

5 ORIGINAL UTF BRIEF OF 2007 AND 2010 QUESTIONS

From these reflections on publicly available evidence related to Schwechat's future development, the likelihood of UTF scenarios in the changing circumstances, and the original questions of the 2007 UTF brief, a set of structured questions have been devised for interviews with the key protagonists and for feedback from the UTF team to draw lessons for the future on cooperation by international planning experts towards practical political and commercial decision making on development strategies.

In 2007, Schwechat's goal was "to generate a liveable city where people like to live, work and consume, equipped with a quality of life with which every part of the population can identify in its own way". The

contribution of the UTF was to provide concrete suggestions towards realising this goal through planning mechanisms. The 2010 questions below have been selected to find out what the local authority and the international airport have done to introduce changes of their own or in response to the proposals of the UTF on the three selected aspects, transportation, innovation and cooperation, originally singled out for consideration by the UTF.

5.1 Transportation

Schwechat has great locational advantages as a multimodal transportation hub. The drawbacks are environmentally damaging through traffic and loss of quality of life in the town centre. The 2007 objectives were:

re through traffic:

- reduce through traffic
- reconcile traffic growth projections with traffic calming
- alternative traffic routes
- shift cargo from lorries to rail

re revitalising the city centre

- revitalise city centre activities and attract users (by traffic calming)
- stimulate economic viability of the city centre
- design an appropriate physical functional shape
- extend the functional influence of the city centre to its surroundings

Questions 2010

re through traffic

has the local authority monitored the impacts of its traffic calming scheme of the high street?

if yes, what measures has it taken to act upon the findings?

has it undertaken further traffic calming in the city centre?

If yes, was it based on monitoring results?

has it explored locations for bypasses for through traffic?

If yes, has it amended its development plan?

(e.g. introduced the idea of an eco-boulevard as proposed by UTF?)

has it studied the potential positive and negative impacts of shifting traffic out of the city centre?

has it undertaken experimental closure to test the scenarios? (e.g. Geneva experiments)

has it measured the effects of the completion of the eastern motorway ring on through / local traffic?

if yes, and impacts were negative or neutral, has it altered the local network and its connections to the motorway?

has it studied how it could increase local public transportation supply?

in connection with better high speed connections between Vienna and the airport and to the east

has it explored what would be required to shift freight from lorries to rail?

has it found out which partners would need to be involved?

re revitalising the city centre

has the local authority introduced mixed uses and more housing in the city centre?

if yes, has this policy been formally incorporate in the local development plan?

has it explored incentives (or constraints) to stimulate the uptake of mixed development?

if yes, did more people move to the centre, did more shops return?

if yes, what effect did this have on local mobility?

has it taken measures to extend the influence of the city centre to its wider surroundings?

if yes, what were they and how have they contributed to the regeneration of the centre?

5.2 Innovation

Schwechat has the ambition to convert itself from a transport hub into a knowledge hub. The municipality has an industrial tradition with high land consumption. Similarly, it has a dense, multimodal transport infrastructure network which may attract low grade, land hungry logistics instead of high value added economic activities. While building on its industrial strength and curbing its adverse impacts the local economy needs innovative diversification. The municipality initiated e-Schwechat to that effect. The expectations in 2007 were:

re economic diversification

- make the existing industrial economy more sustainable
- attract new competitive firms
- diversify the local economy
- offer state of the art infrastructure and high quality living conditions

re town marketing

- make Schwechat known as a competitive business destination
- publicise its favourable international location
- participate in virtual networks

Questions 2010

re economic diversification

has the local authority managed to curb industrial pollution?

if yes, to what extend, with what long term commitments?

has it managed to attract new modern industrial firms to reinforce the industrial cluster effect?

if yes, how do they cooperate, complement or compete with existing firms?

has it taken physical planning measures to attract new companies?

if yes, has it made land and/or premises and infrastructure available?

has it worked on other conditions to attract innovative service industries?

if yes, has it contributed to (re-)training and skill provision

has it studied the feasibility of attracting congress tourism and related activities?

if yes, what are its conclusions and action plan?

has it attracted new innovative (service) businesses?

if yes, how many, which types, with which incentives?

has it taken concrete measures to avoid becoming a preferred location for low grade, land hungry logistics due to its dense multimodal transport infrastructure?

if yes, which measures, and how are they being implement?

re town marketing

has the local authority set up a marketing strategy?

if yes, what is it and how is it disseminated?

has it managed to overcome the contradiction between an industrial image and a green city?

if yes, with what measures, to what effect?

has it taken measures to change its image and market itself as a leisure and health destination?

if yes, has it monitored visitor numbers, their activities, spending pattern and length of stay?

has it built up a professional and international marketing capacity?

if yes, has it marketed its privileged location as a "4-country corner", its proximity to Vienna and its airport and its exceptional open spaces along the Danube, the Schwechat river and the Vienna green belt?

5.3 Cooperation

Schwechat enjoys a favourable position as it can benefit from the future development of the eastern region of Austria, also beyond its national boundaries due to the extension of the EU. Centrope, a political structure of voluntary cross-border cooperation between regions in four adjacent countries (Austria, Czech Republic, Slovakia and Hungary) at supra-regional level offers new development opportunities. Planning cooperation (Planungsgemeinschaft Ost) between three Austrian Laender (Vienna, Burgenland and Lower Austria) identifies Schwechat's regional strategic position. At the metropolitan level, Schwechat forms an integral functional part of Vienna's growing conurbation and can take advantage of the presence in its municipality of energy supply, port, motorway ring-road and multimodal transport infrastructure and especially Vienna's international airport. Schwechat's aspirations were as follows:

re cooperation at international, regional and local levels

- strengthen cooperation with the city of Vienna, the city region and supra-regional opportunities
- take part of the growth dynamic of the Vienna conurbation
- exploit new economic opportunities arising from closer openness toward Eastern Europe
- seek dialogue and cooperation with international companies and increase competitiveness
- develop international city to city relations

re relation between the international airport and the city

- improve cooperation and coordination between the international airport and the municipality
- deal with possible contradiction between an emerging airport city and the traditional city centre
- identify and share complementary activities (eg housing provision for commuters)

Questions 2010

re cooperation at international, regional and local levels

has the local authority taken advantage of Centrope?

if yes, in terms of what concrete projects or benefits?

has it initiated independent cooperative ventures with regions beyond its own and national borders?

if yes, what are they, and with which local authorities, companies, other institutions?

has it taken advantage of its functional importance by obtaining new roles for Vienna?

if yes, what are they, and what are the concrete and material benefits?

has it taken pro-active initiatives to cooperate with international innovative companies?

if yes, with which companies, for what purpose, under which contractual arrangements?

re relation between international airport and the locality

has the local authority examined potential adverse impacts of airport growth on the municipality?

if yes, what are the potential impacts, how can they be resolved, by whom?

has it explored whether an airport centre can coexist soundly with the city centre?

if yes, what are the findings and what measures are proposed?

has it studied the requirements of airport growth on transport infrastructure?

if yes, what are they, and how will they be carried out and financed?

has it undertaken steps to initiate shifts between multimodal transport?

if yes, has it made proposals of shifting staff and passengers from car to public transport?

has it negotiated a division of labour between services at the airport city and those of the city centre?

if yes, which services, businesses, under what conditions and/or responsibilities.

6 UTF OUTCOME 2007 AND UPTAKE BY THE CLIENT 2010

Besides the single spatial scenario produced by the UTF in 2007 to synthesise its ideas for Schwechat's transformation from a transportation hub into a knowledge hub (see figure 1), the UTF suggested specific actions. They were conceived around four functional scenarios at different scales: Centropolis, Airport City, Living Lab, A Place to Meet (see figure 2). Detached from everyday local constraints and reality the purpose of the UTF was not to undertake existing planning functions but to contribute ideas towards the future of the region and the chances of their implementation.

