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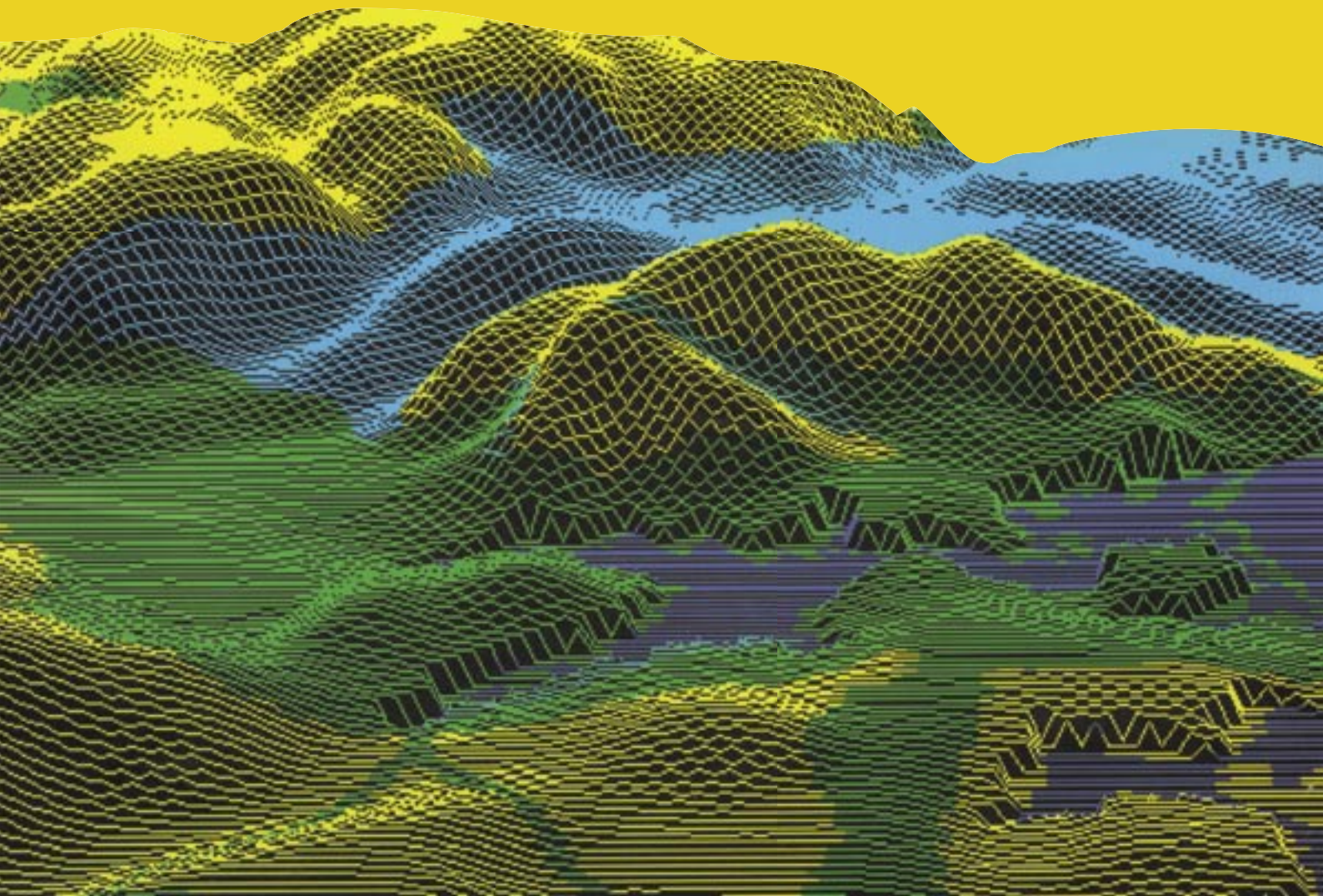

Fig. 9: The centre of Telč (population 5,800), composed of the market square, the chateau and fishpond, is a part of the UNESCO world heritage.

(Photo: E. Kallabová)

Fig. 10: Kamnik (population 12,200) is one of historical Slovenian Towns.

(Photo: E. Kallabová)

Illustrations to D. Cigale´s et. al. paper

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Articles

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Editorial

The periodical of ***Moravian Geographical Reports*** enters its 14th year of existence. When the first issue appeared in 1993, the main objective of editors was to develop a technical magazine for publishing activities of experts from the Institute of Geonics, Academy of Sciences of the Czech Republic, from Moravian universities and their geographical workplaces and from cooperating institutions. In the course of time, both the periodical and the situation on the market of geographical publications were observed to pass through a certain development. The Editorial Board became gradually international and the number of papers submitted by foreign authors was increasing. The periodical began to near the central-European dimension.

Therefore, the management of the Institute of Geonics ASCR and the Editorial Board of Moravian Geographical Reports decided to modify the scope of the periodical so that it would better correspond to high international standards. Although the editors still expect a greater part of papers to originate from the European environment also in the future, the regional engagement of the periodical is now without any territorial limits. Within the framework of unambiguous trends to interdisciplinary approaches the magazine extends its engagement from geography to other disciplines dealing with various aspects of regional issues such as landscape ecology, regional economics, regional geology, region-specific contributions from the sphere of town planning, sociology and other dicsiplines.

In addition to main papers the periodical stages also scientific communications (information on projects in progress, partial results, contributions to scientific discussion), scientific reports (information on scientific conferences, meetings, etc.) and reviews. Monothematic issues devoted to specific up-to-date topics will be prepared once a year at a maximum. Summaries of all main papers since the beginning of the publishing of the periodical are available on the periodical's web-site in Czech and English versions.

A decision was made to extend the publishing periodicity to three issues in 2006 with the prospect of a further increase to four issues in one of the coming years. This is corresponded to by some measures in the editorial work. The tasks would be unfeasible without a financial support from the Academy of Sciences of the Czech Republic and from the Institute of Geonics ASCR. The Editorial Board will focus also on the sphere of distribution and monitoring of the periodical by leading world universities and associations.

The objective is to create a high-standard international periodical of attractive form. Nevertheless, the scientific quality of a magazine depends not only on the Editorial Board but namely on authors and reviewers. The effort of the Editorial Board will be therefore to continually extend the constituency of cooperating researchers and scientists and to actively offer the publishing of results of interesting projects and dissertations, and the presentation of geographical and other regionally focused workplaces.

The Editorial Board accepts offers of papers and scientific reports with no time limits. Authors interested in the publication of their works will find all necessary instructions on the following webpages of the periodical: http://www.geonika.cz/mgr.

THE URBAN TRANSITION OF INNER CITY AREAS RECONSIDERED (A GERMAN-CZECH COMPARISON)

Annett STEINFÜHRER

Abstract

The cities of Central Europe have now experienced fifteen years of post-socialist transition. In many respects, they started with similar structural patterns, but they have developed rather differently during this period. Thus, both the predictions formulated at the beginning of the transition and the assumption of only one model of the post-socialist city, needed revision in the course of the process. After reviewing major prognoses of the outcomes of urban transition from the beginning of the 1990s, the focus of this paper will be on the development of neighbourhoods in the inner city areas of Leipzig (Germany) and Brno (Czech Republic). In both towns, these neighbourhoods constitute a significant part of the urban fabric and built local heritage. It is argued that despite similar structural patterns still evident in the 1990s (physical dilapidation, population losses and ageing, restitution of property), the transition pathways have since departed from each other. Differences have emerged concerning tenure structures, the situation of the rental market and housing mobility patterns, all of which will make the two paths even more dissimilar in the future. From a theoretical point of view, it is maintained that the simple category of change is not sufficient to understand and explain the multi-faceted processes of urban transition. Therefore, a broader typology of change, revitalisation, continuity and persistency is suggested.

Shrnutí

Revitalizace území při centrálních zónách velkoměst (německo-české srovnání)

Velkoměsta střední Evropy za sebou mají 15 let post-socialistických přeměn. Přestože východiska těchto přeměn měla v mnoha směrech podobnou strukturu, rozvíjela se zmíněná velkoměsta v průběhu tohoto období dosti rozdílným způsobem. Jak prognózy formulované na počátku přechodu, tak i hypotéza pouze jediného modelu post-socialistického velkoměsta proto musely být průběžně revidovány.

Po přehledu hlavních prognóz výsledků urbánních přeměn z počátku devadesátých let se tento příspěvek soustředí na rozvoj vnitřního města v Lipsku (Německo) a v Brně (Česká republika). V obou městech tvoří sídliště významnou část městské struktury i vybudovaného lokálního dědictví. Diskutuje se skutečnost, že přes podobné strukturální uspořádání v devadesátých letech (fyzické chátrání, úbytek a stárnutí obyvatelstva, majetkové restituce) došlo mezitím k divergenci v průběhu těchto přeměn. Objevily se rozdíly v majetkových strukturách, v situaci na trhu s nájemním bydlením i v migračních modelech bydlení, které ještě více oddálí budoucí podobnost směřování těchto dvou měst. Teoreticky vzato se usuzuje, že tato kategorie přeměny není dostatečně vyhovující pro pochopení a vysvětlení mnohostranného procesu urbánních přeměn. Proto bude navržena širší typologie změn, revitalizace, nepřetržitosti a stálosti.

Key words: *post-socialist transition, eastern Germany, Czech Republic, inner cities, comparative analysis*

Introduction

At present, there is no longer much scientific discussion about the post-socialist transition. Meanwhile, the standard conceptual frame of the 1990s for the analysis and explanation of societal change in Central and Eastern Europe has lost its special significance. This also holds true for urban studies. Instead, more general concepts, such as "restructuring" or "change" have come into being (e.g. Enyedi, ed., 1998; Lowe, Tsenkova, eds., 2003).

Therefore, it is time for more systematic reviews of the outcomes and mid-term consequences of urban transition processes in the 1990s. This approach will be in the paper restricted to major cities in eastern Germany and Czech Republic – two cases rarely compared in the transition research. The empirical focus will be on Leipzig and Brno and their inner city residential areas, which in contrast to other urban zones (such as city centres, socialist housing estates and suburban locations) did not attract much scientific attention. This is all the more

astonishing as these neighbourhoods constitute crucial multi-functional zones which link the urban past with the present and are significant for local identities.

The paper is mainly based on the approach and some results of my PhD thesis in urban sociology (Steinführer, 2004), but it also includes later findings and insights from further comparative projects. Before analysing how the inner cities in post-socialist countries have developed in the course of just 15 years, it might be helpful to reconsider some scientific prognoses about the direction and outcomes of urban transition from the beginning of the 1990s.

Urban transition – the prognoses reconsidered

Despite the almost complete failure of the social sciences in predicting the break-down of real socialism in the late 1980s, there were quite a few assumptions made regarding the direction of urban change at the beginning of the political transformation. The underlying hypothesis was the same that has been forming the basis of urban sociology and geography since the Chicago School: Social relations find their expression in spatial structures – and the socio-spatial organisation affects societal structures, too.

Therefore, the transition from a socialist to a capitalist city was expected to have certain socio-spatial patterns and outcomes. The most important prognoses about intra-urban changes, formulated by several authors at the beginning of the 1990s (Friedrichs, Kahl, 1991; Marcuse, 1991; Musil, 1992; Węcławowicz, 1993) can be summarised as follows:

- Most dynamic and distinctive will be the functional and structural transformation of the *city centres* (CBD). The retail structure is going to change, the number of leisure facilities and restaurants will increase. Housing will lose its importance in these areas. Prices are going to be highest.
- The degree of *residential segregation* will notably increase. The most decisive inner-urban processes are the down-grading of large housing estates, mainly due to selective out-migration, and the gentrification of inner city areas. Demographic factors lose their importance for residential segregation.
- *Housing preferences* and *lifestyles* are going to become much more differentiated and will influence the segregation patterns.
- There will be a growing spatial mobility and *immigration* from abroad influencing the patterns and degree of residential including ethnic segregation.
- *Housing shortage* will be on the agenda, not least due to a rising number of households.
- *Home-ownership* will be of higher importance. *Suburbanisation* is likely to occur.
- Differences between cities and city regions will increase leading to greater *regional disparities*.

At the first sight, most of these predictions have indeed become true, also in eastern Germany and in the Czech Republic – despite specific spatial expressions which differ between the cities, city regions and countries (Faßmann, Lichtenberger, eds., 1995; Kabisch et al., 1997; Franz, 2000; Sýkora et al., 2000; Musil, 2002). The degree of residential segregation increased, city centres and urban fringes notably changed, housing preferences and lifestyles differentiated, mobility rose, immigrants belong to main cities, growing regions differentiated from de-industrialised ones with a high unemployment rate, and housing shortages are on the agenda – with a notable exception of eastern Germany.

This last example already signifies that such a generalising summary is not sufficient and closer inspections are obligatory. Hence, differentiations and corrections will emerge, especially when leaving the macro-scale of "the" post-socialist city and entering empirical urban research on a smaller scale. This is the objective of the remaining parts of this paper.

Inner city areas: Initial situation and post-socialist change

In many central European towns, inner city areas constitute a distinctive part of the built urban heritage. With their functional mix as places of work, housing and commerce, they are a symbol of rapid urban change and expansion during the period of industrialisation from the late 18th and early 19th centuries onwards. At the same time, they form a significant buffer zone between the city centres (CBD) which in their origins often stem from the Middle Ages and later garden-city type areas from the first half of the 20th century (Vaishar, Zapletalová, 2003). Despite a different urban development in North America, also the sociologists of the Chicago School recognised the importance of these areas when characterising them as specific "zones of transition" with a permanently high degree of mobility and change.

In Germany (both its eastern and western parts), inner city residential districts are at the present mainly characterised by a *Gründerzeit* housing stock (dating from the 1870s onwards), at least in cities that were not heavily destroyed during World War II. In the Czech Republic, these neighbourhoods comprise both pre- and post-1918 buildings which were nationalised after 1945. By contrast, in the GDR this housing stock remained predominantly private, but due to the restrictive rental policy, many owners in the course of the post-war period handed their property over to the state, simply because they could not bear the burdens of restoration.

By 1990, the physical, environmental and socio-structural situation of these pre-war districts was in both countries rather similar. Due to mostly ideological reasons and with only a few exceptions, the inner cities gradually dilapidated in the 1970s and 1980s, while the bulk of state resources went into new housing estates (*Neubaugebiete*, *sídliště*) at the urban fringe. The physical decay, which resulted in the pre-eminent image of "grey cities" (Marcuse, 1991) and growing flat vacancies, was superposed and aggravated by a heavy environmental pollution mainly due to archaic heating systems and industries (Breuste, ed., 1996). With younger and higher educated generations moving into the new housing estates, the social structure of the inner cities became more and more dominated by older and hence less educated social strata (Matějů et al., 1979; Kellnerová, Toušek, 1997). But at least in the GDR these areas also offered space and opportunities for younger and less adapted life style groups (Rink, 1997). In some Czech towns, ethnic colonies mainly formed by Romany people existed (Burjanek, 1996).