The UTF used its potential as a catalyst to suggest closer relations between Schwechat, regional protagonists and, in particular, the international airport, to benefit from synergies in improving local conditions, including new forms of local governance to contribute to institutional capacity building.

re establishing synergies between the municipality, the international airport and others

cooperative – negotiated development strategies

- conceptualise development strategies through cooperation between the local authority, the airport and other main workplaces (refinery, plastic factory, brewery, etc), and ways of implementing them

sound and transparent evidence base

- develop an easily accessible, user friendly evidence base as a powerful support of development strategies:
- disseminate and explain planning proposals and strategies to the local community and beyond;

create a regular discussion forum open to all to identify potential conflicts early innovative governance and institutional capacity building

- build on existing new institutional structures through more active participation, e.g, Centrope;
- initiate new horizontal structures for cross-functional cooperation and coordination on a project basis;
- set up an interactive contact point at the municipality for regular information exchange and project exploration, inviting suggestions from the main businesses, local interest groups and civil society.

Questions 2010

Has the local authority worked out an evidence base (SWOT) for alternative spatial plans, taking into accouont the economic downturn?

if yes, where is the evidence available and to what development strategies has it led?

has it costed all its initiatives and explored sources of funding?

if yes, has it consulted on the budget and put the results into the public domain?

has it attempted to implement ideas and suggestions of the UTF?

if yes, which aspects, and with what results?

For both parties, the last question is probably the most relevant regarding future UPATs and their usefulness in practice. One expected outcome of this analytical survey is to provide some empirical base for a debate on the future orientation of UPATs. More generally, the results would provide a concrete and informed basis for future decision makers to seek independent advice from professional planners.

7 CONCLUSION

This paper is a speculative follow-up of an Urban Task Force which Isocarp provided on the invitation of the Municipality of Schwechat and the Vienna International Airport in 2007. The purpose of the survey, once the questions are answered by the key protagonists who requested planning inputs from the UTF to their benefit, is to draw some lessons from such short term interventions by professionals without local knowledge but well versed in a broad range of planning issues in countries throughout the world. One aspect is to examine

what such varied cultural perspectives can contribute in the light of little knowledge of local circumstances, and whether they can have a catalytic effect beyond the scope of local expertise. The exceptional changes in economic circumstances may skew the outcome of this particular survey, but they are also testing the robustness of long term scenarios which should withstand unpredictable contexts.

Wien – vom Rand des Eisernen Vorhangs zu einem zentralen Knotenpunkt der EU-Makroregion Donauraum

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1 NEUE ROLLE WIENS IM GEFOLGE DES FALLS DES EISERNEN VORHANGS

1.1 Geopolitische Lage und hohe Lebensqualität als Plus

Vor mittlerweile mehr als 15 Jahren ist Österreich der EU beigetreten, im vergangenen Jahr konnte 20 Jahre Fall des „Eisernen Vorhangs" gefeiert werden. 2004 ist die Europäische Union um zehn mittel- und osteuropäische Staaten gewachsen, 2007 traten Rumänien und Bulgarien bei. Ein geteiltes Europa und Österreichs temporäre Rolle als Außengrenze der EU gehörten damit endgültig der Vergangenheit an. Wien rückte von einer Randlage ins Zentrum eines neuen Europas. „Wenngleich die strategische und alltagspraktische „Verarbeitung" dieser grundlegenden Veränderung noch Jahre dauerte und letztlich noch heute in Gang ist, spricht einiges dafür, den Übergang von den achtziger zu den neunziger Jahren des 20. Jahrhunderts – wenn auch nicht ausschließlich 1989 – als deutliche Zäsur in der Planungsgeschichte Wiens zu sehen.")

Gleichzeitig mit den Entwicklungen auf europäischer Ebene konnte in den letzten Jahren eine Stärkung der Regionen und der Stadträume beobachtet werden. Im Sinne einer „Renaissance of the cities" gewinnen städtischen Ballungszentren immer stärker an Bedeutung, leben doch immerhin 80 % der EU-Bürger/-innen in Städten (etwa 60% davon in größeren Ballungsgebieten mit mehr als 50.000 EW).

Die neue geografische Lage, die Stärkung der Metropolenregionen sowie die Tatsache, dass Wien über beste Verbindungen zu den neuen Wachstumsmärkten in Mittel- und Osteuropa verfügt, bietet optimale Chancen, um gemeinsam mit den Partnerstädten und -regionen ein prosperierendes Zentrum in der Mitte Europas zu bilden. Die guten Beziehungen mit den Nachbarstädten sind Voraussetzung zur Nutzung der gemeinsamen Möglichkeiten, die weiter ausgebaut werden müssen. Ein wesentlicher Schritt dazu war und ist die Initiative CENTROPE. Der Aufbau nachhaltiger Beziehungen in dieser Region zeigt, dass Konkurrenz und Kooperation einander nicht ausschließen.

Im Wettbewerb mit den (europäischen) Städten und Stadtagglomerationen hat Wien aufgrund seiner Zusammenarbeit mit dem Stadtumland sowie den benachbarten Regionen Tschechiens, der Slowakei und Ungarns eine gute Ausgangsposition. Auch mit den Kooperationsformen über die Planungsgemeinschaft Ost (PGO) in der Länderregion Wien, Niederösterreich und Burgenland sind gute Voraussetzungen dazu gegeben. Nicht zuletzt allein aufgrund der räumlichen Nähe der „Twin-Cities" Wien und Bratislava (rd. 60 km) ist die Entwicklung gemeinsamer Strategien naheliegend. CENTROPE soll dabei helfen, diese Region, in der rund sechs Millionen Menschen leben, als überregionalen Entwicklungs- und Wirtschaftsmotor zu etablieren und dabei die wertvollen Grünräume (Nationalpark Donauauen) als „grüne Mitte" nachhaltig zu sichern und zu erhalten.

Für Wien eröffnen sich die Chancen, sich nicht nur aufgrund seiner geopolitischen Lage, sondern auch wegen seiner hervorragenden Lebensqualität weiter als Standort für Unternehmenszentralen zu positionieren. In internationalen Standortrankings steht Wien hinsichtlich seiner Lebensqualität (von der Umweltqualität über eine funktionierende Verwaltung bis hin zu den sozialen Standards und dem kulturellen Angebot) stets an führender Stelle. So wurde Wien 2009 vom renommierten Beratungsunternehmen Mercer in seinem internationalen Städtevergleich auf Platz 1 gereiht.

Hinsichtlich der wirtschaftlichen Situation zählt die Metropolregion Wien innerhalb der EU nach wie vor zu den wirtschaftsstärksten Regionen, die aufgrund der geografischen Nähe zu den neuen Mitgliedsstaaten Slowakei und Ungarn eine besondere Ausgangssituation aufweist. Laut jüngster Statistik der Eurostat liegt die Region Wien hinsichtlich Kaufkraft an 11. Stelle und zählt damit zu den 20 Regionen in Europa mit höchstem Bruttoinlandsprodukt.

Zwischen 2005 und 2008/2009 zeigt die Wirtschaftsentwicklung in Wien einen durchwegs positiven Verlauf, wobei die Wirtschaftskrise Mitte 2008 natürlich auch an Wien nicht spurlos vorübergegangen ist. Wien erweist sich jedoch deutlich resistenter gegenüber den Auswirkungen als andere, nicht zuletzt aufgrund der

Branchenstruktur, dem hohen Anteil der öffentlichen Verwaltung und vor allem aufgrund der umfassenden Infrastrukturpakete, die eingeleitet wurden.

1.1.1 Ausbau der Verkehrsinfrastruktur

Wesentlicher Eckpfeiler in der regionalen Kooperation und Voraussetzung für eine wirtschaftliche Weiterentwicklung ist der Ausbau der Verkehrsinfrastruktur. Ziel der Verkehrspolitik ist es, den Güter- als auch den Pendlerverkehr so weit wie möglich auf die Schiene zu verlagern.

In der West-Ost-Richtung verläuft mit der Donau eine der wichtigsten Wasserstraßen Europas durch beide Städte der Twin-City-Region Wien/Bratislava; zudem bildet die Region einen zentralen Knoten der Bahnverbindungen zwischen Paris und Budapest (der sogenannten „Magistrale“). Gleichzeitig gewinnen gerade im zentraleuropäischen Raum auch die Nord-Süd Verbindungen an Bedeutung. Durch die EU-Erweiterung haben der Donauraum als natürlicher Korridor und die Eisenbahn-Magistrale enorm an Bedeutung gewonnen. Die Vienna Region, aufgewertet durch die EU-Erweiterung, setzt in die Weiterentwicklung der angrenzenden tschechischen, slowakischen und ungarischen Teilregionen große Hoffnung. Dies bedeutet auch neue und bessere Chancen für die Wirtschaft, Fremdenverkehr und private Mobilitätsbedürfnisse. 2009 unterzeichnete der Wiener Planungs- und Verkehrsstadtrat DI Rudi Schicker gemeinsam mit den Oberbürgermeistern von Bratislava und Karlsruhe, Andrej Durkovsky und Heinz Fenrich, die Twin-City-Deklaration der Initiative "Magistrale für Europa". Die Initiative besteht aus Städten, Regionen und Wirtschaftsvertretern/-innen entlang der europäischen Bahnachse von Paris über München, Wien bis nach Bratislava bzw. Budapest. Ihr Ziel ist es diesem 1.500 km langen Bahnkorridor, in dem ca. 34 Mio. Menschen leben, eine zentralere Bedeutung innerhalb des europäischen Eisenbahnnetzes zu verleihen. Im Zuge der „Magistrale für Europa“ wird auch der neue Hauptbahnhof für Wien, das vitalste Schlüsselprojekt in der Infrastruktur, von der EU kofinanziert.

Aber auch die Straßeninfrastruktur soll ausgebaut und verbessert werden. In diesem Zusammenhang ist die Schließung des Regionenrings für Wien, wie auch die Errichtung der Nordautobahn, dessen südliches Teilstück kürzlich eröffnet werden konnte, zu nennen. Generell drängt die Stadt Wien seit langem auf die Verbesserung der Schienen- und Straßenverbindungen in der Ostregion. Allein es liegt nicht in der Kompetenz des Landes Wien – hier sind vor allem Entscheidungen auf Bundesebene gefragt.

1.2 Bevölkerungsentwicklung

Wien ist seit der Jahrtausendwende von einer deutlichen Zunahme der Bevölkerung geprägt (durchschnittlich ca. 15.000 Personen pro Jahr). In den Jahren davor – seit Mitte der 1990er-Jahre – war die Einwohnerzahl in etwa konstant geblieben, wobei der Stadtentwicklungsplan 1994 – nicht zuletzt aufgrund der Ereignisse im Jugoslawienkrieg und einer verstärkten Migrationsbewegung – von einem deutlichen Bevölkerungswachstum ausgegangen ist.

Die aktualisierte Bevölkerungsprognose der ÖROK aus 2005 verzeichnete ein Wachstum im Ballungsraum Wien (Wien und Umland) um rund 450.000 Einwohner/-innen bis 2035, davon in Wien um nahezu 300.000 EW.

Wien verzeichnet bereits seit einigen Jahren die höchsten Zuwächse aller österreichischen Bundesländer. Dies vor allem aufgrund von Wanderungsgewinnen, seit 2004 auch infolge positiver Geburtenbilanzen. In der Donaumetropole stieg die Bevölkerungszahl 2009 mit 0,7 Prozent dreimal so stark wie im Durchschnitt.

Im Zeitraum 2005-2009 entwickelte sich die Bevölkerung Wiens sehr dynamisch. Im genannten Zeitraum erhöhte sich die Einwohnerzahl um 54.702 Personen (25.940 Frauen/28.762 Männer), das entspricht einer Veränderung von 3,4% (Österreich: 1,9%).

Der Einwohnerzuwachs ist weitgehend auf intensive Zuwanderung aus dem Ausland zurückzuführen, wobei im Unterschied zu früheren Perioden in den letzten Jahren verstärkt Personen aus den EU-15-Ländern, und hier vor allem aus Deutschland, nach Wien einwandern. Deutsche Staatsbürger/-innen stellen damit eine der größten Gruppe innerhalb der Zuwanderer/-innen dar, ihre Zahl hat sich seit dem Jahr 2005 um fast 54% erhöht. Im Vergleich dazu sinken bzw. stagnieren die Anteile der Staatsbürger/-innen aus den traditionellen Herkunftsländern (Ex-YU von 7,1% auf 6,9%, Türkei 2,4%).

Diese neuen Wanderungsbewegungen bringen es auch mit sich, dass es zu einer Veränderung der Altersstruktur kommt. So zeigt sich bereits, dass der Anteil der 15 bis unter 30-Jährigen durch Zuwanderung steigt, der Anteil der über 75-Jährigen sinkt. Wien weist aktuell österreichweit mit 69% auch den höchsten Anteil der Personen im erwerbsfähigen Alter (15-64 Jahre) auf.

2 ENTWICKLUNG DER REGIONALEN KOOPERATION

2.1 Grundlegende strategische Konzepte und Instrumentarien der Stadtentwicklung

Die politischen Entwicklungen in Europa spiegeln sich auch in den strategischen Konzepten der Stadtentwicklung und Stadtplanung wider. In zunehmendem Maße bildete die regionale Dimension den Bezugsrahmen in den Instrumentarien, wie Stadtentwicklungs- und Strategieplan, aber auch die Aktivitäten der Planungsgemeinschaft Ost (PGO), die vor 30 Jahren gegründet wurde, bekamen zunehmend grenzüberschreitenden Charakter. Im Folgenden werden die wesentlichsten Instrumentarien und Programme kurz skizziert. www.stadtentwicklung.wien.at

2.2 Stadtentwicklungsplan 1994

Im Gegensatz zum Stadtentwicklungsplan 1984 wurde der STEP 1994 unter den Vorzeichen einer wachsenden Stadt entwickelt und stand unter den Prämissen einer sozialen und umweltverträglichen Entwicklung. Insgesamt wurde einer einsetzenden wirtschaftlichen Dynamik mit dem Schlagwort „Neue Gründerzeit“ Rechnung getragen, wobei die Zielsetzung eine maßvolle Erweiterung war und vor allem auch Schwerpunkt auf eine innere Stadterweiterung bzw. Entwicklung entlang von öffentlichen Verkehrsachsen bzw. den Ausbau des ÖV gelegt wurde.

Angesichts der politischen Umwälzungen von 1989 fand auch die europäische Dimension ihren Niederschlag. Eine der 15 Thesen, die dem STEP vorangestellt wurden, war der Kooperation mit dem Umland gewidmet: „Wien und das Umland: Gemeinsam sind wir stark. Eine stärkere Orientierung an gemeinsamen Vorstellungen über die Entwicklung der Region muss die Grundlage für eine intensive regionale Zusammenarbeit bilden. Auch und gerade auf regionaler Ebene ist umweltverträgliche und an Lebensqualität orientierte Entwicklung essenziell. Im Zusammenhang mit den grenzüberschreitenden, transnationalen Entwicklungen wird die aktive Region weiter an Gewicht gewinnen.“ (STEP 1994)

In der konkreten Umsetzung blieb man 1994 jedoch eher unverbindlich. „Obwohl jedoch der STEP 94 von bereits von einer neuen geo-politischen Ära ausging und dadurch ausgelöste Trends in Szenarien diskutierte, blieb die konkrete regionale Perspektive eher peripher.“)

Kernthemen im STEP1994 waren: Mehr Wohnungen und Arbeitsplätze, Vorrang für den öffentlichen Verkehr, umweltschonende Stadterweiterung bei gleichzeitiger Stadterneuerung, bürgernahe Stadtplanung. Als jährliches Ziel wurde von einer Wohnbauleistung von 8.000 bis 10.000 geförderter Wohnungen ausgegangen. www.wien.gv.at/stadtentwicklung/grundlagen/planungsgeschichte.html

2.3 Stadtentwicklungsplan 2005

Für den Stadtentwicklungsplan 2005 bildeten die neuen wirtschaftlichen und politischen Rahmenbedingungen (EU-Erweiterung, Städtekonkurrenz, Stellung Wiens in einer neuen Europaregion CENTROPE) einen wesentlichen Bezugsrahmen. Darüber hinausgehend waren demographische und gesellschaftliche Veränderungen, Transformationen in der Wirtschaft und Veränderungen in der Raumstruktur, die unter der Zielsetzung nachhaltiger Entwicklung, chancenorientiert regional, gesamtstädtisch und teilräumlich zu bearbeiten sind, wichtige Grundlagen. Der Stadtentwicklungsplan hat die großen Entwicklungsziele für die nächsten Jahre räumlich zu konkretisieren. Dies bedeutet eine ressortübergreifende enge Vernetzung mit den städtischen Handlungsfeldern, Zielen und Projekten. Die räumliche Dimension der zukunftsfähigen Entwicklung Wiens kann nur in den Synergien von Siedlungs- und Wirtschaftsentwicklung, regionalen Kooperationen und Standortpolitik sowie Lebensqualität, Gender Mainstreaming und Bürger/-innenbeteiligung konkretisiert werden. Wien konnte seit dem letzten Stadtentwicklungsplan 1994 vielfältige Erfahrungen in der Abwicklung größerer infrastruktureller und städtebaulicher Projekte wie auch in Strategien der kleinteiligen Impulssetzung und Erneuerung sammeln.