In the course of the post-socialist transition, the inner city areas in both east-German and Czech towns became much more differentiated. The commencement of the restitution principle in either country brought about a first crucial structural change. While in the Czech Republic the bulk of restitution procedures was finished already in 1993 and subsequent transactions could take place (Sýkora, 1996a), the situation was much more difficult in eastern Germany. Since the restitution there meant a compensation for expropriations from 1933 to 1945 and from 1949 to 1989, respectively, for every single building claimed by former owners or their heirs a "biography" reaching back to the first half of the 20th century needed to be written and proven. By the mid-1990s, just 50 % of the claims were definitely decided, and the termination of the process took the entire decade. In spite of lacking all-embracing data on post-restitution developments, it is well-known that subsequently large-scale property transfers to mostly non-local (west-German) and professional owners (real estate funds or stock companies) took place (for more details see Reimann, 2000). Hence, an unprecedented ownership structure arose in most inner city areas in eastern Germany. Supported by heavy public funding based on tax-reduction incentives, restoration activities gained momentum in the second half of the 1990s (Fig. 1). It is important to realise that despite all property turnovers, these areas are still predominantly characterised by rental housing, at least in main cities. Rent de-regulation started in the mid-1990s and became finally effective by 1998.

Also in the Czech Republic, the new ownership structure in the inner cities is far away from the pre-war model. This is, first of all, due to the regulatory framework of the restitution which excluded nationalisation actions prior to February 1948. Secondly, the privatisation of the municipal housing stock to sitting tenants accelerated from the late 1990s onwards (ÚÚR, 2004). This process has significant impacts on the tenure structure of inner city areas, too, for example in Brno. However, a general remark should be made in this context: Systematic investigations of inner cities in the Czech Republic are rare (with a similar assessment: Vaishar, Zapletalová, 2003). Only highly deprived or gentrified areas, hence the extreme poles of residential segregation, as well as the expansion of central functions to these areas (commercialisation) with the resulting conversion of dwellings into offices have attracted the attention of the scientific community (Burjanek, 1996; Sýkora, 1996b). This neglect is obviously also due to the prevailing impression that despite physical improvements and changes in the tenure structure, the post-socialist transition did not have a major impact on these neighbourhoods. Main reasons are seen in low housing mobility and in the institutional structure of the housing market. Sýkora et al. (2000) speak about "islands of dynamic revitalisation" in these areas but conclude that "the majority of inner city residential areas is characterised by stagnation." However, demographic, social, property and environmental changes took place in the 1990s – although in most cases they were less apparent than those in eastern Germany.

While this paper focuses on the inner city districts, it needs to be pointed out that both general trends in post-socialist cities as well as changes in other types of residential areas – suburbanisation, commercialisation, differentiation of post-war housing estates and the restructuring of housing markets (Franz, 2000; Sýkora et al., 2000) were crucial not least for the development of inner cities in either country, both directly and indirectly.

Based on a comparison of urban and housing market developments in Leipzig and Brno in the 1990s (Steinführer, 2004) and smaller investigations in later projects, the following two paragraphs are devoted to major transition processes in the inner cities of Leipzig and Brno, as well as to their outcomes. Methodologically, the original work was based on a contrastive approach. This means that big differences which evolved between the situations in eastern Germany and Czech Republic were recognised but do not – as is usually the case – hinder a comparison. During the entire research process, the east-German case, hence the one more familiar to the author, used to be a starting point for developing the conceptual approach, the methodological design and the direction of the interpretation. Questions to be answered might therefore differ from those raised by a Czech researcher (in more detail: Steinführer, 2005).

In order to get a general overview of the framework conditions, Table 1 provides some main facts about the two towns and their housing markets.

	Leipzig	Brno
Size:		
– 1990/1991	146 km²	230 km²
– 2002	298 km²	230 km²
Population:		
– 1980	562,480	371,463
– 1990/1991	511,079	388,296
– 1995	471,409	388,899
– 2000/2001	493,208	376,172
– 2003	497,531	369,559
Housing stock – buildings:		
– 1992/1991	36,580	36,327
– 2000/2001	52,112	37,051
Housing stock – dwellings:		
– 1992/1991	259,878	158,555
– 2000/2001	315,701	165,366
Housing market segments (1995/2001):		
– housing stock from before 1948/1945	62 %	33 %
– system-built housing stock (Plattenbauten, paneláky)	ca, 33 %	43 %
– dwellings in detached and semidetached houses	5 %	20 %
Unoccupied dwellings (2000/2002)	ca, 17 %	[8 %]

Tab. 1: Basic facts about Leipzig and Brno

Note: Not all data are available for the same points in time. The first date in column 1 always refers to Leipzig, the second one to Brno. The Czech data are mainly taken from the censuses. Differences in the data generation cannot be avoided in an inter-country comparison. E.g., the Figs. concerning the Leipzig housing market are based on all dwellings, including the vacant ones, whereas the Brno data usually exclude dwellings which are not permanently occupied. The definition of housing vacancy (unoccupied dwellings) also differs – in Leipzig these flats are indeed not used by any resident.

Source: Steinführer 2004; Statistisches Jahrbuch 2004; Český statistický úřad 2004 (internet database: www.czso.cz/xb/redakce.nsf/i/mesta_a_obce); Monitoringbericht 2003

The inner city in Leipzig: staggering physical and socio-demographic change

By 1989, Leipzig was regarded as the symbol of urban decay par excellence among the major cities in the GDR. It was well known in the whole country for the highly deteriorated state of its old housing resources and for the ecological degradation of traditional worker areas in the inner city and in the whole industrial region of Leipzig-Halle.

Observers of that period of time would not recognise the town today. About 80 % of the *Gründerzeit* buildings (mainly dating from the late 19th century) and most of the post-war *Plattenbau* stock – hence the major housing market segments (Tab. 1) – have been restored since the beginning of the 1990s. Along with the rapid deindustrialisation of the region, also the environmental situation significantly improved (Breuste, ed., 1996). Billions of Euro, stemming from both public and private funds, went into the renovation and restoration of the physical environment, including the housing resources, roads and public spaces.

Hence, at least at the first glance, the post-socialist transition of Leipzig would seem to be a success story. Nevertheless, in just regarding the physical structures, such an assessment would be one-sided. Although a high share of the historical housing stock could be physically rescued and symbolically recovered (Fig. 1), new and unpredicted problems arose – the most severe one being a huge amount of vacant housing stock, which by the end of 2002 was estimated at 55,000 dwellings

Fig. 1: Modernised housing resources in the inner city of Leipzig (Photo: A. Steinführer)

Fig. 2: Vacant housing resources in the inner city of Leipzig (Photo: A. Steinführer)

(Tab. 1; Fig. 2). At least one third of them are on the market (Monitoringbericht, 2003), thus contributing to relatively stabile rents in the town for some years now. The most important reason for this unanticipated situation was a historically unique overlapping of contradictory developments: significant population losses (of about 100,000 inhabitants) because of labour migration to prosperous regions of western Germany and a strong suburbanisation on the one hand, and the restoration of about 75,000 dwellings in the city itself as well as the construction of about 20,000 new flats due to tempting tax incentives on the other hand (Kabisch, 2002; STEP, 2000; Steinführer, 2004). When discussing the specifics of the eastern Germany transition path, one has to point out this pattern of a "decoupling"of the overall economic parameters and the situation of the construction sector – despite recession and a continuously high unemployment rate in the town since the mid-1990s (about 20%), tens of thousands of dwellings in Leipzig and its surroundings were newly built or restored, including many old tenement buildings which were unoccupied by the end of the 1980s. In no other transition country did such a decoupling existed.

In the course of the 1990s, the inner city of Leipzig – a ring of *Gründerzeit* areas surrounding the centre which survived World War II with comparatively little destruction – became much more differentiated, in physical and social terms. First years of the post-socialist transition saw a rather slow onset of urban renewal because of thousands of unsolved restitution claims which affected about 22% of all residential buildings in Leipzig but much more in the inner city. From the mid-1990s, the process of inner city renewal accelerated. However, the strong suburbanisation in the surroundings of Leipzig (Nuissl, Rink, 2003) did not only impact on large housing estates, but also on pre-war areas: population decline, a continuous pattern of the inner city for decades, was typical for most *Gründerzeit* districts until about 1999.

Since then, the housing mobility patterns have changed and the socio-spatial differentiation has increased more decisively than in the first transition decade. A sociological analysis in the mid-1990s already distinguished several "types of the social space" but stressed that residential segregation had remained at a very low level (Kabisch et al., 1997). With the growing supply surplus in the housing market mainly in the inner city, both small-scale vacancies and population influx increased, thus contributing to a higher degree of segregation. Meanwhile, three patterns of residential segregation can be distinguished:

– socio-structural differentiation
– changes in the demographic composition
– and ethnic clustering.

In the inner city, the first two patterns usually go together. By the end of the 1980s and still until the mid-1990s, these areas were characterised by ageing, with younger cohorts mostly moving to the housing estates (before 1990) and to suburban locations (from 1993/94 onwards), respectively. Hence, a "natural" change was somehow overdue (Fig. 3) but several structural conditions were necessary in order to bring it about. The first factor was the rising number of attractive, modernised housing alternatives within the city boundaries in the second half of the 1990s. They became increasingly accessible because of the accelerating process of urban renewal, the declining number of inhabitants and (until 1997) households, respectively, and subsequently growing vacancies. In Leipzig, the intra-urban housing mobility significantly increased between 1997 and 1999 (Steinführer, 2004). The second crucial aspect has already been mentioned above: the specific East Germany version of restitution which resulted in a continuous predominance of rental housing. In the inner city of Leipzig, tenants make up approximately 90% of all households. A privatisation of the housing stock to sitting tenants, which was typical for many other transition countries, occurred only in exceptional cases. Therefore, the pre-war areas in Leipzig (as well as in other major cities in eastern Germany) are at present characterised by a high degree of absenteeism of "actual" owners. Recent efforts of the municipality to encourage (mainly young) households to become owner-occupiers (*Selbstnutzer*) in dilapidated, vacant buildings in the inner city have had only limited success so far. Finally, a third aspect impacting on the increasing demand for inner city housing must not be forgotten: the rising number of students in the town who – usually as flat-sharers (*Wohngemeinschaften*) – became a significant factor for the housing market and the infrastructure particularly in central locations. While in 1995, about 25,000 young people were studying at various colleges and universities in Leipzig, they already amounted to 37,000 in 2003 (Statistisches Jahrbuch 1997 and 2004).

As a result of these processes, the inner city age structure (Fig. 3) almost reversed in just one decade: in all central districts, the share of inhabitants between 20 and 30 years of age is above 15%, in most cases even above 20%, i.e. higher than in all other parts of the town. After a period of a strong suburbanisation (Nuissl, Rink, 2003), several districts of the inner city are currently experiencing a tendency towards reurbanisation (Haase et al., 2005). Some areas which in recent years developed into typical students' districts (mainly Südvorstadt), show signs of gentrification (e.g. an increasing number of pubs and student hang-outs, etc.), a process which, though, has to be coined as differing from standard western models given the overall framework of oversupply in the Leipzig housing market.

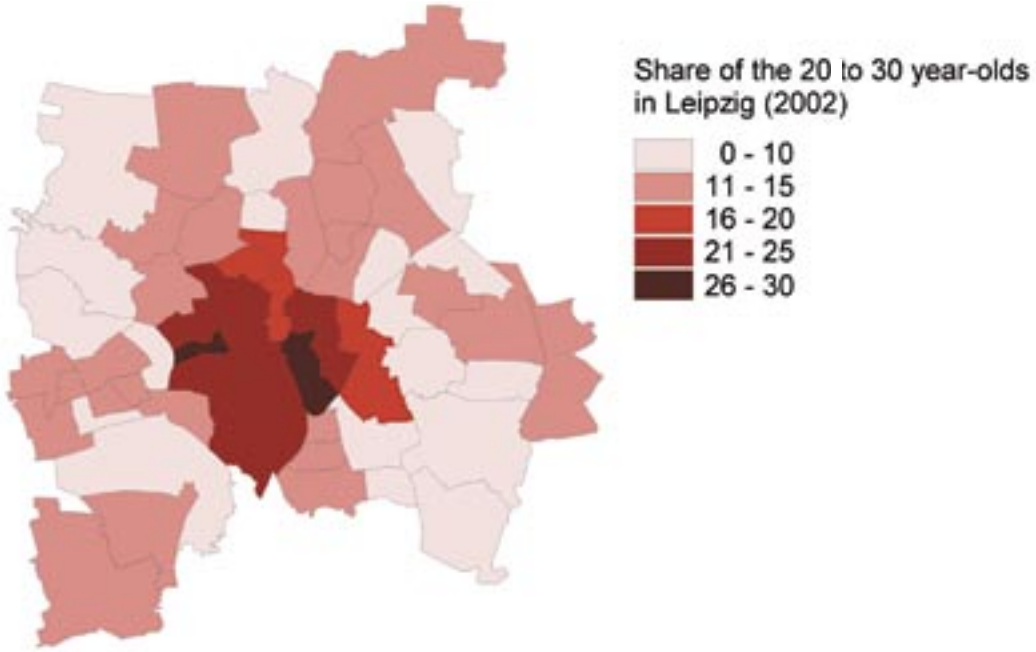

Fig. 3: Share of the 20 to 30 year-olds in the districts of Leipzig (2002)
Source: Orsteilkatalog 2002
Layout: Dagmar Haase, UFZ Leipzig

However, most inner city areas are characterised by social heterogeneity which came into being as a result of transition and is not to be regarded as a persistent pattern of real socialism: The supply surplus in the housing market allowed different social strata to enter the "traditionally" middle- and upper class districts. But the same factor is also increasingly threatening especially former working class areas in terms of abandonment and physical, social and symbolic deterioration. Furthermore, one of the losers of urban transition are some large post-war housing estates, especially the most recent ones, which in the 1990s were characterised by selective in- and out-migration processes and a strong symbolic devaluation, but – in comparison with other transition countries – also by a relatively good state of repair. The biggest residential estate of this type (Grünau, with less than 50,000 inhabitants now, but with nearly 90,000 occupants in 1990) exhibits in some areas signs of deprivation because of the concentration of low-income groups. But the older parts of the housing estates, in particular, are so far relatively stabile. However, demographic changes are approaching and will significantly impact on these areas in the near future, too.

When talking about ethnic segregation in the city, one has to be aware that non-German immigrants play only a minor role in Leipzig – as well as in all other East German towns (except Berlin) – not least due to the very difficult situation of the labour market. In 2003, just 7% of foreigners (a typical category in the German statistics; Statistisches Jahrbuch, 2004) lived in Leipzig. Major and since the late 1990s significantly increasing concentrations are to be found in just one eastern district (Neustadt-Neuschönefeld; about 15% of foreigners) which is also characterised by a high share of (German) unemployed and non-voters.

Despite the growing differentiation in recent years, the socio-spatial extremes are not as pronounced by far as the prognoses claimed. Moreover, the majority of inner city areas provide different housing opportunities for diverse social groups and allow, in the current circumstances of the housing market, for a relative social mix in many districts.