Der Stadtentwicklungsplan greift erstmals die regionale Perspektive als Bestimmungsfaktor für die Entwicklung Wiens auf und zieht verstärkt das wirtschaftliche und infrastrukturelle Umfeld mit ein. Er ist

somit viel stärker als die vorangegangenen Stadtentwicklungspläne auf die Außenbeziehungen und deren Einfluss auf die innere Entwicklung der Stadt ausgerichtet. Die Funktion und Bedeutung Wiens für die Region CENTROPE sowie die Bereitschaft der Stadt zur Kooperation mit Niederösterreich, dem Burgenland, den niederösterreichischen Gemeinden und den benachbarten Regionen Tschechiens, der Slowakei und Ungarns und konkrete Ansatzpunkte werden in einem "Regionalen räumlichen Leitbild" dargestellt. Es umfasst Themen wie den geplanten Ausbau der regionalen und überregionalen hochrangigen Infrastrukturen, nachhaltige Siedlungsentwicklung, die Ausweisung der regionalen baulichen und wirtschaftsstrategischen Entwicklungsgebiete sowie der großen regionalen schützenswerten Natur- und Erholungsräume aber auch organisatorische Fragen regionaler Zusammenarbeit.

Ein ganz neuer Weg der Planung wurde im STEP05 mit der Festlegung der "13 Zielgebiete der Wiener Stadtentwicklung" beschritten. Bei der Auswahl dieser Gebiete ging es darum, die Vielfalt der städtischen Struktur, die unterschiedlichen Problemlagen sowie die im gesamtstädtischen Interesse wichtigen Entwicklungspotenziale und Chancen so umfassend wie möglich einzufangen, sie konkret zu "verorten" und entsprechende Entwicklungsstrategien und Maßnahmen anzudenken. Hier wurden bewusst nur spezielle Teile des Stadtgebietes ausgewählt, in denen aufgrund ihrer Ausgangssituation oder der erwarteten Veränderungen in den nächsten Jahren eine hohe Aufmerksamkeit der Stadt erforderlich sein wird. Die 13 Zielgebiete der Wiener Stadtentwicklung stellen aber nicht nur eine Neuerung in der Präsentation der Anliegen der Stadtentwicklung dar, sie werden auch die Arbeitsweisen in der Planung stark verändern. Es werden bezirksgrenzenüberschreitende mehrjährige Programme erstellt werden, partizipative Planungsverfahren sollen die Einbindung relevanter Akteure/-innen bei der Programmerstellung und Umsetzung sicherstellen, die Umsetzung soll durch ein Monitoring begleitet und die Steuerung und Qualitätssicherung durch ein Programm-Management gewährleistet werden.

Themen, die sich sowohl bei den Maßnahmen als auch bei der Umsetzung als Querschnittsmaterien wiederfinden, sind die Bereiche Partizipation, "Gender Mainstreamings", Nachhaltigkeit und Diversity.

Die wesentlichsten Zielsetzungen des STEP 05 sind:

- Durch attraktive Standorte, Infrastruktur und innovative Einrichtungen ein investitionsfreudiges Klima für die Wirtschaft zu schaffen sowie die Nahversorgung zu sichern
- •Die Vielfalt und Qualität des Lebensraumes in der Region Wien durch Sicherung und Ausbau des Grüngürtels und der Donaulandschaft gemeinsam mit Niederösterreich zu gewährleisten
- Die bauliche Entwicklung entlang leistungsfähiger öffentlicher Verkehrsmittel zu konzentrieren, mit der Ressource Boden sparsam umzugehen, Nutzungsmischung zu forcieren und die funktionelle und soziale Entmischung zu verhindern
- Den Anteil des Umweltverbundes (Rad, zu Fuß, öffentlicher Verkehr) zu steigern, und gleichzeitig den Anteil des motorisierten Individualverkehrs zu reduzieren
- die Lebensqualität in Wien durch chancengleichen Zugang zu Einrichtungen des kulturellen Lebens, zu den Sozial-, Bildungs-, Gesundheits- und Betreuungseinrichtungen, zu Wohnraum ausreichender Größe und Qualität sowie zu Natur- und Erholungsräumen zu gewährleisten
- und nicht zuletzt den Anforderungen der "Wissensgesellschaft" durch eine adäquate Förderung von Forschung und Lehre Rechnung zu tragen und so Wien als "Wissensmetropole" weiterhin zu positionieren.

Der STEP 05 ist gemäß Gemeinderatsbeschluss fortzuschreiben und zu evaluieren. Ein entsprechender Prozess wurde 2009 eingeleitet, 2010 soll der Fortschrittsbericht dem Gemeinderat vorgelegt werden. www.wien.gv.at/stadtentwicklung/strategien/step/index.html

2.4 Siedlungspolitisches Konzept Ostregion (SKO) 1993/94

Um der Zersiedelung und Suburbanisierung im Wiener Umland entgegenzuwirken, wurde von der Planungsgemeinschaft Ost (PGO) 1994 mit dem „Siedlungspolitischen Konzept Ostregion" (SKO) eine gemeinsame Strategie der drei Bundesländer Wien, NÖ und Burgenland ausgearbeitet. Dadurch sollten mehrere Entwicklungszentren am Rande und außerhalb des Wiener Umlandes (Tulln, Stockerau, Mistelbach, Hollabrunn, Gänserndorf, Bruck a. d. Leitha, Eisenstadt, Neusiedl a. See und Mattersburg) gestärkt werden.

Dieses "Siedlungspolitische Konzept" folgt dem Leitbild der "Dezentralen Konzentration" und hatte für die anzustrebende regionale Entwicklung der Region Wien fundamentale Bedeutung.

Durch ein Paket an unterschiedlichen Maßnahmen sollte eine Milderung des Siedlungsdruckes auf die Gemeinden am Rande Wiens erzielt werden.

Hauptelemente dieser Strategie waren:

- Verwirklichung des Regionalschnellbahnkonzepts in Abstimmung mit dem regionalen Busnetz zur Verbesserung der Erreichbarkeit der Entwicklungszentren
- Erhöhung des Wohnungsneubauvolumens in den Entwicklungszentren
- Konzentration der Betriebsflächenangebote in den Entwicklungszentren
- Erstellung von Stadtentwicklungskonzepten für alle Entwicklungszentren (mit Maßnahmen zur Erhöhung der Innenentwicklungspotenziale und der Zentrumsattraktivität durch Stadterneuerung; Verdichtung der Ortskerne; Miteinbeziehung privatrechtlicher Maßnahmen der Stadtgemeinden)
- Gründung einer "Land-Stadt-Gesellschaft" als Planungs- und Entwicklungsgesellschaft zur Umsetzung der SKO-Strategie im Bereich der Liegenschaftspolitik in enger Zusammenarbeit mit den Gemeinden
- Einrichtung eines NÖ Landesbaulandfonds, der durch Statuten und Aufsicht ausdrücklich an die Ziele der Raumordnung gebunden wird und die Gemeinden und Developer bei der aktiven Bodenpolitik unterstützt.
- Eigendynamik in den Gemeinden Korneuburg, Groß-Enzersdorf, Schwechat und Wolkersdorf weiterhin zulassen (allerdings unter Forcierung flächensparender Bau- und Siedlungsformen)
- Begrenzung des Siedlungswachstums und zielkonformer Einsatz von Förderungsinstrumentarien (z.B. Wohnbauförderung)

Die Ziele des SKO sind jedenfalls nur partiell erreicht worden. Nicht zuletzt deshalb und aufgrund der gestiegenen Entwicklungsdynamik wurde die PGO 2007 von den drei Landeshauptleuten der Region beauftragt, eine Aktualisierung der siedlungspolitischen Konzeption einzuleiten.