The inner city in Brno: major changes about to come

In contrast with Leipzig, the situation of the inner city in Brno appears – at first glance – completely different and almost non-comparable: Patterns of residential segregation are much more stable, in extreme cases already for decades and corresponding with a strong symbolic differentiation (Burjanek, 1996; Steinführer, 2003). Physical renovation activities took place much more on an individual, single-unit basis, and often not all parts of a residential building could be modernised at the same time. Due to the Czech housing policy (for a recent overview: Lux et al., 2004), the housing market is highly segmented and the rental sector *de facto* marginalised. The share of municipal housing in districts like Střed (42% of all multi-storeyed residential

buildings) or Královo Pole (46%) is still relatively high (ČSÚ, 2003a). But also on an intra-urban scale, the outcomes of post-socialist transition in the inner city can be easily overlooked, particularly in comparison with the housing and population dynamics at the urban fringe, e.g. in former villages like Medlánky, Jehnice, Ivanovice, Ořešín or Útěchov in the north of the town, which experienced rapid transformations in the second half of the 1990s. For example, the smallest district of Brno, Útěchov, almost doubled its population between the two censuses of 1991 and 2001 (211 vs. 446 inhabitants), and its housing resources grew by 129% (from 69 to 158 dwellings, mainly in family homes; ČSÚ, 2003b).

From the perspective of the census data, major parts of the inner city appear to be on the opposite path: While the city lost just 3% of its inhabitants in the 1990s, the population of Brno-Střed (which, however, also includes the city centre) decreased by 11% or 8,400 people. Also the number of permanently occupied dwellings declined in this part of the town by 8% (2,464 flats), with Brno as a whole experiencing almost no change at all (+53 dwellings; ibid.). These tendencies are accompanied by both decreasing household sizes and population density (Generel bydlení, 1999; Vaishar, Zapletalová, 2003).

On the one hand, these Figs. indicate the continuation of long-term trends: ageing and gradual thinning out of the inner city, typical for such areas already in the 1970s and 1980s. But on the other hand, the official macro-data probably hide more than they detect. Scepticism arises because of at least three aspects: Small-scale data distinguishing between the population change due to natural processes (births, deaths etc.) and housing mobility are lacking. Moreover, people registered as inhabitants in other towns, like students, who live in these areas as subtenants (mainly in town quarters close to universities, in Brno e.g. in Veveří), do not appear in the official statistics. Finally, the intense discussion in the Czech media and among scientists after the publication of the census data of 2001 about what the category of "unoccupied dwellings" (*neobydlené byty*) means in reality, revealed how difficult an adequate interpretation of the Figs. about the Czech housing stock and their utilisation actually is. Black markets are by their very nature no issue for official statistics.

Almost inevitably, a closer inspection of the inner city reveals a more ambiguous picture and by far more change. For example, decreasing (official) numbers of inhabitants are accompanied by ongoing physical densification, mainly under use of extensions and attics (*nadstavby*, *vestavby*; Fig. 4) and a rising number of owner-occupiers. The improvement of the air quality in general is partly negated by new environment degradation, mainly due to significantly increased traffic in the direction of new suburban shopping centres (Mikulík, Vaishar, 1996). This is also substantiated by results from a questionnaire survey which was carried out in two inner city areas of Staré Brno and Ponava in 2000 (Steinführer, 2003). The most dramatic change in recent years complained about by residents is indeed the environmental situation and mainly high air pollution and noise – although small-scale improvements are observed. Hence, when comparing the subjective evaluation of different dimensions of the residential environment (Fig. 5), physical patterns (ecological aspects, structural state of the buildings) are mostly criticised while the location of the areas is regarded and praised as a major advantage of the inner city.

But also the social surroundings are changing: The long housing occupancy of the residents (in the survey on average 24 years in Staré Brno and 26 years in Ponava) and their distinct intentions to stay is certainly a decisive pattern for the socio-demographic structure of these areas, especially in the context of a German-Czech comparison (Steinführer, 2004). But the same inhabitants also report on new in-migrants, partly socially and ethnically different, in recent years. Although "immobility" is an ostensible, first-glance impression for outside observers, the inside perspective reveals a permanent restructuring of buildings, dwellings and households which is only partly reflected by macro-data (in more detail: ibid.).

How to integrate these rather ambivalent patterns of inner city development in Brno into a concise picture? Have they been "stagnating" or "changing" in recent years – or to put it differently: How intensively did the post-socialist transition actually impact on these areas?

First of all, one should distinguish between implicit and explicit objects of reference: When comparing inner city areas such as Staré Brno or Ponava with the urban fringe (i.e. on an intra-urban scale) or with the situation in some neighbourhoods in Prague (inter-urban scale) or even with an example in another country such as in Leipzig (inter-cultural scale), then the changes are inevitably less pronounced and the impression of "stagnation" easily comes about.

Secondly, a distinction needs to be made in terms of more and less obvious developments. In this context, one can argue that several processes are already underway – but not yet apparent – which in the short- and medium term will have much more visible impacts on inner city areas not only in Brno:

– *overall demographic change*: While ageing has been one of the decisive socio-demographic patterns of inner city neighbourhoods in Brno for a long time now, in the future a "natural" replacement will

Fig. 4: Ongoing densification in the inner city in Brno (Photo: A. Steinführer)

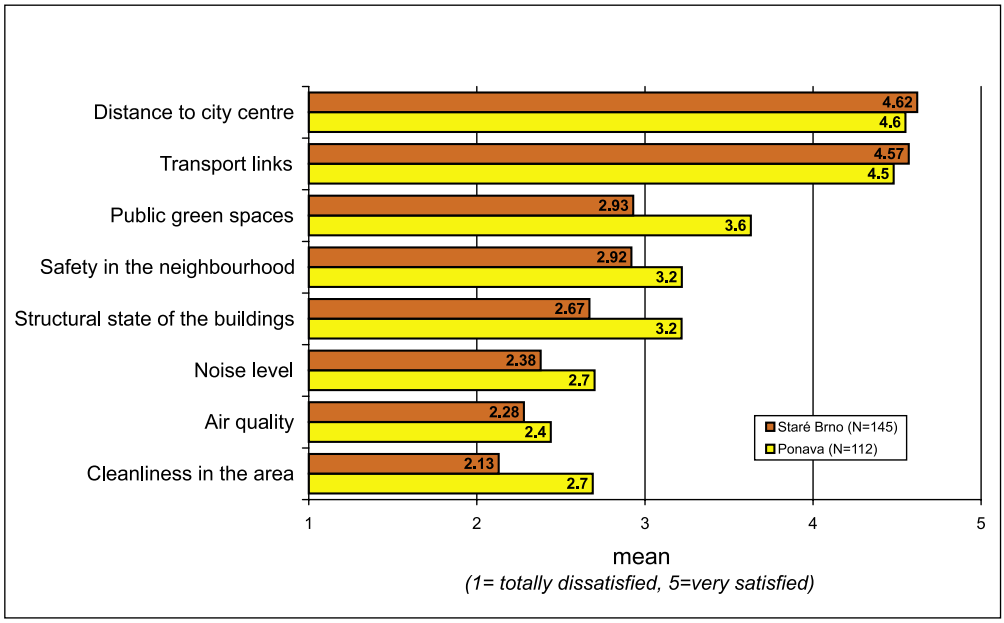

Fig. 5: Satisfaction with the residential environment in the inner city areas of Brno
Source: own investigation (October 2000)

occur. But regardless of single areas, the broader societal process of changing demographic behaviour (Rychtaříková, 1999) with its consequences of smaller and less stabile households, a growing share of the elderly to the disadvantage of younger age groups, more one-person households of different age and a declining importance of families in comparison with other household types will change urban structures and housing markets in the long run, too. When taking into account developments in other European cities, one can assume that the prospect for inner cities to attract new household types of younger cohorts is rising. Also new problems (displacement of poorer and older residents, increasing prices) will emerge. An initial sign of the significance of overall demographic processes are the currently declining

populations in many European towns, also in the Czech Republic (Andrle, 2001).

– *far-reaching change of tenure structures*: In comparison with many other transition countries, the large-scale privatisation of municipal housing resources started in the Czech Republic relatively late, but accelerated in the second half of the 1990s. Since then, many municipalities have been trying to get rid of their property, usually in favour of the sitting tenants. By the end of 2003, about 56% of all dwellings which had been handed over to the towns in 1991 were privatised (2001: 45%), (ÚÚR, 2004). So far, the City of Brno is playing a special part in this process, since here the sales are going on rather reluctantly: Until 2003, Brno (and its districts, respectively) kept 81% of the municipal housing stock (in contrast to 61% in Ostrava and 43% in Plzeň; ibid.). Moreover, in Brno the process is concentrated in the inner city and not, like in other towns or in other transition countries, in the post-war housing estates. The long-term outcomes of this crucial structural change – which the Slovene sociologist Srna Mandič (2001) coined as a "housing career dynamism without relocation" – and mainly its social consequences are unpredictable. In the short- and medium-run, the process of urban renewal will certainly be stimulated, but a stepwise takeover of these housing resources by professional, profit-seeking companies and subsequent displacements of long-time residents are also imaginable.
– *ongoing commercialisation of the city centre*: With the globalisation of real estate markets and increasing urban competition on the national and European levels, economic and functional changes in city centres will further on affect the neighbouring residential areas. Offices and shops are outsourced to cheaper locations. In Brno, the newly emerging southern centre (Jižní centrum), under the lead of the internationally operating developer ECE, will certainly change the socio-spatial structure and prices of the nearby deprived area of Trnitá, where a relatively high number of Romanies is living at present. This is also true for the planned relocation of the main railway station in the same direction. Urban researchers will have to observe these ongoing functional, physical and social transformations carefully.

A final remark concerning the question of "stagnation" or "change" in the inner city areas of Czech Republic seems to be necessary: For quite a long time, the transition research was focused only on the change – of structures, space, demographics, social groups etc. With the growing recognition of unpredicted consequences, path dependencies and different paces of single societal spheres in the course of the post-socialist transition, the maintenance of certain patterns was no longer regarded as a deviation from something given, but instead as inherently belonging to the process of societal transformation. To put it differently: the importance of dynamic features was overestimated not only in urban research – reflected also by the above mentioned prognoses. In practice, rapid change proved to be not the only expression of the post-socialist transition. The next chapter will systematise these patterns against the background of a German-Czech comparison taking into consideration broader urban trends and not only the inner cities.

Patterns of urban transition in inner city areas: a typology

In the briefly described example of inner city residential neighbourhoods in Leipzig, structural, socio-demographic and environmental change outweighed the constants, which, however, also existed. On the contrary, in Brno continuous patterns on several scales (dwellings, neighbourhoods, town) were most apparent. But also several dynamics on the meso- and micro-scale, such as a deteriorating environmental situation, physical changes in- and outside the buildings or large-scale property transfers, impacted and are still impacting on the inner city areas and the daily lives of their residents.

Based on the findings presented so far and the results of the broader investigation mentioned above (Steinführer, 2004), a typology of patterns of urban transition is suggested: *change* and *revitalisation* as dimensions of urban dynamic, *continuity* and *persistency* representing structural constants. In the following, each of these patterns will be substantiated with examples from the cross-national comparison:

1. Transition literature is full of descriptions and explanations of societal and urban *change* due to the threefold influence of post-socialist transition, globalising economy and new pan-European institutions. The change affected all dimensions of urban life, such as the policy agenda, administrative configurations, ownership structures and property rights, housing markets and social differentiation patterns. Concerning their general direction, the main socio-spatial changes (commercialisation, suburbanisation, selective up- and downgrading of pre- and post-war districts) were rather similar in both East Germany and Czech towns, although they occurred at different magnitudes and at different times.
2. Due to their very nature as born out of market economy logics, some changes can be regarded as a *return* to or a *revitalisation* of urban structures typical for the cities already before World War II. Urban research makes use of this pattern under several labels, such as "rectification" (Musil, 2002; with reference to the French historian François Furet), "return" or "tying up" (Fassmann, Lichtenberger, eds., 1995; Burjanek, 1996; Hampl et al., 1996; Rink,

1997). As one very obvious example, the revitalisation of the capitalist property market can be mentioned, which constitutes the main foundation of different socio-spatial processes also in eastern Germany and in the Czech Republic. Another déjà-vu process is the regained importance of "address" (place of living) as a status symbol along with the revaluation of certain urban districts as places which possess a high symbolic value of distinction.

3. Notwithstanding the urban change, in all post-socialist towns the *continuity* of social, material, symbolic, spatial and mental patterns stemming from the period of real socialism is apparent. This is not only true for physical structures. For example, despite the dynamic commercialisation, housing did not entirely disappear from many city centres nor is it restricted to yuppies. Instead, quite a few long-time residents kept their – seen from the perspective of a capitalist housing market – privileged position in these areas. This is also true for Leipzig and Brno, since in either town municipal housing companies still possess residential buildings in the city centres and the position of long-term tenants is rather strong. With respect to East German towns in general, the influential market position of municipal housing companies can be regarded as a further relict dating from before 1989. Other examples are restricted in this form to the Czech housing market, such as the phenomenon of "quasi-property" (Šmídová, 1996), which again refers to the strong position and the often very long housing occupancies of tenants and their emotional and material relationship to the dwelling they live in. Also in terms of housing careers and strategies – how to obtain, keep and adapt a dwelling over the course of a lifetime – many more aspects could be listed.
4. The latter pattern of urban transition should be separated from the final type, *persistency*, which additionally inherits the notion of resistance despite unfavourable contextual circumstances. Persistent urban structures reach back to even older configurations and survived real socialism without major changes and seem now to be back in their "natural" setting. For example, in both eastern Germany and the Czech Republic the institution of private property also in the housing sector was kept alive in certain types of neighbourhoods during the post-war period. After 1989, these assets provided the respective social groups with far better opportunities for the new capitalism when compared to tenants under rental contracts or starter households. Another example could be substantiated within this cross-cultural comparison only for Brno: the persistency of both symbolic and actual poles of residential segregation (areas with a poor and less qualified population living in deprived housing conditions, as contrasted with those neighbourhoods evidencing the opposite characteristics) over the entire 20th century, despite profound social, political and demographic changes in the city in this period (in more detail: Steinführer, 2003). But a similar, historically orientated analysis of Leipzig – which due to a substantial lack of small-scale data is much more difficult to realise – would certainly find some parallels.

This typology should be seen as a preliminary approach for systematising the different expressions, patterns and paths of post-socialist urban transition. It needs a further investigation and underpinnings. However, at this stage it is already becoming obvious that the concept of "*post-socialist*" (or "post-communist") *city* as separated from other models (Sýkora, 2000) is still worthwhile since it refers to a specific, somehow hybrid type of urban development with its own unique characteristics that will have long-lasting consequences for the future directions and structures of these cities – despite many prognoses from the beginning of the transition process.

Conclusions

"The" post-socialist city is a myth. Instead, a diversification of cities according to size, economic and demographic structure as well as location can be observed. Also the differences between urban developments in eastern Germany and Czech Republic in recent years are striking, e.g. concerning the quantitative situation of housing markets (oversupply versus shortage), the extent of housing mobility in the 1990s (high versus low), the physical appearance of inner cities (which in East German towns is much better), the rental market (important versus more and more marginalised) and the respective legal frameworks (deregulated rents versus ongoing pre-1990 principles for large parts of the housing stock). But with respect to basic structural patterns of the post-war period, the level of industrialisation, the condition and structure of housing resources, both countries started down their transitional paths in 1990 at a rather similar stage. And also today not all common features have disappeared, although in contrast with eastern Germany, the Czech situation often appears as either "catching up" (*nachholend*), delayed, slower or – especially in inner city areas – even stagnating.