2.5 Siedlungspolitisches Konzept Ostregion (SRO) 2007

Beim Treffen der Landeshauptleute Wiens, Niederösterreichs und des Burgenlandes im Juni 2007 erhielt die PGO den Auftrag, das „Siedlungspolitische Konzept Ostregion – SKO“ aus dem Jahr 1993 neu zu bearbeiten. Begonnen wurde zunächst mit der Analyse der Entwicklung (Bevölkerung, Arbeitsplätze, Wohnungen), aus der sich die Wirksamkeit des SKO 93 nur teilweise nachweisen lässt. Die neuerliche Bearbeitung konzentriert sich daher primär auf die in den Leitkonzepten der Länder ausgewiesenen Strategien für die künftige Siedlungsentwicklung und dazu ausgewiesenen Entwicklungs- und Verbindungsachsen, Entwicklungsschwerpunkten und Zielgebieten. Wesentlicher Unterschied zur SKO 93 ist, dass die Umlandgemeinden (mit Unterstützung des Stadt Umland Managements) möglichst früh in die Bearbeitungen einbezogen werden. Das Bearbeitungsgebiet umfasst das Umland von Wien, den Raum Neusiedl – Eisenstadt – Wr. Neustadt und die Wiener Außenbezirke.

Als erstes von fünf Bearbeitungsschritten wurde das Modul 1 „Analyse der Entwicklung 1991 – 2007“ bereits fertig gestellt und in einem „Atlas der wachsenden Stadtregion“ zusammengefasst. Weitere Module beschäftigen sich mit Handlungsoptionen und Instrumenten zur nachhaltigen Siedlungsentwicklung sowie mit Szenarien der räumlichen Entwicklung.

2.6 Initiative JORDES+

Im Vorfeld der EU-Erweiterung haben sich die in der Region Wien–Bratislava–Györ gelegenen Gebietskörperschaften entschlossen, eine gemeinsame Initiative zur grenzüberschreitenden Regionalentwicklung zu starten. Dazu wurde das Projekt JORDES+ ins Leben gerufen, das seitens der EU durch Mittel aus dem Interreg III A kofinanziert wurde. Die Abkürzung JORDES+ bedeutet Joint Regional Development Strategy – gemeinsame Regionalentwicklungsstrategie für die Region Wien-Bratislava-Györ. Jordes + startete 2002, bis zum Abschluss des Projekts 2005 wurde eine Strategie erarbeitet, die den

Gebietskörperschaften helfen soll, in den nächsten Jahren den Weg zu gemeinsamen Entwicklungszielen zu steuern.

Schwerpunktmäßig wurden folgende Themen behandelt:

- Standortpolitik
- Wirtschaftsentwicklung
- Verkehrssystem
- Bildung/Wissenschaft/Forschung
- Siedlungsstruktur
- Natur- und Umwelt
- Tourismus und kulturelles Erbe

http://www.planungsgemeinschaft-ost.at/jordes_hp/jordes_frameset.htm

2.7 Region CENTROPE

Im Herbst 2003 unterzeichneten die Landeshauptleute von Wien, Niederösterreich und Burgenland gemeinsam mit den Partnern/-innen aus den Teilräumen Tschechiens, der Slowakei und Ungarns sowie den größeren Städten dieser Bereiche eine politische Deklaration zum Aufbau einer Europaregion. In dieser Region – deren Namen CENTROPE im Rahmen eines grenzüberschreitenden Schülerwettbewerbs gefunden wurde – sollen gemeinsam Potenziale genutzt und somit auch die wirtschaftliche Entwicklung forciert werden.

Um im Sinne der Deklaration diese Europaregion sowohl als europäischen als auch als „global player“ zu etablieren, wird derzeit im Rahmen des Central-Projektes CENTROPE-Capacity eine effiziente Dachstruktur aufgebaut. Erste Schritte einer Implementierung der Region wurden im Rahmen eines INTERREG-III A-Projektes CENTROPE bis Frühjahr 2006 abgeschlossen. Es besteht die Absicht zum Aufbau einer gemeinsamen Regional- und Standortentwicklung, Infrastrukturplanung und

-realisierung, Bildungs- und Forschungspolitik sowie zum Aufbau von Netzwerken in Kultur, Tourismus und Freizeit. Als zentral wird auch die engere Kooperation im Bereich der Umweltpolitik eingestuft. Mittel- bis längerfristig wird eine gemeinsame Positionierung und Vermarktung der Europaregion angestrebt. Dabei geht es um die Weiterentwicklung vorhandener Innovationspotenziale und eine nachhaltige Erhöhung der Wettbewerbsfähigkeit unter Nutzung der sprachlichen und kulturellen Vielfalt. CENTROPE wird als multilaterales Projekt unter Einbindung aller relevanten Akteure/-innen der grenzüberschreitenden Region im Rahmen einer eigenen Plattform durchgeführt.

Bereits jetzt hat sich CENTROPE einen Top-Ruf als Musterstandort für Unternehmen in den Bereichen Biotechnologie, Automotive und Telekommunikation erarbeitet – grenzüberschreitende Wirtschaftsparks, Cluster und sonstige Kooperationen forcieren diese Branchen enorm. Vor allem Wien kann hier große Erfolge verbuchen und gilt im Bereich der Biotechnologie und der Life Sciences bereits als internationales Kompetenzzentrum. Rund 13.500 Personen in 140 Unternehmen sind in den Bereichen Biotechnologie, Pharma, Medizintechnik und spezialisierte Zulieferer tätig, rund 3.800 davon in Forschung und Entwicklung. Um das vorhandene Arbeitskräftepotenzial voll ausschöpfen zu können, gibt es in diesen Bereichen auch grenzüberschreitende Ausbildungskooperationen.

http://www.centrope.info

2.8 CENTROPE Capacity

Im Zeitraum 2003-2007 wurden bereits zwei INTERREG IIA/IIIA-Projekte in der Region CENTROPE unter dem Titel BAER I und II (Building a European Region) durchgeführt. Dabei wurden die grundsätzlichen Vorbereitungen für die Etablierung einer grenzüberschreitenden Region zwischen Tschechien, der Slowakei, Ungarn und Österreich getroffen.

Besonders intensiv wurde daran gearbeitet, die Möglichkeiten und Rahmenbedingungen zur Weiterentwicklung einer multilateralen Europaregion zu klären. Das „Zukunftsleitbild CENTROPE 2015“ fasst die gemeinsamen Vorstellungen für die Entwicklung und das Zusammenleben in dieser dynamischen

Vierländerregion zusammen. Zur Realisierung der „Vision 2015“ wurde ein detaillierter Businessplan für die künftige Kooperation, der als Fahrplan für konkrete, von gleichberechtigten Partnern getragene Kooperations-aktivitäten dienen soll, erstellt. Auf diesen Business Plan einigten sich die politischen Vertreter 2007 in Bratislava.

In Zukunft wird die Zusammenarbeit in der Region CENTROPE durch ein nachhaltiges transnationales Kooperationsmanagement intensiviert. Für die Jahre 2009 bis 2012 wird nun der multilaterale Betrieb dieses Kooperationsmanagements auf der Basis des gemeinsamen Projekts CENTROPE Capacity im EU-Förderprogramm CENTRAL EUROPE verwirklicht. Die Stadt Wien (MA 53) nimmt dabei die Rolle des Leadpartners wahr. Die MA 18 unterstützt die MA 53 fachlich bei der Projektsteuerung. Die operative Umsetzung weiter Teile der Projektaufgaben übernimmt ein multilaterales Konsortium externer Dienstleister.

Grundvoraussetzung für ein effizientes Gelingen des multilateralen Kooperationsmanagements ist eine professionelle Organisation der dezentralen CENTROPE-Büros in jedem der vier Mitgliedsstaaten. Von besonderer Bedeutung ist dabei, dass Politik und Verwaltung ihr Handeln auch auf diese transnationalen Anforderungen hin ausrichten, sowohl die interne Kommunikation betreffend als auch die Entwicklung von weiteren Kooperationsprojekten im Raum CENTROPE.

In folgenden Themenfeldern sollen aufbauend auf die bisherigen Pilotprojekte, thematische Leitprojekte entwickelt werden:

- Knowledge Region (Wirtschaftsentwicklung, Innovation, Forschung)
- Spatial Integration (Planung, Verkehr, Umwelt)
- Human Capital (Bildung, Qualifizierung)
- Culture Region (Kultur, Tourismus)

2009 wurde intensiv an der technischen Projektimplementierung gearbeitet. Mit den Projektpartnern wurde die gemeinsame Partnerschaft nachhaltig mit der Unterzeichnung von Abkommen besiegelt. Die umfangreichen Projektaktivitäten werden ab Jahresbeginn 2010 unter Federführung der Stadt Wien und mit Unterstützung des externen grenzüberschreitenden Projektmanagements starten.

2.9 Donauraumstrategie

Im Juni 2009 erhielt die Europäische Kommission das Mandat, eine transnationale Strategie für die Entwicklung des Donauraums zu erarbeiten. Diese Strategie soll nunmehr gemeinsam mit den Mitgliedsstaaten erarbeitet werden.

Die Donauraumstrategie stellt ein Instrument für die Zusammenarbeit zwischen Staaten in unterschiedlichen Stadien des europäischen Integrationsprozesses dar. Abgesehen von der Erleichterung der Kooperation zwischen „alten“ und „neuen“ EU-Mitgliedsstaaten öffnet die Donauraumstrategie auch den Blick in Richtung der Staaten mit mittel- bis langfristiger Beitrittsperspektive. Ziel muss es sein, diesen Raum wirtschaftlich, aber auch kulturell-emotional an die EU heranzuführen.

Die Donauraumstrategie soll primär der strategischen Abstimmung von Kooperationsprozessen und der Verzahnung der entsprechenden Programme dienen. Der Donauraum bietet sich auch für die Verknüpfung anderer europäischer Großräume, wie den Ostseeraum, den Mittelmeerraum, den Alpenraum und den Schwarzmeerraum an.

Auf österreichischer Ebene haben dazu bereits intensive Vorarbeiten stattgefunden, auf Initiative der Stadt Wien wurde der „Beitrag der Bundesländer Burgenland, Niederösterreich, Oberösterreich und Wien zur EU-Donauraumstrategie“ erarbeitet. In diesem gemeinsamen Papier sind 5 „Säulen“ der Kooperation ausgewiesen: Neben den von der Kommission angeregten drei sektoralen Kooperationsfeldern („environment“, „connectivity“ und „socio-economic integration“) werden von den österreichischen Bundesländern zwei weitere Säulen vorgeschlagen, die Querschnittsmaterien darstellen: „Wohlstand und Sicherheit“ (die etwa die für den Raum wichtigen Themen Lebensqualität und Tourismus umfasst) sowie „Kooperation der Städte und Regionen im Bereich Innovation und Governance“.

3 FAZIT

Wien versucht die Chancen, die sich durch politische und gesellschaftliche Entwicklungen ergeben, bestmöglich zu nutzen. Der Fall des Eisernen Vorhangs und die Erweiterung der Europäischen Union haben Wien von einer Randlage ins Zentrum Europas gerückt und so neue Voraussetzungen für ein prosperierendes Wachstum geschaffen. Das prognostizierte Bevölkerungswachstum – zunehmend durch verstärkte Zuwanderung aus den EU-Ländern geprägt - bringt für Wien nicht nur demografisch gesehen, sondern auf vielen Ebenen, Vorteile.

Für die Stadtentwicklung bedeuten diese Entwicklungen neue Rahmenbedingungen und Herausforderungen, denen mit einer Vielzahl an Instrumentarien und Programmen begegnet wird. In immer stärkerem Maße bekamen dabei die europäische Dimension und gemeinsame Entwicklungsperspektiven einen höheren Stellenwert, der in die Etablierung der grenzübergreifenden Europaregion CENTROPE mündete. Aber auch auf vielfältigen anderen Ebenen spielt die Kooperation auf nationaler und internationaler Basis eine bedeutende Rolle. Ein weiterer logischer Schritt dabei ist das Engagement Wiens bei der Formulierung der Strategie für den Donauraum durch die Europäische Kommission. Stadtentwicklung ist nicht (mehr) auf kleinräumige, administrative Grenzen beschränkt, sondern kann in Wahrnehmung einer Agglomerationsperspektive nur mehr durch grenzüberschreitende Zusammenarbeit funktionieren.

Die Wiener Stadtentwicklung ist dabei stetig bemüht, ihre Instrumente so zu gestalten und weiterzuentwickeln, dass sie einerseits robust für neue Rahmenbedingungen sind, andererseits aber auch so flexibel, um neue Trends zuzulassen und offen für Neues zu sein. Letztendlich geht es darum, die Lebensqualität innerhalb der Stadt selbst, aber auch im gesamten Umland und der Region positiv zu gestalten und Wiens Rolle als führende Metropole im Zentrum Europas zu festigen und auszubauen.

Innovative Fördermechanismen für den Radverkehr

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KURZFASSUNG

Österreich liegt mit 5% Radverkehrsanteil im internationalen Vergleich im Mittelfeld. Das Radverkehrspotenzial ist jedoch hoch, da rund 50% aller Autofahrten kürzer als 5 Kilometer sind, und die Steigerungen des Radverkehrs ist wie Beispiele zeigen möglich. Als Erfolgsfaktor für die Radverkehrsförderung die drei Bereiche Koordination, Infrastruktur und Bewusstseinsbildung zu nennen, die im Masterplan Radfahren - der nationalen Radverkehrsstrategie mit dem Ziel den Radverkehrsanteil in Österreich bis 2015 auf 10% zu verdoppeln - abgedeckt sind.

Die Umsetzung des Masterplan Radfahren erfolgt über klima:aktiv mobil, der Klimaschutzinitiative des Lebensministeriums. **klima:**aktiv mobil stützt sich dabei auf vier Säulen: beraten (zielgruppenorientierte kostenlose Beratungsprogramme im Mobilitätsmanagement), fördern (finanzielle Förderprogramme für die Umsetzung von Radverkehrsmaßnahmen), motivieren (Bewusstseinsbildungskampagnen für das Radfahren im Alltag) und auszeichnen (Auszeichnung der Akteure im Radverkehr).

RADVERKEHR IN ÖSTERREICH

3.1 Ausgangslage Radverkehr in Österreich

Der Radverkehrsanteil (Anteil der am Fahrrad zurückgelegten Wege an allen Wegen) ist in Österreich mit ca. 5% im internationalen Vergleich eher niedrig (Niederlande: 27%, Dänemark: 18%, Deutschland und Belgien: je 10%, Schweiz: 9%, Finnland: 7,5%). Dies gilt auch für die durchschnittlichen pro EinwohnerIn und Jahr zurückgelegten Fahrradkilometern. Mit 154 Fahrradkilometer pro Einwohner und Jahr liegt Österreich deutlich hinter Deutschland (300 Fahrradkilometer / Einwohner / Jahr) und Dänemark (958 Fahrradkilometer / Einwohner / Jahr).

Die Radverkehrsanteile innerhalb von Österreich weisen jedoch große Spannweiten auf. So liegt der Radverkehrsanteil in der Stadt Salzburg bei rund 16% in der Stadt Wien bei rund 5%. Auch regional schwankt der Radverkehrsanteil zwischen Vorarlberg (15%) und Burgenland (5%) deutlich.