On the basis of just a few selected findings from an inter-cultural comparison, it was argued that
(a) a closer and empirically grounded view reveals relatively high dynamics both at the level of residential areas and at the micro-level of urban actors as well as in the inner city areas of Brno,
(b) that continuities and persistent structures belong to the post-socialist transition just like the change and the return of pre-war patterns, which are worthwhile to

look for also in other, apparently more dynamic places, such as Leipzig. This result was owed to the contrastive German-Czech comparison which allowed for mutual learning from both case studies.

The focus of this paper was placed on inner city areas which in the international debate on the post-socialist transition attracted much less attention than other urban zones. Both in the present and the past, they embody crucial multi-functional urban structures, the development of which is always dependent on changes in other parts of the respective town. Increasingly, more general societal trends (in particular demographic changes) will impact on these areas both in (eastern) Germany and in the Czech Republic. The post-socialist transition can therefore no longer remain as the one and only point of reference – instead, broader European trends of urban development have to be taken into account. This will signify, among other things, an opportunity to reintegrate urban patterns in eastern Germany and Czech Republic into a more general debate regarding the present condition and the future of the "European" city.

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SUSTAINABLE DEVELOPMENT OF SMALL TOWNS A SLOVENIAN-MORAVIAN COMPARATIVE METHODOLOGICAL APPROACH[1]

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Abstract

The sector of small towns plays an important role in both Slovenian and Moravian settlement systems. Its sustainability is the subject of the study. Subject to evaluation was a theoretical background. There were 15 Slovenian and 50 Moravian small towns with 5 – 15 thousand inhabitants chosen for the comparison. A typology of small towns was developed. A set of 12 indicators (economic, social and environmental) was defined.

Shrnutí

Setrvalý rozvoj malých měst: slovinsko-moravský srovnávací metodologický přístup

Malá města hrají významnou úlohu jak ve slovinském, tak v moravském systému osídlení. Jejich setrvalost je předmětem řešeného projektu. V příspěvku byla vyhodnocena teoretická báze studia. Pro srovnání bylo vybráno 15 slovinských a 50 moravských malých měst s 5 až 15 tisíci obyvateli. Byla zpracována jejich typologie a definováno 12 srovnávacích ukazatelů (ekonomických, sociálních a environmentálních).

Key words: *small towns, typology, Slovenia, Moravia, Czech Republic*

1. Background to the study of the sustainable development of small towns

City is a complex spatial and social phenomenon, characterized by the dense concentration of population, clustered pattern of settlement, urban way of living, and city-based economic activities (Vrišer, 1983). Cities can be treated as natural ecosystems that have been heavily transformed by anthropogenic impacts, or as ecosystems with additional energy flows based on fossil fuels. Biologist Odum (1989) defines the city as a parasite on natural and agricultural ecosystems. Cities of the world are increasingly consumers of goods and ecological services provided by the planet, and hence represent a critical burden on the global ecosystem. The environmental impact of urban activities can be analyzed at three levels (Špes, 2000):

– global: via energy and resource consumption
– regional: impacts on adjacent rural areas from pollution, land use pressures, interference in water flows and other natural resources
– local: cities shape a specific internal environment with a changed quality of landscape-forming components

Sustainable urban development arises from an ecosystemic understanding of cities in which it is necessary to strike a balance among all elements of urban life (Encyclopedia of the City, 2005). The basic paradigm of sustainability stems from needs and demands for the maintenance of ecosystem stability in dynamic equilibrium. This allows the landscape-forming components to renew in the face of short-term external impacts (shocks). All natural or predominantly natural ecosystems tend towards the long-term stability and have a capability to adapt to external effects by absorbing or neutralizing them and creating a new equilibrium. In this way ecological stability is maintained over the long term. However, it can be disrupted by human impacts which are too powerful, or by rapid changes which act synergistically and thus alter the flows of matter and energy through the ecosystem. This brings unexpected and unforeseen environmental effects counter-acting to sustainable development (Park, 1997). A variety of human impacts, especially the effects of most aggressive activities, can reduce the quality of life for a large number of urban residents.

[1] The paper is focused on the comparison of small towns in Slovenia and Moravia, being implemented within the programme of bilateral international cooperation KONTAKT on the theme of Sustainable Development of Small Cities. On the Czech part it also links with the grant project of Grant Agency ASCR No. IAA3086301 Geography of Small Towns.

Adaptation to bioregional limits, or a return to Howard's concept of the green city, is critical for cities. Urban planning should thus take into consideration the varying self-cleaning capacities of cities and their neighbourhoods, the limits and risks in the environment as part of the environmental impact assessment (EIA) and the strategic and more broadly conceived assessment of urban plans, projects, and renewals on the environment (SEA).

With respect to the multi-level development of cities it should be stressed that sustainable urban development does not include merely the environmental and ecosystemic aspects. Sustainable urban development includes economic, social and environmental sustainability, i.e. desire for a general state of urban well-being and high quality of life for all urban residents, an appropriate material standard of living and a degree of social security and justice, while still preserving spatial and living conditions for the future generations of urban residents. Sustainable cities are thus cities where social and economic interests are in harmony with environmental and energy interests, thereby ensuring sustainability in change.

It is Pacione's view (2001) that cities vary greatly among themselves according to numbers of inhabitants, area, economic, ecological and other characteristics, and it is therefore not possible to apply some generalized concept of sustainable urban development. Very different forms of urban development require likewise very different strategies for new development and changes in existing urban spaces which are adapted to local urban conditions. In this regard small towns which are subject of our investigation demonstrate specific needs in planning for their sustainability. For the last decade towns have been subject to strong pressures from a variety of human activities (the construction of housing, infrastructure, industrial and business zones, tourist facilities and so on), and have undergone major changes in their spatial expansion, suburbanization and also in social and economic areas. In many places the transition changes and the closing down or restructuring of manufacturing plants led to higher unemployment, to a general weakening of social security, and spread of acute environmental problems. There are also instances of small towns that experienced radical developmental improvements in the foundation of successful companies which in turn attracted other kinds of economic activities.

Small towns represent a specific phenomenon of the settlement structure. Small towns represent an alternative living environment for at least certain groups of population. The specific environment of these towns is characterized for example by a simple fact that people need no cars to move around. A person moving around in his/her town by foot or biking perceives the town, behaves and maintains social contacts quite differently than a car driver. Small towns provide to their inhabitants and visitors a feel of greater security. The research problem can be formulated as follows: What is the attractiveness of small towns consisting in, what are the merits and drawbacks of living in them, what factors can influence their development and what is the regional differentiation of this development.

Small towns are also a key in understanding and finding the way to rural prosperity since they ensure for inhabitants of their microregions the primary level of urban services. It is not only services in the proper sense of the word but also job opportunities and social contacts. It can be said that the prosperity of marginal regions depends to a great extent also on the prosperity of their centre. Reduction of job opportunities in small towns has affected mainly the rural population in their hinterlands. The research problem can be formulated as follows: What are the existing principles of the formation of microregions, what can be future ways and directions of the prosperity of small towns and their hinterlands.

Small towns are a typical phenomenon observed in Europe while the phenomenon is not known in the developing world too much. Czech small towns were developing for centuries in the social and economic context similar to small towns in other countries of Central Europe. West Europe recently experienced a process of the partial disintegration of microregional structure. In connection with the concentration of activities and enhancement of rural population mobility a number of village inhabitants meet their requirements of central services not in neighbouring small towns but rather in more distant medium-size and larger centres that are often better equipped. However, the former 40 years of centrally planned economy to a certain extent conserved the settlement structure of the 1940s in the post-socialist countries. The road to unlimited course of similar changes in the settlement system as that existing to the west of our state borders was opened only ten years ago. The research problem can be formulated as follows: What is the course of this development in the conditions of Central Europe, to what extent this development has similar features as that in West Europe and what is its regional differentiation.

A question is the criterion of small towns assessment. We assume that small towns should provide an optimum housing environment for their inhabitants, attractive environment for their visitors, effective entrepreneurial environment for bearers of economic activities, and that they should furthermore provide for personality development. The starting of behavioral issues and methods in urban geography was pointed out by Lees (2002). The research problem can be formulated as

follows: What is the perception of small towns by their inhabitants, visitors, entrepreneurs, and what are the ways by which their identity is created.

2. Objective and methodology

Geography of small towns is methodologically the geography of small areas as a part of regional geography. Regional geography is a supreme geographical discipline that however has been experiencing a certain crisis. According to some authors, this crisis results from a methodologically uncleared character of the discipline as compared with the partial geographical sciences. The problem can be found especially at a stage of regional geographical syntheses. Methodology of geographical disciplines was rapidly developing in the last ten years in connection with the changed community demand, approach to new information technologies and development of new scientific branches that have not been sufficiently methodologically refined yet (e.g. telecommunications). With their size and population number small towns make it possible to explore reality in details and to test methods which could be adequately used also in big towns or in rural space. The research problem can be formulated as follows: What are the ways to enrich under existing conditions the methodology of individual partial disciplines and regional geography as a whole in relation to the research of small towns?

In this article we present the basic starting methodological points for the bilateral research project whose main objective was to study the condition of small towns in the Czech Republic (Moravia) and in Slovenia in the light of their prospects for sustainable development. We selected various economic, social and environmental indicators, for which both countries had the required comparable data available, which allowed us to do a comparative analysis of the quality of life in selected small towns.

For all selected indicators which as a rule require a great deal of both quantitative and qualitative information, we prepared precise definitions at the outset, identifying data sources and formulating calculation procedures. In this way we assured the uniformity of the research part, as well as a good understanding of the meaning of individual indicators for assessing the economic, social or environmental segment of sustainable development. In order to balance all three segments we decided to have an equal number of indicators for each.

Parallel to the selection of the most relevant indicators of sustainable development of small towns it was necessary to develop also a typology of small towns. We assumed that settlements with 5,000 to 15,000 inhabitants can be grouped into several characteristic types with respect to their demographics, functions, genesis, morphology and so on. At the forefront of our interest were differences in the assessment of indicators of their sustainability, and especially the differences between the comparable types of small towns in Moravia and in Slovenia.

3. General characteristics of urban ecosystems

Slovenia has typically a relatively low level of urbanization; based on the last census, 50.8 % of the Slovenian population lives in an urban ecosystem (in towns and urban regions) (Mestna naselja, 2004), which is well below the EU average and even less than at the time of the 1991 census (51.4 %). Intensive demographic growth in cities and towns began immediately after 1945 due to rapid urbanization and rural depopulation. The fastest growth was recorded in the 1960s, with the number of inhabitants in some urban centers growing by one-fifth or more between 1961 and 1971. In the 1970s and 1980s, the population growth in towns subsided, but the population in the surrounding region of cities began to grow faster. After 1981, the housing construction in urbanized areas on the outskirts of cities was greater than in the cities themselves. The average annual growth in the number of residential units in the past decade exceeded the population growth (Ravbar, 1999). In the last decade (1991 – 2002) the demographic stagnation in urban settlements continued, with an average index of 98.8. Over a half of the Slovenian population in urban ecosystems is concentrated on 6 % of the country's territory with an average density of 864 inhabitants/km^2 and occupying 52 % of all housing (SURS, 2004).

In general, urban regions of Slovenia are the most heavily polluted landscape ecosystems, and among landscape components reducing urban environmental pressures, the reduction of classic emissions of air pollution was successful. The major contemporary environmental problems of Slovenian cities and their environs consist in an inadequate system of municipal waste management, inappropriate discharge and treatment of municipal wastewater (low environmental municipal standard), emissions from motor vehicle traffic (including noise), increase in the material and energy flows of households, and limited effectiveness in reducing pressures on and degradation of lowland ecosystems due to dispersed settlement patterns and other inappropriate impacts on the environment and space use (Plut, 2000).

There are no systematic studies in Slovenia on the quality of urban ecosystems, environmental consequences of the network (sample) of settlements and flows of matter and energy within and among them. Given the geographical variation of Slovenia's cities as well as the varying degrees of environmental pressure on them, it is necessary to take into account the widely different self-cleaning capacities of the environment and its

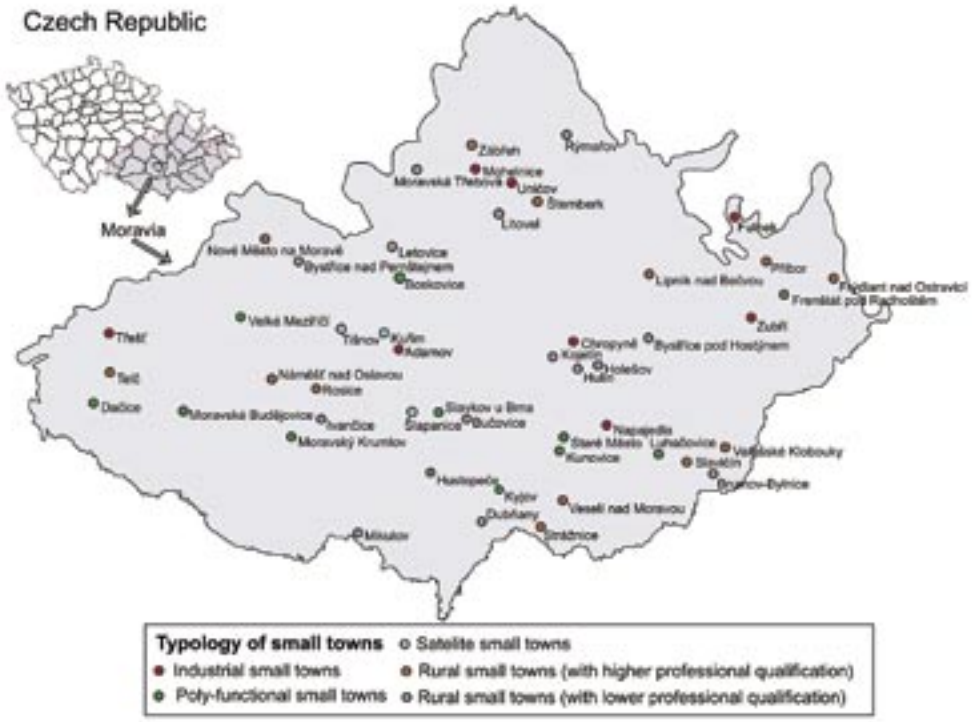

Fig. 1: Typology of small towns: Moravia

Fig. 2: Typology of small towns: Slovenia

individual landscape-forming components, which along with the extent of pollution have an influence on the degree of pollution of the residential environment. Also, due to the fact mentioned it is necessary in planning the

urban system (network) of Slovenia to consider the self-cleaning capacities and other spatial and environmental conditions, protective limits, and the degree and extent of landscape and especially urban degradation (Plut, 2004).

Towns in Czechia are defined by an administrative status which does not answer to the geographical definition of the town. The criterion of population number – required for the submission of application for town status – started to be used only recently. The administrative limit of 3 thousand inhabitants is however not a currently monitored statistic category. The post-war population development in the territory of today's Czechia by size categories is presented in Tab. 1.