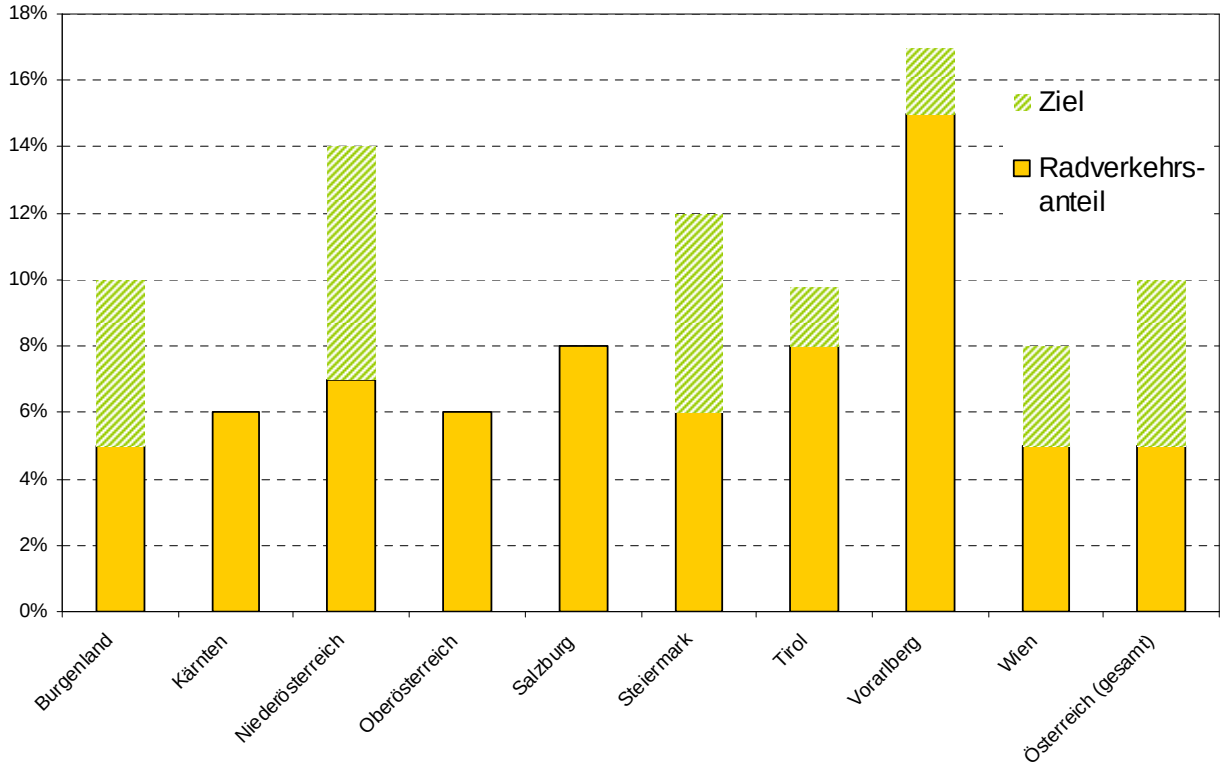

Abb. 1: Radverkehrsanteil und Ziele nach Bundesland

3.2 Steigerung des Radverkehrsanteils

Das Potenzial für den Radverkehr ist enorm, da ein hoher Prozentsatz an privaten Autofahrten aufgrund der kurzen Fahrtdistanz verstärkt auch per Rad abgewickelt werden könnte. Konkret sind ca. 25% aller privaten Autofahrten kürzer als 2 km, bzw. sind ca. 50% aller privaten Autofahrten kürzer als 5 km. [4][5][6]

Als Erklärungsansatz für die große Spannweite des Radverkehrsanteils in Österreich wird neben Topographie und Siedlungsstruktur auch die konsequente Radverkehrsförderung auf kommunaler bzw. regionaler Ebene herangezogen. Beispiele wie die Stadt Salzburg, daß seine Radverkehrsanteil von 12% 1995 auf 16% 2004 steigern konnte zeigen, daß durch effiziente Maßnahmen eine deutliche Steigerung des Radverkehrs und seines Anteils am täglichen Verkehrsaufkommen erreicht werden kann. Selbst in ländlichen Gemeinden wie Langenlois konnte im Rahmen des Projektes „Verkehrsparen Langenlois“ der Radverkehrsanteil von 1999 bis 2002 von 3% auf 14% fast verfünffacht werden.

Als Erfolgsfaktoren sind dazu die drei Bereiche Koordination, Infrastruktur und Bewusstseinsbildung zu nennen. Koordination heißt die unterschiedlichen Akteure in Planung und Bau sowie in den unterschiedlichen Wirkungsbereichen (Gebietskörperschaft, Betriebe, Schulen) im Bereich Radverkehr zu koordinieren und abzustimmen. Eine/ein Radverkehrsbeauftragte/r in der Verwaltung ist eine effektive Maßnahme um das auf den Radverkehr einwirkende Verwaltungshandeln gezielter zu steuern.

Das Rückgrat bildet die Radinfrastruktur (Hardware) bestehend aus Abstellanlagen und Radrouten bzw. Radwegen. Jedoch ist die beste Infrastruktur nicht effektiv genutzt ohne Bewusstseinsbildung und Motivation (Software) für das Radfahren im Alltag. Mit entsprechenden Aktionen kann auf die bestehenden Infrastruktur aufmerksam gemacht werden, und Bürgerinnen und Bürger zum vermehrten Radfahren animiert werden.

3.3 Nationale Radverkehrsstrategie - Masterplan Radfahren

In Österreich liegt die institutionelle Kompetenz für die Angelegenheiten des Radverkehrs im Wesentlichen bei den Kommunen als unmittelbar zuständige Akteure und Maßnahmenträger. Die Länder sind (freiwillige) Koordinations- und Förderstellen. Dem Bund kommen dzt. nur im Rahmen der Straßenverkehrsordnung direkte Kompetenzen im Radverkehr zu. Allerdings steht der Radverkehr und Maßnahmen zu dessen Förderung in Wechselwirkung mit wichtigen Interessen des Bundes (Klimaschutz, Gesundheit, Verkehrssicherheit, Luftreinhaltung, Lärmminderung, ...). Eine kooperative Vorgangsweise bei der Radverkehrsförderung ist daher sehr zweckmäßig und liegt im Interesse aller Beteiligten.

2006 wurde vom Lebensministerium als nationale Radverkehrsstrategie der Masterplan Radfahren vorgelegt, mit dem sich die österreichische Bundesregierung das Ziel setzt bis 2015 den Radverkehrsanteil auf 10% zu verdoppeln. Mit 17 Maßnahmen die in Kooperation mit unterschiedlichen Umsetzungspartnern und Ebenen (Bundesländer, Gemeinden) umgesetzt werden, sind die für den Erfolg der Radverkehrsförderung relevanten drei Bereiche Koordination, Infrastruktur und Bewusstseinsbildung abgedeckt. Der Masterplan Radfahren als Strategie zur Radverkehrsförderung ist eine wichtige Vorraussetzung für eine systematische und mittelfristige erfolgreiche Förderung des Radfahrens im Alltag in Österreich.

4 KLIMA:AKTIV MOBIL – KLIMASCHUTZINITIATIVE DES LEBENSMINISTERIUMS

klima:aktiv mobil ist die Klimaschutzinitiative des österreichischen Umweltministeriums im Verkehrsbereich und Teil der österreichischen Klimastrategie. Unter anderem Dank der Aktivitäten von **klima:**aktiv mobil konnte der Anstieg der CO_2-Emmissionen im Verkehr in Österreich gestoppt werden, und eine Trendumkehr erreicht werden.

Die Initiative stützt sich auf vier Säulen: beraten (zielgruppenorientierte Beratungsprogramme im Mobilitätsmanagement), fördern (finanzielle Förderprogramme), motivieren (Bewusstseinsbildungskampagnen), auszeichnen (Auszeichnung der Akteure).