Population	1950	1961	1970	1980	1991	2001
up to 1 999	46.1	40.1	35.4	24.5	24.8	26.1
2 000 – 19 999	25.8	29.5	29.2	31.5	28.8	29.1
20 000 – 99 999	11.0	12.7	16.6	23.1	23.0	24.0
100 000 and more	17.1	17.7	18.8	20.9	23.4	20.8

Tab. 1: Czech Republic – Population development (%) by size categories of communes in 1950 – 2001
Source: Czech Statistical Office Prague

It should be added for explanation that individual table items were affected by changes in the administrative structure of municipalities. Until the 1991 census, the merging of municipalities occurred which resulted in a rapid population loss – in the smallest communes among other things also due to their affiliation to towns. The period between the censuses in 1991 and 2001 was on the contrary a period of the division of municipalities, which slightly increased the number of "rural" inhabitants. On the other hand, in many a case some larger towns fell into lower population size categories due to the singling-out of their rural parts.

Nevertheless, since 1980 the above table shows an apparent predominance of the population in communes with 2–20 thousand inhabitants, i.e. in the population size category that contains small towns and the largest rural villages. The number of inhabitants in the communes of this category increased in the last ten years. Thus it is obvious that small towns have a very considerable share of urban population in Czechia with the distribution of the population in the communes by selected size categories being relatively uniform.

The quality of urban ecosystems has been recently markedly changing also in Czechia. A certain decrease of pollution from industries and agricultural operations occurred in consequence of the bankruptcies of many manufacturing enterprises and thanks to technological changes focused on higher effectiveness, lower energy requirements of production and environment legislation. Pollution from communal management was reduced thanks to the building and completion of environmental infrastructure (sewerage systems, sewage water treatment plants, gasification, controlled landfills of solid communal waste). This concerns also the small towns in Moravia where the infrastructure was built later and its condition is better as compared with medium-size and large cities.

These efforts are somewhat disturbed by a greater use of substances foreign to nature such as plastic covers, home chemistry etc. in communal management. Regarding the high price of electric energy, gas, domestic waste disposal and the like, a part of the population returns to old heating technologies. Pollution from communal management depends on the physico-geographical location of individual towns (on the scale of atmosphere aeration, frequency and duration of temperature inversions, discharge of local water courses etc.).

One of major environmental problems in towns is the extreme development of individual motoring and consequences of the fact that a considerable share of freight transport has been moved onto roads. The load rate of small towns by traffic depends on their location with respect to main traffic arteries. Approximately a third of small Moravian towns are situated on main arterial roads thus having a considerable part of transit transport.

4. Typology of small towns

The precise number of towns in Slovenia is hard to determine, since towns do not have a special formal-legal position in the administrative and territorial organization of the country (Rebernik, 2005). Based on the latest methodology for the identification of urban settlements used by the Statistical Agency of the Republic of Slovenia, the urban system comprises 156 cities and urban settlements. The category of towns includes settlements with more than 3,000 inhabitants, settlements with more than 2,000 inhabitants and a surplus of jobs beyond the size of the working age population of the settlement, and municipal centers with more than 1,400 inhabitants and jobs which exceed the size of the working age population. According to these

criteria there are 104 cities and urban settlements in Slovenia. Other 52 urban settlements are suburban settlements situated in a greater vicinity to an urban center and functionally connected with a city (Urban settlements in the Republic of Slovenia, 2003).

Typical for the Slovenian urban system is a predominance of small towns; only 10 cities have a population larger than 20,000 inhabitants. The two largest cities (Ljubljana and Maribor) account for a combined total of 360,000 residents, or 40 % of the urban population, whereas there are few medium-sized cities with populations between 15,000 and 100,000 inhabitants, and a lot of towns with 5,000 to 15,000 inhabitants. These are frequently former municipal centers occurring in the administrative system of the past Socialist Republic of Slovenia. Municipalities had a high degree of autonomy with respect to economic, social, and spatial development, and municipal centers were particularly strong as a result. In this way a dense network of small towns took shape, which became employment and supply centers for the wider rural areas that they served. The proximity of jobs and shops enabled daily commuting, which influenced the relatively low degree of urbanization in Slovenia. Due to their large significance for spatial, regional and economic development we included 26 settlements with 5,000 – 15,000 inhabitants in our study. Cities with more than 15,000 inhabitants in the urban system of Slovenia represent the level of regional centers, and their functions and the area of the regions they influence diverge from those of small towns.

Fig. 3: Kočevje (Slovenia – population 9,000) can be found close to the Croatian border. (Photo: A. Vaishar)

With respect to demographic and economic development, in consultation with our Czech colleagues we developed a typology for small towns, classifying them into four groups. The typology is based on a combination of three groups of criteria: demographic development (with an emphasis on the population development in 1991 – 2002), economic trends (especially the ratio between the secondary and tertiary activities) and the degree of employment (the ratio between the number of jobs and the number of working-age-people and the extent of daily commuting). Three types (industrial, employment centers in rural areas, and satellite towns) are common to both countries, while the fourth variant is distinguished in Slovenia by tertiary activities and in the Czech Republic as a rural small town.

Czech territory chosen for the analysis was the area of historical Moravia – better comparable with Slovenia. This territory includes 50 towns with the population ranging between 5 to 15 thousand. With respect to the fact that Moravia has only five towns with the population between 15 to 20 thousand inhabitants, the interval represents a certain gap. On the other hand, there are 3 big cities in Moravia: Brno, Ostrava (partly situated in Silesia) and Olomouc. There is another gap in the interval between 50 and 100 thousand. The group consists only of the regional center of Zlín and towns of Frýdek-Místek (on the Silesian border) and Jihlava (on the Bohemian border). The five cities (except of Frýdek-Místek) represent a regional level of the Moravian settlement system. A district level is based mostly on towns with 20 to 50 thousand people. There are 16 towns of this size in Moravia. The number of Moravian towns with less than 5 thousand inhabitants (according to administrative status) is 59 but the actual urban character of many of them is disputable from the geographical and functional point of view.

Typology of small towns should take into account different characteristics of the current stage of urbanization processes. A very pronounced feature is the insufficient equipment with services of Moravian small towns as compared with Slovenia. It is namely the tourist industry that is much more developed in Slovenia than in Moravia. This is why employment rate in the tertiary of Moravian small towns ranges by 10–15 % lower than in Slovenia and which is also the reason why not a single one of Moravian towns can be ranked in the category of tertiary small towns.

Industrial small towns

The "industrial small town" type was identified on the basis of a combination of two criteria: a sharp drop in population between 1991 and 2002 (index below 95) and a high share of employees in secondary activities (over 43 % in Slovenia, over 42 % in Czechia). There are 4 such towns in Slovenia and 8 in Moravia.

Towns of this type were those that had undergone early industrialization in the 19th century, due to their natural resources or favourable location for transportation. Their economic development was based on mining (coal) or on "old" industrial branches such as foundries and metal, machine and textile industries. Towns of this type achieved a surplus of industrial production and employment in the 1950s, 1960s, and 1970s. The labour force demand caused intense immigration to these towns during the same period from rural areas of Slovenia

Fig. 4: Zagorje (Slovenia – population 6,900) is industrial and mining town in the central Slovenia. (Photo: N. Marot)

and other republics of the former Yugoslavia, as seen in the above average share of the non-Slovenian population in these towns. In the 1980s, the older industrial sectors were hit by a recession which further deepened during the period of economic transition in the 1990s. The towns are subject to de-industrialization, which has economic, social, spatial, and environmental impacts. As industrial plants declined and underwent restructuring, there was a sharp drop in the number of jobs in industry, which led to an exceptionally high growth of unemployment. Poverty and the social marginalization of a part of the population deepened. High level of unemployment, unfavourable educational structure and below average wages are typical for towns of this type. Economic transformation in the direction of the development of new industrial sectors and services was hard to carry out in these industrial small towns due to the lack of required skills and training of the labour force. Part of the population is migrating to other regions of the country, causing a population loss.

A direct result of the early industrialization is a severely degraded environment (air, water, soil). In the 1990s, there was a perceptible improvement in environmental quality as a result of the decrease in industrial activity and pollution, brought about by the economic recession and environmental protective measures. Due to de-industrialization, a severely degraded urban environment (abandoned industrial plants and mining areas, degraded residential areas) is typical for industrial small towns. Such an environment reduces the quality of life and the value of land, but at the same time represents a valuable area for development within towns.

Fig. 5: Adamov (Czech Republic - population 5,000) is an extreme case of industrialized town. Prefabricated houses built in the 1970s stand in a sharp contrast to the rest of the original village represented by the Church of St. Barbara. The whole scene is surrounded with valuable forests. (Photo: E .Kallabová)

Industrial small towns in Czechia are towns whose economic foundation was as a rule just one enterprise, often with several thousand employees. The 1950–1980s were typical with high immigration which was – unlike in Slovenia – usually arriving from the close surroundings and also with intensive commuting for work. A specific case is the town of Fulnek where the population was in fact totally exchanged in 1945 after the evacuation of Germans. After 1990, the leading companies were as a rule maintained by government for a certain time, often also due to social reasons. The employment rate in industries however recorded a dramatic decrease (Vaishar, Kallabová, Trávníček, 2002) – be it in the consequence of bankruptcies or due to company transformations.

Fig. 6: Fulnek (Czech Republic – population 6,000) is connected with the name of Jan Ámos Komenský. The private chateau dominates the main square, renovated after the WWII. (Photo: A. Vaishar)

Employment centers in rural regions (Poly-functional small towns)

The "employment centers in rural regions" type is distinguished by a large surplus of jobs relative to the size of the working age population (index over 1.3 in Slovenia, simple majority in Czechia). Thus the towns of this type serve as employment centers for the predominantly rural surrounding region. As a general rule they are located in less developed, peripheral, and mostly rural regions. The set consists of 10 such towns in Slovenia and 12 in Moravia.

Towns of this type experienced a rapid economic and demographic development mainly between 1970 and 1990. Slovenia introduced a concept of polycentric spatial and regional development back in the 1970s. Dispersed industrialization was typical for this period. Industrial enterprises, frequently "dislocated" units of larger industrial concerns, were located in small towns and central settlements of rural regions. Due to the need of a greatest possible number of jobs, labour-intensive industries (textiles, footwear) or industries based on local resources (timber, food) were given special priority in the development. In the majority of these towns, there is therefore an above average presence of industry. Some towns in this group provide services and supplies to their rural hinterland, with the development of services being especially intensive in recent decades. In the 1990s, as a result of globalization, there was a deepening of the recession affecting the labour-intensive industries, which has contributed to the rise of unemployment in less developed regions of Slovenia.

Fig. 7: Ajdovščina (Slovenia – population 6,400) is situated in the east of the country, below the Trnovski gozd plateau. (Photo: E. Kallabová)

The former administrative system also had a strong influence on the development of this type of small town. The 1958 reform of the administrative-territorial organization resulted in many small towns becoming municipal centers with a high degree of autonomy and new functions in public administration, supply, and services, which heavily influenced their development. Due to suburbanization and economic recession the majority of small towns of this type experienced stagnating or slightly falling population levels in the 1990s. Many small towns in this group lost their role of employment and supply centers for rural areas, which reflected in the increasingly unequal levels of regional development in Slovenia.

Poly-functional small towns in Czechia are usually towns with the developed tertiary sector which – in combination with the formerly localized industrial operations – creates a sufficient amount of job opportunities. The group of towns contains some traditional centres of rural hinterlands such as the most important Moravian spa of Luhačovice, and as a special example also the two satellites of the medium-size east-Moravian town of Uherské Hradiště – Staré Město and Kunovice where job opportunities were localized at times when the three towns formed together one administrative unit.

Satellite small towns

The basic criteria for the classification of this type was a number of working age inhabitants greater than the number of jobs, and a high rate of population growth between 1991 and 2002. The "satellite small towns" type comprises towns which are functionally closely tied to larger urban centers. A large portion of the population of satellite towns is thus employed in the center of the urban region. Satellite towns thus together with the greater larger center comprise an urban region with an intense daily commuting traffic. Decentralization of the population is also a characteristic feature, as the population migrates from the city centers to more dispersed satellite towns in suburbanization zones.

In Slovenia the only urban center around which satellite towns are developing is Ljubljana. Within the Ljubljana urban region they are located at a distance of 20 – 30 km from the city. After 1991 they experienced a rapid population growth as a consequence of both emigration from Ljubljana and immigration from other Slovenian regions, attracting in particular young families with children. A characteristic feature of towns of this type is an above average proportion of young and younger middle-age generations, which creates a demand for new infrastructure and public services. The population growth induces intensive housing construction and increasing real estate prices. Although a large share of the working age population commutes to Ljubljana, satellite towns are also smaller employment centers with from 2,000 to 7,000 jobs. As a part of the Ljubljana's urban region with the highest level of economic development and favourable development potential, satellite towns experience an intensive economic, population and spatial growth. Towns in this group are thus characterized by a

favourable educational structure and by an above average income of the population.

The degree of suburbanization in Moravia is considerably lower than in Slovenia. This is why only three small towns situated in Brno surroundings have been included in the category of satellite small towns. Small towns near Ostrava are mostly situated already in the territory of Silesia. Satellites are usually historical towns that used to have activities of their own and the present suburbanization processes only modify or overcover the original structure. These satellites are not only the places of housing for people working in Brno but they also concentrate job opportunities in industries and in tertiary activities. The intensive commuting for work exists therefore not only from the satellites to Brno but to a certain extent also in the opposite direction. Tišnov has a relatively extensive and clearly demarcated catchment area on the contact of three districts. In contrast, with respect to its social characteristics Adamov is not considered a suburbanized town in spite of the fact that it can be easily reached from Brno by public transport in 20 minutes.

Advantage of satellite towns is usually a possibility of using the labour market of large city and as a rule also an above-average qualification structure of population. Problem is on the other hand a risk of identity loss in these satellite small towns that increases with the decreasing distance from Brno.

Tertiary small towns

The principal criterion for the "tertiary small towns" type was a strong orientation towards the secor of services (with more than 65 % of the employed). Tourist centers along the Slovenian coast and at the edge of the Alps are in this group. Characteristic of tertiary small towns is a surplus of jobs relative to the size of the working age population. In addition to tourism, the retail and health care sectors also have a relatively high economic significance. Characteristic features of small towns of this type are very good services and supply infrastructure and a high quality residential environment. Despite the stagnation in population, tertiary small towns are experiencing intensive spatial expansion, as reflected in particular in the construction of tourist infrastructure and housing. Also characteristic is a high proportion of secondary residences. The above average share of older people indicates the start of a process of immigration by retirees from other Slovenian regions.

Fig. 8: Bystřice nad Pernštejnem (Czech Republic – population 9,000) grew in the last 40 years as a settlement of uranium miners. In connection with the expected lose / down of the miners, the town looks for new prospects. (Photo: A. Vaishar)

Rural small towns

Other small Moravian towns which did not meet the criteria of appurtenance to some of the above mentioned groups were defined as rural small towns. This category includes 27 small towns in Moravia. The large group is further differentiated according to population qualifications. The group of small towns with the lower qualification potential of population includes 14 towns with less than 36 % of inhabitants over 15 years of age with the school-leaving exam; 13 small towns in Moravia have the population of higher professional qualification.

The lower qualification potential was recorded in former industrial or mining towns in which the original economic activities have been already down-sized as well as the share of employment in industries. These are also the towns in which the population was replaced after World War II and after the evacuation of Germans. Some of these towns struggle for the maintenance of their urban functions. The struggle can be successful namely for towns that will succeed in winning or defending important tertiary functions (secondary schools, hospitals and the like).