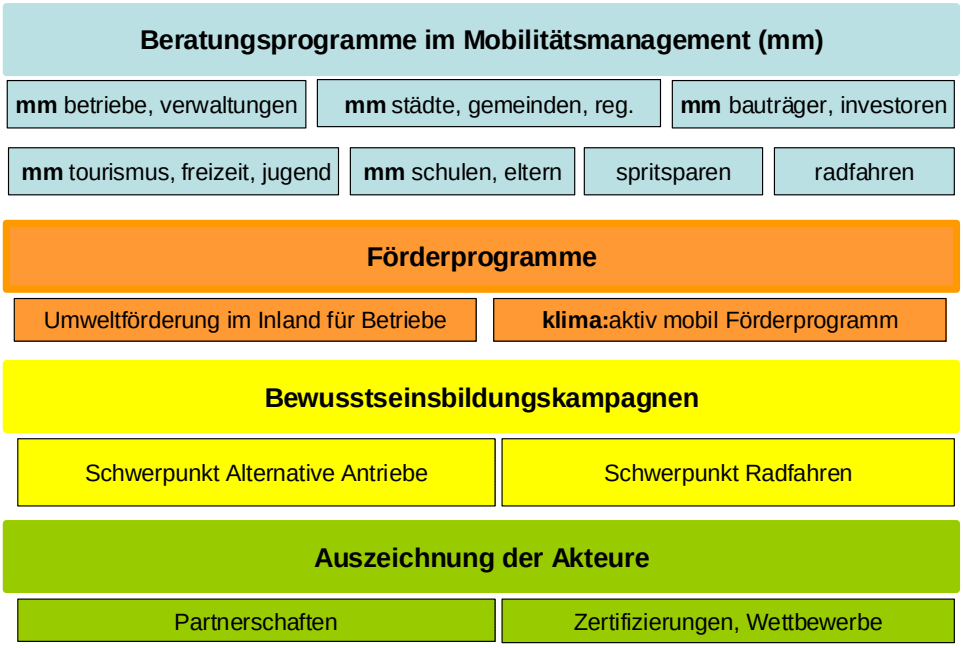

Abb. 2: Struktur von **klima:**aktiv mobil

4.1 Zielgruppenorientierte Beratung

Um relevante Akteure wie Gemeinden und Betriebe unter anderem bei der Entwicklung von Radverkehrsmaßnahmen zu unterstützen, wird seit 2005 vom Lebensministerium kostenlose Beratung für folgende Zielgruppen angeboten:

- Mobilitätsmanagement für Betriebe und Verwaltungen
- Mobilitätsmanagement für Städte, Gemeinden und Regionen
- Mobilitätsmanagement für Tourismus, Freizeit und Jugend
- Mobilitätsmanagement für Eltern und Schulen
- Mobilitätsmanagement für Bauträger, Immobilienentwickler und Investoren

Die Beratung erfolgt im Auftrag des Lebensministeriums, und wird von Planungsbüros und Instituten durchgeführt. Die Beratungsaufträge enthalten auch eine erfolgsabhängige Honorarkomponente abhängig von der CO_2-Reduktion der Verkehrsmaßnahmen der beratenen Akteure. Am Ende einer Beratung unterschrieben die Beratenen Gemeinden bzw. Betriebe eine **klima:**aktiv mobil Projektpartnerschaft, bei der sie sich zur Umsetzung der entwickelten Verkehrsmaßnahmen verpflichten. Die **klima:**aktiv mobil Beratungsprogramme unterstützen bei der Entwicklung von klimaschonenden (Rad)Verkehrsmaßnahmen, berechnen den CO_2-Reduktionseffekt und helfen bei der Fördereinreichung.

Bisher setzen österreichweit über 200 **klima:**aktiv mobil Projektpartner (Betriebe, Gemeinde, Tourismuseinrichtungen) Radverkehrsmaßnahmen um, und sparen dadurch jährlich rund 55.000 Tonnen CO_2 ein.

4.2 Finanzielle Förderung

Für Betriebe steht die Umweltförderung im Inland mit einem Fördersatz von bis 30% der umweltrelevanten Investitionskosten bei der Umsetzung von Radverkehrsmaßnahmen zur Verfügung. Gebietskörperschaften können beim **klima:**aktiv mobil Förderprogramm bis zu 50% der umweltrelevanten Investitionskosten gefördert werden. Zur Förderung können Investitionskosten, Betriebskosten sowie immaterielle Kosten eingereicht werden. Die Förderquote ist abhängig von der CO_2-Reduktion gestaffelt, bei Radverkehrsprojekten wird zusätzlich noch die Fördersätze gestaffelt abhängig davon ob das Projekt neben Infrastruktur auch bewusstseinsbildende Maßnahmen enthält. Damit soll die Kombination der Erfolgsfaktoren Infrastruktur und Bewusstseinsbildung stärker unterstützt werden.

Für Radverkehrsprojekte wurde seit 2007 16,8 Mio. Euro an Fördermittel vergeben, die aufgrund der Kofinanzierung Investitionen von 76,6 Mio. Euro in den Radverkehr auslösten.

4.3 Bewusstseinsbildung

Neben dem Beratungs- und Förderprogramm, das sich nicht an Privatpersonen richtet, wird seit 2005 in einem Bewusstseinsbildungsprogramm Bürgerinnen und Bürger zu umweltfreundlicherem Verkehrsverhalten motiviert. Zum Radverkehr werden unterschiedliche Aktionen wie das 1. Elektrofahrradrennen auf den Großglockner, Radverkehrsfachveranstaltungen in Kooperation mit den Bundesländern (Radgipfel Niederösterreich, Radgipfel Steiermark, Radgipfel Oberösterreich) oder die Internetplattform www.radfahren.klimaaktiv.at unterstützt. Für 2010 werden in einer **klima:**aktiv mobil Tour in allen Landeshauptstädten den Bürgern die Möglichkeiten einer Alternativen Mobilität präsentiert, und z.B. Lastenräder sowie Elektrofahrräder zum testen angeboten.

Das **klima:**aktiv mobil Bewusstseinsbildungsprogramm half durch den Praxistest auf den Großglockner den Elektrofahrradboom in Österreich auszulösen.

4.4 Auszeichnung

Alle Projektpartner werden von Umweltminister Niki Berlakovich persönlich ausgezeichnet. Die Auszeichnung der Akteure hat sich als besondere Anerkennung für die Akteure erwiesen, und motivierte schon einige Nachbarbetriebe oder –gemeinden Radverkehrsmaßnahmen zu setzen. Neben der Motivation auch im eigenen Wirkungsbereich Maßnahmen zu setzen, wird nach der Auszeichnung diese besonders in Regionalmedien als Werbung für die Ausgezeichneten verwendet, womit das Thema Klimaschutz im Verkehr eine große breite erfährt.

ZUSAMMENFASSUNG

Die Mechanismen zur Förderung des Radverkehrs bei **klima:**aktiv mobil stützen sich auf den vier Säulen beraten, fördern, motivieren und auszeichnen. Neben einer kostenlosen Beratung bietet des Lebensministerium Betrieben und Gemeinden auch Förderung bei der Umsetzung an. Bürgerinnen und Bürger werden durch die Aktivitäten des Bewusstseinsbildungsprogramms zum Umstieg auf das Fahrrad motiviert, und Projektpartner erhalten vom Umweltminister Niki Berlakovich eine Auszeichnung als Anerkennung für Ihre klimafreundlichen (Rad)Verkehrsmaßnahmen.

Die Erfolge von **klima:**aktiv mobil liegt neben der Kombination der vier Säulen auch im erfolgsabhängigen Honorar für die Beraterinnen und Berater. Über 200 **klima:**aktiv mobil Projektpartner setzen radverkehrsmaßnahmen um, und sparen dabei dadurch jährlich rund 55.000 Tonnen CO_2 ein. Für Radverkehrsprojekte wurde seit 2007 16,8 Mio. Euro an Fördermittel vergeben, die aufgrund der Kofinanzierung Investitionen von 76,6 Mio. Euro in den Radverkehr auslösten. Weiters konnte durch das Bewusstseinsildungsprogramm das Radfahren im Alltag bei politischen Entscheidungsträger und in den Medien als sinnvolle und positive Maßnahme für den Klimaschutz im Verkehr verankert werden.

Die Erfolge von **klima:**aktiv mobil lassen das Erreichen des österreichischen Radverkehrsziels – Verdoppelung des Radverkehrsanteils bis 2015 – als realisitsch erscheinen.

REFERENCES

KOCH: Masterplan Radfahren, Wien, 2006.