The urban character of rural small towns with the higher qualification potential of population cannot be doubted about. The towns in question are mostly important centres of rural hinterlands or places with the rapidly developing tourist industry. It can be assumed that these towns will gradually achieve the fulfillment of criteria for the classification in the category of tertiary or polyfunctional small towns.

5. Selected indicators of sustainable development of small towns

Economic development creates an indispensable material foundation for sustainable development and is the basis of human prosperity. From the standpoint of sustainable development it is not only the type and extent of the production of goods and services and their

ECONOMIC INDICATORS			
No.	**Name of indicator**	**Definition of indicator**	**Rationale for the indicator with respect to sustainable development**
1	Gross income (Slovenia)	Gross income as a basis for calculating income tax per capita	Measures the economic power of the urban population and shows the extent of financial resources obtained from income (wages, pensions, income from capital, vacation and performance bonuses, etc.)
1a	Town budget (Czechia)	Total town budget per capita	Measures the funds available to the town that can be channeled into overall development
2	Availability of jobs	Number of jobs relative to the size of the working age population in the town	With respect to balanced development a slight excess of jobs is recommended in a town as an employment center, which does not cause excessive commuting among the population.
3	Employment structure	% of employed in the service sector	In the post-industrial period the service sector, which is theoretically more environment-friendly and sustainable, predominates, thus a high share is evaluated positively.
4	Market price for real estate	Price per m^2 of land for building and housing	A complex indicator of the development potential of the town – higher prices are usually a reflection of greater demand as a result of favourable factors (socio-economic development, quality of the residential environment, access, etc.).
SOCIAL INDICATORS			
5	Age structure	Index of ageing or ratio between the population over 65 and under 15	This reflects natural and settlement trends of the population as well as the increase in life expectancy. Ageing of the population with respect to sustainable development is unfavourable (wider social context), because it slows down the rate of economic growth and threatens the quality and financial stability of pension and health care systems, or in other words the system of health and social security.
6	Unemployment rate	The share of the unemployed working age population	High level of unemployment results from recession in certain economic sectors and from the unsuccessful restructuring of economy. Unemployment increases poverty and social marginalization of a part of the population.
7	Educational structure	Share of the population older than 15 with higher education	A better education structure of the population means crucial development potential. Human resources are an increasingly important factor in competitiveness, and knowledge ensures a better life quality and development of social contacts.
8	Accessibility of public services	Access to selected services in the town: high school, old peoples' home, hospital	Access to selected public services is indicative of the social aspects of sustainable development, whose basic objective is ensuring high quality of life, social contacts and equal opportunities.
ENVIRONMENTAL INDICATORS			
9	Index of ecological stability	The ratio between ecologically stable areas and ecologically unstable ones in the region of the settlement	A favourable ratio between the natural (ecologically stable) and built (anthropogenic) environment contributes significantly to a higher quality of the residential environment.
10	Air quality	The synthetic expert assessment of the physical geographical features of the townwith respect to air quality and an estimate of sources of pollution	A key and integral part of environment quality is clean air. Physico-geographical features of the town and its immediate vicinity have an important influence on the superior or inferior capacity of the environment for regeneration or neutralization.
11	Wastewater treatment	% of households hooked up to a wastewater treatment plant and the method of treatment	A complex indicator through which it is possible to conclude about the amount and degree of treatment of household wastewater and which indicates the so-called municipal environmental standard.
12	Municipal waste management	A synthetic indicator which takes into account: the annual amount of municipal waste collected per capita, the % of recycled collected waste, and the suitability of landfill location with respect to geographical characteristics	A complex indicator of pressure on environment; among the main goals of waste management is a reduction of the amount of waste produced at its origin, as well as sorting of waste for re-use and the use of waste with as little dumping as possible.

Tab. 2: Definitions and rationale for sustainable development indicators of small towns

distribution that is important, but also the optimal use of natural resources. Therefore in the context of sustainable development it makes sense that economic indicators are interpreted only if connected to social and environmental ones.

Four basic indicators, reflecting the economic strength of the town and its population were included in the group of economic indicators: availability of jobs, employment structure, and the attractiveness of the town as a place to live and work. The main economic objective of sustainable development is certainly to increase the material welfare of the population, which in the case of Slovenian towns is measured by gross income per capita, which indirectly also reveals differences in the level of economic development of towns. A similar information for the Moravian towns is provided by the indicator of funds available from the town budget per capita. The employment structure is also an important indicator of economic development and functional orientation of towns, in which priority is given to the sector of services, which is less energy and resource intensive. Economic success and development opportunities for a town are reflected in increasing or decreasing demand for housing and construction land that directly affects their market prices. From the standpoint of sustainable development it is desirable that the local economy can satisfy also the demand for jobs, as a result of which a moderate excess of jobs relative to the size of town's working age population is regarded as favourable. Such a distribution of jobs ensures the employment of the town's population and immediate gravitational hinterland, which contributes over a long run to the separation of economic growth and environmental degradation. The lack of success in achieving the latter remains one of the main deficiencies of today's development indicators.

The social aspect of sustainable development is reflected in the assurance of prosperity, equal opportunities, and in the high quality of residential environment, prevention of poverty and social marginalization. Welfare of the population is a reflection of economic success and prevention of excessive social stratification. Equal opportunities are provided by the state and local community through an equal access to educational opportunities, work, health care, and social security. Unemployment, poverty and social marginalization are achieved in particular through the provision of jobs and concern for the residential environment and accessibility of public services.

The environmental component of the sustainable development of small towns was evaluated by using four mostly synthetic indicators. Because the pressures of various human activities are increasing, the ratio between the natural and the built environment in the region of the town (the so-called index of ecological stability) is a good indicator of the quality of environment and life. Due to the lack of suitable data, air quality can be evaluated only through expert estimates based on the knowledge of the physical geography of towns (wind, fog, inversions, microrelief features), which can have a considerable influence on the superior or inferior regeneration and neutralization capacities of environment and on the assessment of actual sources of pollution (traffic and industrial emissions). The environmental municipal standard of small towns is shown by the treatment of wastewater and solid waste management. Because environmental pressures are concentrated in towns due to the population density and different functions, this aspect of sustainable development should be accorded particular attention, in which it is essential to introduce measures for mitigating these kinds of pressures.

6. Conclusion

Sustainability means taking into account the future development. It seems to be clear that the future of small towns will be differed. Both typologies of small towns and their observation by means of the defined set of indicators are among methodological instruments for its prediction. A detailed investigation of case studies is also necessary to understand trends and factors of the development.

To define conditions, peculiarities of life quality in small towns, advantages and disadvantages of living in small towns, target groups that prefer to live in small towns, occasions and hazards connected with this important part of the settlement system could be challenges for the next research.

The small towns sector is of substantial importance not only in Slovenia and Moravia. It could be very interesting to extend the research also to other Central European countries. The performed set of indicators can serve not only for the evaluation of sustainability and monitoring of Slovenian and Moravian small towns but also for an international comparison.

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BOSCH DIESEL – NOT ONLY AN INDUSTRIAL PHENOMENON IN THE VYSOČINA REGION (CZECH REPUBLIC)

Josef KUNC

Abstract

The aim of the presentation is to depict the history and genesis of Bosch Diesel Company in the Czech Republic and the main corporate activities in the Vysočina Region and in Jihlava. Bosch Diesel is an industrial entity backed by German Capital active in machine industry and electrical engineering. The German corporation of Robert Bosch entered a joint venture with Motorpal Jihlava in the mid-1990s to become entirely independent in several years. At the present time, the Corporation employs more than 6 thousand people and is a dominating and driving industrial power in the Vysočina Region its significance having long ago exceeded the boundary of economic prosperity, becoming socially powerful and prestigious. Current economic performance of Bosch Diesel has no comparable equivalent in the Czech Republic during the transformation era.

Shrnutí

Bosch Diesel – nejen průmyslový fenomén v kraji Vysočina (ČR)

Cílem příspěvku je zachytit historii a genezi podniku Bosch Diesel v České republice a především jeho současné aktivity v kraji Vysočina resp. Jihlavě. Jedná se o průmyslový subjekt, za nímž stojí německý kapitál, působící v oblasti strojírenství a elektrotechniky. V první polovině devadesátých let vstoupil německý koncern Robert Bosch do společného podnikání s jihlavským Motorpalem, aby se o několik let zcela osamostatnil. V současné době podnik zaměstnává více než 6 tis. osob, je zcela dominantním hnacím motorem průmyslu na Vysočině a jeho význam již dávno překročil hranici ekonomické prosperity, stal se společensky vlivným a prestižním. Průvodní ekonomické výsledky Bosch Diesel v období transformace nemají v České republice srovnatelnou obdobu.

Key words: *Czech Republic, Vysočina Region, Industry, Bosch Diesel*

The history of Bosch Corporation in the Czech Republic

Corporation Robert Bosch GmbH was founded by Robert Bosch in Stuttgart in 1886. The original fine mechanics and electronics manufacture gradually evolved into one of the biggest industrial companies in Germany. The whole Corporation consisting of about 240 subsidiaries in fifty countries of the world employs about 226 thousand employees (more than a half outside Germany) and its yearly earnings amounted to about 35 milliards Euro in recent years.

Robert Bosch Company came to the Czech Lands already at the end of the 19th century, where it made business with domestic automobile factory Laurin & Klement in České Budějovice. The first official sales office was founded in Prague in 1920 and the Company established on the Czech market in the present history in 1991 again.

Robert Bosch spol. s r.o. (Ltd) in České Budějovice was the first manufacturing plant founded in the Czech Republic after 1990, and it was established in 1992 as a joint venture of Bosch GmbH Corporation from Stuttgart and Motor Jikov, a.s. (Corp) with property share in the proportion 76 % to 24 % in favour of the German Company. Brand new facilities were built for the newly established company with the state-of-the-art technology and infrastructure. Apart from individual manufacturing units, also own research and development department was built, including a test centre for long-term testing. Both parties gradually concluded that the existing property conditions are far from ideal for the decision making and acceptance of strategic decisions and thus Bosch Company purchased the share of the Motor Jikov Company and became the owner of 100 % of the Company. Customers for the components of automotive machinery constituting production programme (petrol pumping and suction units, cylinder head covers and electronic gas pedals)

are almost all significant European and also some Asian automobile factories. The Company in České Budějovice exports more than 90% of the production.

Another important location of Bosch Company is, respectively used to be Česká Lípa. Autobaterie, s.r.o. Company is located there and employs almost 500 people. The accumulator production history was founded in Česká Lípa in 1944, when the German army moved the battery manufacturing from bombed Berlin in the former textile factory. The manufacture from Česká Lípa became part of the biggest European battery-producing corporation Varta-Bosch Autobatterie in 1992. The management of the German Company decided to build a new assembly shop in Česká Lípa industrial park. The investment of more than 160 mil. CZK significantly increased labour productivity so the biggest producer of starting batteries had produced 5 mil. of pieces already in 2003. The turnover of the subsidiary has been dramatically increasing since the introduction of foreign strategic investor and has been breaking boundary of 2 billion CZK since 2001. Bosch Corporation sold a majority interest in 2004 and Autobaterie Company became part of the Johnson Control Group (the world leader in car accessories and components).

Bosch Company has also a small manufacturing plant in Brno (while trade offices are in Prague and in Ostrava), with about 100 employees. The subsidiary operates under name Bosch Rexroth ČR and is oriented to manufacturing and sale of hydraulics components and systems. In addition, Bosch Group in the Czech Republic has placed three trading and distribution companies in Prague.

Bosch corporation in Jihlava or in the Vysočina region

Virtually the same scenario as in České Budějovice was applied in the foundation of Bosch Diesel, s.r.o. (Ltd) in Jihlava (in January 1993), which is the largest employer of the group in the Czech Republic and in the same time the largest employer in the Vysočina Region at present.

The partner of the German Corporation was Motorpal Jihlava, manufacturer of fuel injection systems and component for diesel engines. Motorpal invested premises and factory building under construction; Bosch brought in technology, machinery and finished the construction of the shop. The majority (76%) was in the possession of Robert Bosch GmbH. The company rented offices in Motorpal and was working there till June 1993. Motorpal sold off the minority interest in October 1996 and Bosch Diesel Jihlava has been in 100% possession of Robert Bosch GmbH since than. Purchase of the interest did not interrupt the cooperation with Motorpal and the Company is still one of the important domestic suppliers for Bosch.

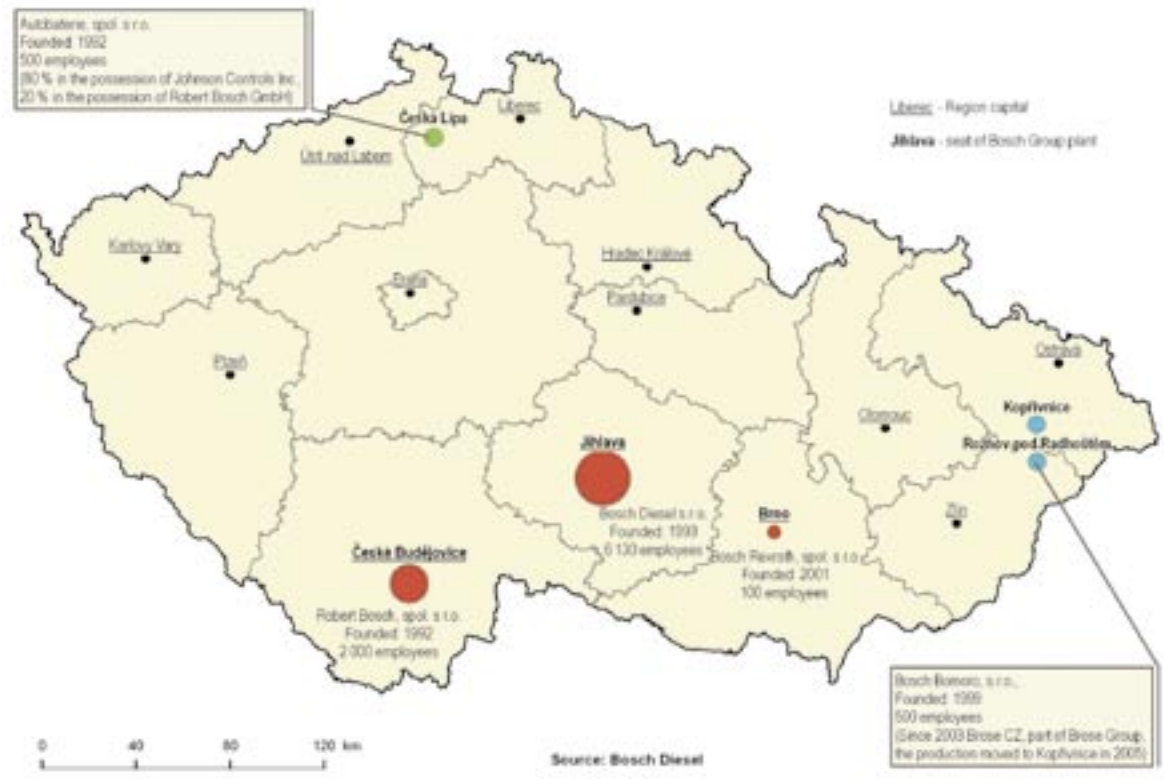

Fig. 1: Production plants of Bosch Group ČR (part of Robert Bosch GmbH Corporation in 2005)

Why Jihlava? Why the Vysočina Region and Bosch Corporation? In respect to the strategic location of Jihlava directly on D1 highway and halfway between Brno and Prague, moreover with rich history in automotive industry, Jihlava was one of the major locations in taking decision on the foundation of branch of the German Corporation in Europe, precisely diesel engine division.

The German management considered various criteria and the crucial ones included:
- political stability of the country
- convenient location in the middle of Europe
- long tradition of automotive industry and a possibility of the foundation of joint venture with Motorpal Company
- good infrastructure in comparison with other countries of Eastern Europe, and not only transportation, but also institutional
- long history of Robert Bosch Corporation in the Czech Republic
- qualified personnel with reasonable language skills
- low costs on the whole operation

The gradual expansion of the Company that became too large for the original premises in Motorpal, continued in the following years. In 1999, Bosch Diesel expanded further on by renting (and purchasing in 2001) the former Jihlava plant of Pelhřimov textile works Alfatex. The erection of a new manufacturing shop, originally designed namely for light manufacturing division, especially for the production of headlights transferred from German Reutlingen, began in Jihlava's quarter Pávov in the same year. This division singled out from the whole Bosch Group and became part of a new company, Automotive Lighting seated in Pávov premises. Both investors had 50% shares in the foundation of the Company (apart from Robert Bosch Company it covered Italian Company Magneti Marelli dominated by Fiat). Later on, Robert Bosch GmbH sold his interest[1].

Management of Robert Bosch decided to build a new shop for manufacturing of high-pressure pumps in Pávov at the end of 1999. The new plant was put into operation at the beginning of 2001. The construction of the new shop represented an investment of about 1 billion CZK, additional 3.5 billions CZK were invested into purchase of the state-of-the-art technology. The largest part of the shop was designed for the production of a new type of high-pressure pumps, which the Company started to produce on the first assembly line in rented premises already during the year 2000. The Company bought one more manufacturing shop in the vicinity of Jihlava in the same year, so Bosch Diesel had a production area of about 80 thousand sq. meters at the end of 2001 (according to Toušek, Kunc, 2004). The Company built two new plants (Pávov and Humpolecká) and bought one (Dolina).

The crucial investments of the German Corporation were going to České Budějovice, where injection units for petrol engines are produced, in previous years. Investments into new technologies in the first shop in Pávov and building the second manufacturing shop in Pávov (finished in 2002) was the reaction of Bosch to the increasing demand on diesel engines for trucks across Europe. High-pressure pumps of Common Rail System became the new item and a „flag ship" of the production programme. The significance and size of the plant in Jihlava overcome the Bosch plant in České Budějovice and became the largest production base of the Stuttgart Corporation in the Czech Republic.

Economic results of Bosch Diesel Company, production programme

Investments above 8.5 billions of CZK was one of the biggest investment projects of the year and due to this fact Bosch Diesel Company received an investment incentive from the Ministry of Industry and Trade (MIT) at the end of October 2001. In compliance with the Act on Investment Incentives, No. 72/2000 Coll. the Company gained an income tax reduction up to the amount of 1.62 billion of CZK and was released of import duty on machinery and devices designed for manufacturing shops in Pávov. The Company prepares expansion of the high-pressure Common Rail pumps and also a new production of hydraulic accumulator of the same system within the framework of this investment project.

The last investment into manufacturing premises so far is the erection of the third shop in Jihlava-Pávov location, respectively Karlův zámeček, where the costs should reach up to 3 billions of CZK. The expansion of manufacturing areas is closely connected to great demand of the market for diesel engines. New-generation pump CP1H capable of producing higher pressure than the older type, which is still produced in the plant on Humpolecká Street, shall be produced in the new shop. The construction begun in 2004 and the facility was put into operation 7 months afterwards, at the beginning of

[1] BOMORO Company in Rožnov pod Radhoštěm (manufacturer of locking systems for passenger cars) was associated to Bosch Diesel in 1st January 1999 and became a branch. This Company was sold to German Company Brose, leading world manufacturer of car door and windscreen system in the year 2002.

May 2005. Thus, the largest plant producing components for diesel engines with the Common Rail system of Robert Bosch Group was founded in Jihlava.

In 2000, an incentive in the form of income tax reduction for 2001 – 2005 was assigned to Bosch Diesel. The Company has not utilised the incentive yet and the first utilization should come for the tax period of 2004. The second investment incentive, on investments to the new shop, was applied by the Company in May 2004 but in respect of the continuing disputes on the amendment of the act on income tax, the second investment incentive was not assigned to the Company in the autumn of 2005 due to unresolved issues concerning the possibility of a so called concurrence.

Long-term dynamics of the Company is documented also by some economic data. In 2001, Bosch Diesel recorded more than a double increase of the turnover, from 4.6 billion to 9.8 billion CZK and the number of employees double increased from 2 thousand to 4.1 thousand. Bosch invested 10.5 billion CZK (purchase of lands and shops, erection of new shops, purchase of technology, etc.) into the Jihlava plant between 1993 and 2001. The construction of the new plant in Pávov will increase the total investment of Bosch in Jihlava to approximately 16 billion CZK from the beginning of the operation (the 3 billion investment will come into a greater effect in fiscal year 2005). Bosch Diesel ensures more than a half of direct foreign investments in the Vysočina Region since 1993.

Good economic results were also reflected in the position of Top 100 of important companies, declared annually by the Association Czech Top 100, in the Czech Republic in 2003. Bosch Diesel ended on the 32nd place with earnings of 14.8 billion CZK, which meant an annual increase of 16 %. Turnover of the Company increased in 2004 again, to 16.3 billion CZK.

The development of the number of employees since the entrance of Bosch Company into Jihlava Motorpal is clearly documented by Fig. 2. At the end of 2004 the company employed 5,120 persons and in relation to the construction of the new shop, 800 more people were hired in 2005. Almost 1,000 people will find a job in the new shop. Even though some rearrangements within the Pávov plant are in process simultaneously with recruiting, the number of employees exceeded the boundary of 6,000 employees in June 2005 and in the mid November reached the number of 6,130 personnel. The original plan of the company, to employ 6,850 people till the end of 2004 was not met, but despite all the facts the number of employees in the Company could reach 7,000 persons in 2007 in connection with the expansion of production areas.

As it was indicated above, the production programme of Bosch Diesel Company changed in time mainly in correspondence to market demands and customer requirements. Bosch started the year 1993 with the production of PFM single-cylinder pumps and injectors constituting a unit. The production of injectors was transferred to Turkey in 1996. The production of multiple pumps had been core of the programme since 1994. This production was running for five years and was shut down in 1999. It was gradually replaced by the production of PDM pumps and packing machines and was extended even to serial service of rotary pumps and injection units (since 1995, respectively 1997). Also headlights were produced in Bosch Diesel Company in Jihlava during the transiting period (in the years 1997 – 1999).

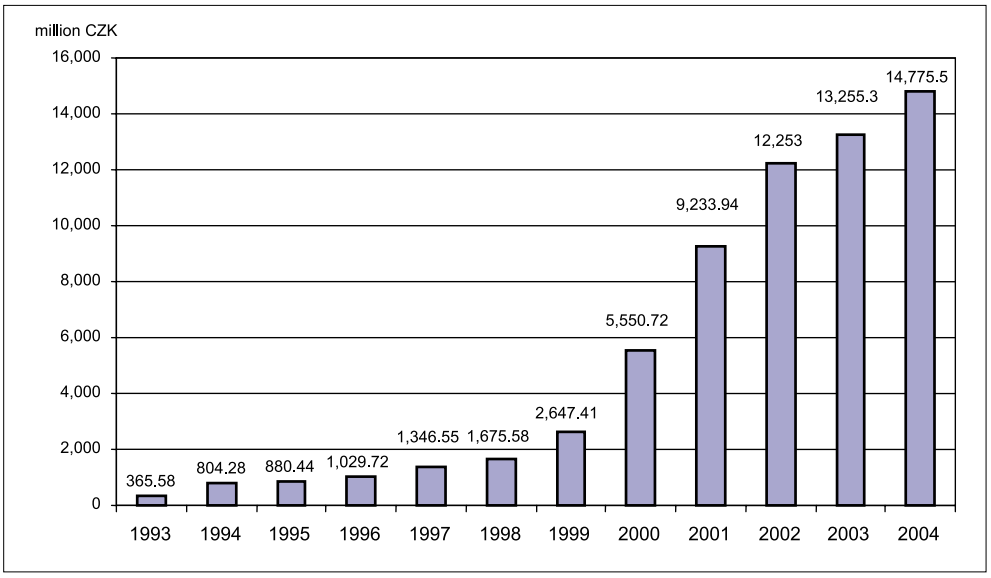

Fig. 2: Cumulated investments invested by Robert Bosch into Jihlava plant Bosch Diesel
Source: Bosch Diesel

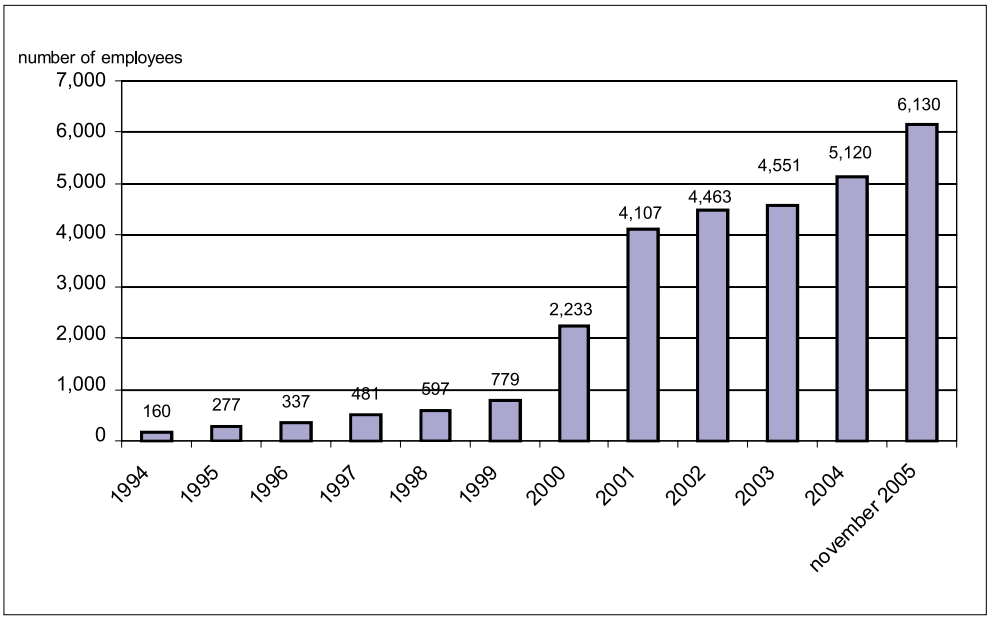

Fig. 3: Evolution of employment in Bosch Diesel Jihlava
Source: Bosch Diesel

Components for the Common Rail system, constituting the core of today's production programme – injection pumps for CP1 and CP3 diesel engines and pressure tanks have been produced since 1999 and pressure control valves since 2003. New plant for the production of CP3 pump was built in Jihlava and the number of employees increased from 1,084 to almost 4,500 and Bosch Diesel s.r.o. thus became one of the biggest plants of Robert Bosch GmbH Corporation. The CP3 pump represents a state-of-the-art product for injection systems of diesel engines and the plant in Jihlava is the parent establishment.

Most important customers of Bosch Company in Jihlava are the producers of passenger cars and trucks – BMW, Volvo, Daimler Chrysler, Peugeot, Audi and Honda. Bosch suppliers are mainly recruited from abroad, because only a couple of Czech companies can meet the requirements of the Company. The basic condition for the company willing to supply to Bosch Diesel is ISO 9001:2000 and ISO/TS16949:2002. At present, Bosch seeks for the suppliers of following technologies: grinding and metal machining, metal works, moulded plastic parts and plastic components, bolts and screws, extruded and drawn sections. The essential suppliers of CP3 pump components are mainly German, Swiss and Japanese companies. Bosch is not opposed to the cooperation with Czech companies and in case they meet the conditions, the foreign companies are not privileged. Just to mention, significant domestic suppliers Motorpal Jihlava supplying components for injection units and also Mars Svratka providing galvanic surface treatment of automotive parts for Bosch shall not be omitted.

Other activities of Bosch Diesel in Jihlava and surroundings

Bosch Diesel Jihlava has established very good relations with the Jihlava town authorities since the beginning of the business. Both parties have regular meetings and notify each other on common plans. The city e.g. presents to the company plans for transportation development and Bosch has a possibility to submit remarks. The cooperation resulted in agreement with a local transportation company when schedules of public transport are accustomed to the shifts in the plants. The transportation of employees to work is relatively well ensured, the Company does not subsidies the transportation neither rents special buses or transportation companies. Anyway, most of the employees commute to work on their own cars so the biggest problem of Bosch Company are larger parking lots. Bosch Company has built a new railway stop in Jihlava -Pávov to make the new plant in Pávov accessible to employees commuting by trains. The Company invested more than 4.5 million CZK into a new stop on the line to Havlíčkův Brod and 500 thousand CZK shall still be invested into a new footpath to the adjacent residential blocks. The inherent train stop bearing the name of the Company was the first one in the Czech Republic built by the largest regional employer. The train stop serves apart from the employees of Bosch Company to other companies with hundreds of employees. The schedule was, after the agreement with the Directorate of České Dráhy accustomed to meet the requirements of Bosch Company on the shift operation.

Bosch Company tries, in cooperation with the city, to solve the housing issues. Bosch is interested in building

flats for its employees – especially qualified engineers from Brno University of Technology to persuade them to settle in the Jihlava region. The town of Jihlava negotiated on a governmental incentive to invest to the building of the first 18 flats in 2004. The Company needs much more of these "corporate" flats.

Another issue resolved in cooperation is the present connection of the Pávov premises to the road I/38, a motorway circuit to Havlíčkův Brod and also to a feeder road to D1 highway, which is hampering the further development of the company. The works should start in the second half of 2005. A railway bypass must be constructed because of the road construction. A new roundabout is also planned on the Pávovská Street. The construction of the connection road to the feeder in difficult terrain will cost at least CZK 150 mil. The town has applied for the subsidy at the Ministry of Industry and Trade of the Czech Republic. The town could reach up to 75 % of the cost from the subsidy.

In the field of employment, Bosch Company is missing a number of the most demanded qualified personnel. There are not so many qualified and trained personnel in the Vysočina Region, but this is a general problem of the Czech Republic in relation to the investor of this size. The Company mainly seeks educated engineers of technical sciences and graduates from industrial grammar schools. Bosch will need, according to the last estimates, 300 university educated personnel every year. Education issue is considered as a crucial problem in Bosch Company so that is why the Company tries to solve it in cooperation with the Jihlava town authorities and also with the Ministry of Education, Youth and Sports of the Czech Republic. The centre of professional education was opened in the Pávov plant in 2003. The costs for the centre reached 7 mil. CZK and over 87 trainees finished the machinery course in 2004/2005. Thirty-seven trainees finished the course in the previous school year and most of them found job in the Company. The secondary level of education is only part of the problem Bosch Diesel has to face in the Vysočina Region. The Company succeeded in foundation of the Polytechnical University in Jihlava in cooperation with the Brno University of Technology and the Higher Professional School of Polytechnics, where machinery bachelor study programme is projected to open.

It must be denied, that there is a lack of interest in working in Bosch Diesel in the Jihlava district or in the whole region. On the contrary, above average salaries attract even the personnel from farther surroundings. According to the database submitted by Bosch Diesel about 60 % of the personnel commute from all districts of the region and also from outside the region. Average wage amounted to 24,400 CZK in 2004 (20,860 CZK in 2003), which was one third more than the region's average[2].

Bosch Diesel is helpful in traditionally delicate matter of sponsorship. The Company does not show off in the region as a transparent general sponsor of activities monitored by the media (sport, culture, etc.) but regardless the fact is the bearer of many small sponsorship gifts. E.g. in the field of health and social care it helps to finance the Jihlava hospital, financially supports the local house of care for mothers with children, through charity supports handicapped people and also sends money to the Endangered Children Fund. The Company has also been supporting the ice-hockey club Dukla Jihlava for several years.

The commuting hinterland of Bosch Diesel Company

Mainly due to Bosch Diesel the town of Jihlava joined the group of cities in the Czech Republic with the largest increase of commuting. In 1991, 8.3 thousand people were commuting to Jihlava, which was only about 1.2 thousand more than to Třebíč. In 2001 the number of commuters increased to 11.5 thousand (the second largest commuting centre in the Vysočina Region was Havlíčkův Brod with 6.2 thousand commuters). Jihlava moved on the rank according to number of commuters of the cities in the Czech Republic from 27th to 12th place within 10 years. The number of commuting people increased to 38.7 % (only cities of Mladá Boleslav, Liberec and Prague have a higher dynamics of commuting).

According to the last census in 2001, Bosch Diesel in Jihlava employed almost 2.5 thousand employees, so the portion of the overall employment in Jihlava of the Company was 7 %. At the end of 2004, Bosch Diesel already 5.1 thousand people were employed (13.8 % employed people in Jihlava), of which only 2,001 people had their permanent residence in Jihlava. More than 3 thousand people were commuting to work; most of them from the Jihlava district (1.5 thousand people), followed by districts of Třebíč (860), Havlíčkův Brod (370), Pelhřimov (120) and Žďár nad Sázavou (98). The commuting region of Bosch Diesel spreads over all districts of the Vysočina Region (see Fig. 4). The region includes 253 communities (communities, where at least 1 % of employed people work in Bosch Diesel), of which 118 communities are situated in the Jihlava district (only the communities of Krasnonice, Mrákotín and Panenské Dubenky do not belong to the region), 67 communities in the Třebíč district, 31 communities in the Havlíčkův Brod district, 25 communities in the

[2] Only for comparison – the average wage of employees in Motorpal Jihlava was about CZK 14,000 per month in 2004.

Fig. 4: View on the premises of Bosch Diesel in Jihlava-Pávov (still without the latest manufacturing shop)
Source: Bosch Diesel

Pelhřimov district and 12 communities in the district of Žďár nad Sázavou. Bosch Diesel is a prominent employer even for the inhabitants of the Dačice region (district of Jindřichův Hradec). The plants of Bosch Company Jihlava employ, apart from the German management, also 27 citizens of Slovakia.

The commuting region of Jihlava has recorded a significant growth after 1989. The dominating element in this expansion of commuting to work in Jihlava was Bosch Diesel. A Company's share of more than 50 % in commuting to Jihlava is seen in the districts of Třebíč, Moravské Budějovice, Havlíčkův Brod and Humpolec. The significant increase of commuting not only in the 1990's but also at the beginning of this decade, signals a changing status of the town of Jihlava in the population system of the Vysočina Region in the future. The central function of the town will be further emphasised (increasing number of commuters will reflect in the future i.e. in growing migration activities of the town) and this will not be the ultimate result of institutional statute of the regional capital but rather of the growing economic importance of Bosch Diesel Company.

Conclusion

What are the future perspectives of Bosch Diesel? The majority of planned activities to be considered feasible have already been mentioned in the above text. The management of the Company considers as key projects the finishing of the new shop in Pávov and the increase of the number of employees up to 6 thousand people. This also depends on cooperation with the town council and also with the Government of the Czech Republic and with terms to be offered to the Company. Another crucial project is construction of the new road, respectively the connection of the Pávov plant to I/38 road and further on to D1 highway. Bosch is going to play a significant role in the secondary and university education and also in the field of construction of new flats, especially for highly qualified personnel the Company would like to retain in the region.

Bosch Diesel Jihlava has created more than 6 thousand new jobs from zero state since 1993. Hundreds of people work in the region in the companies Bosch Diesel helped to establish or was joined by the capital (Motorpal, Automotive Lighting). A number of employees ranks Bosch Diesel among the 5 biggest companies of the manufacturing industry in the Czech Republic. Due to the creation of new job opportunities, not only for manual workers, but also for qualified and educated personnel, the rate of unemployment in the Vysočina Region has dropped to values lowest in the "Moravian" regions and far below the Czech average for several years.

Already the arrival of the Bosch Group which is a leading "European" producer of final products in the field of machinery and electric equipment, to the Czech Republic was promising for our processing industry at the beginning of transition era and at a retro evaluation. Because Bosch was looking for a partner to cooperate with in the Czech Republic, which held true both in the case of České Budějovice and Jihlava, and for a

manufacturing tradition in the field. The investment incentives started to attract Bosch Diesel as an already established and successful company that meets all requirements in compliance with the contracts. There is no place for speculations how long Bosch Diesel will stay in the Vysočina Region. The recession of automotive industry may notably affect even the plant in Jihlava if it is not prepared to a flexible shift of the production programme. According to all activities of Bosch Company in the region, this scenario does not seem to threaten in the near future.

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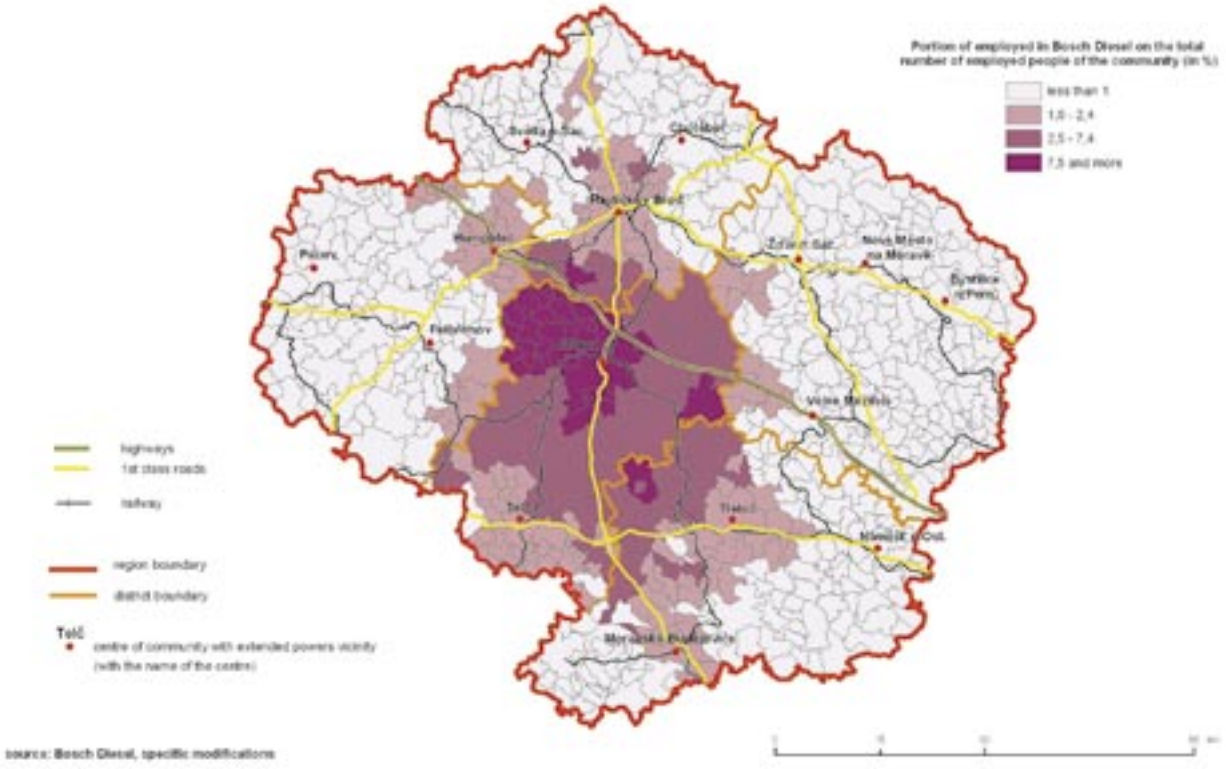


Fig. 5: Commuting Region of Bosch Diesel Company

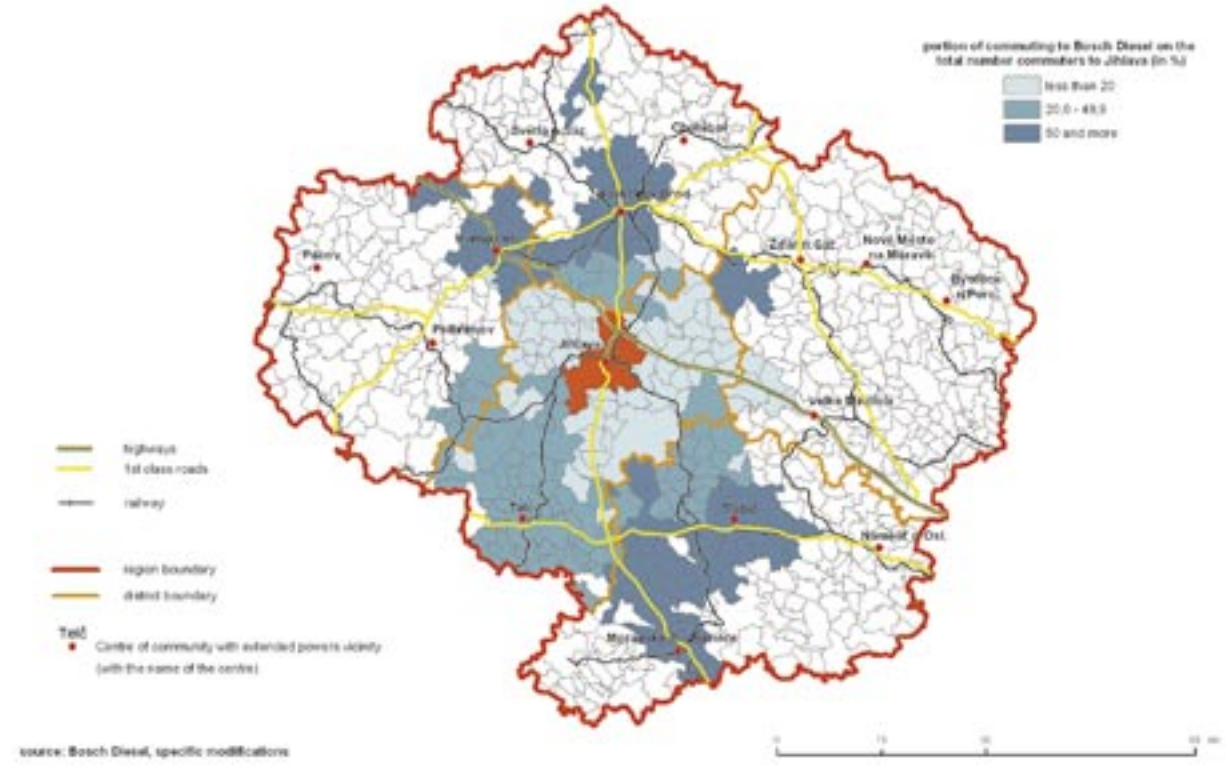


Fig. 6: Share of Bosch Diesel Company in commuting to Jihlava

CONTINUOUS SOIL LOST MODELLING IN THE HARASKA WATERSHED (SE MORAVIA) – AN APPLICATION OF 4D DIGITAL LANDSCAPE MODEL

Pavel VRANKA, Hana SVATOŇOVÁ

Abstract

Most of the geographical information systems and digital landscape model applications are two- or three-dimensional, but it is possible to add a fourth dimension – time. We introduce an application of the continuous erosion model AnnAGNPS, as an example of 4-D digital landscape models. The amount of data needed for the building of a digital landscape model is strongly dependant on the areal extent and variability of the landscapes. The landscapes of Central Europe are highly variable, as both environmental conditions and land-use dramatically change in relatively small areas. Therefore, we decided to work within the relatively small area of the Haraska watershed (Southeast Moravia region): to be able to construct valid models of selected processes, and to prevent the effects of over-generalization and an associated loss of information. Initial erosion depends on a complex collection of environmental parameters and agricultural operations, and the distribution of pollution (fertilizers, pesticides, etc.) is not uniform over the area and the pollution sources are mostly non-point.The spatial database of the Haraska watershed digital landscape model integrates elevation data with environmental, land-use and land-cover information at a high resolution. Spatial analyses and the AnnAGNPS Pollution Loading Model allowed us to create a continuous simulation of erosion processes, to determinate problematic areas, and to estimate the influence of agricultural pollution on the water quality of the Haraska Stream.

Shrnutí

Kontinuální modelování eroze v povodí Harasky (JV Morava) – aplikace 4D digitálního modelu krajiny

Většina aplikací geografických informačních systémů a digitálních modelů krajiny je dvou nebo tří rozměrná, je však možné připojit čtvrtý rozměr – čas. Jako příklad využití 4D digitálního modelu krajiny představujeme kontinuální erozní model AnnAGNPS. Množství dat potřebné pro vybudování digitálního modelu krajiny je silně závislé na rozloze a rozmanitosti území. Krajina střední Evropy je velmi rozmanitá a jak přírodní podmínky, tak využití území se prudce mění na relativně malém prostoru. Proto jsme pracovali s poměrně malým územím povodí Harasky (Jihomoravský kraj), abychom byli schopni sestavit validní model vybraných procesů a předejít generalizaci dat a s ní spojené ztrátě informací. Půdní eroze závisí na komplexu přírodních parametrů a agrotechnických operací, rozložení znečištění ze zemědělství (hnojiva, pesticidy apod.) není rovnoměrné a zdroje znečištění mají většinou plošný charakter. Prostorová databáze digitálního modelu krajiny povodí Harasky integruje výšková data s informacemi o životním prostředí a využití půdy a území. Prostorové analýzy a AnnAGNPS Pollution Loading Model nám umožnil vytvořit kontinuální simulaci erozních procesů, odhalit problematické plochy a odhadnout vliv znečištění ze zemědělství na kvalitu vody v toku Harasky.

Keywords: *GIS, digital landscape model, 4D, erosion, AnnAGNPS, agricultural pollution, non-point sources, water quality*

Introduction

Environmental processes are very complex and we are not able to evaluate all parameters. Although every model is a simplification of reality, digital modelling is an important way how to understand and manage relevant environmental processes. Recent technologies allow us to model not only the spatial landscape structure and discrete long-term changes but also continual processes.

Study area

Haraska (Fig. 1) is a stream of the sixth class of hydrological order (No. 4-17-01-034). It springs east of Šitibořice (South Moravia region) at an elevation of 260 m and joins the Spálený potok Brook near Brumovice at an elevation of 175 m a.s.l. Average discharge at the outlet is 0.07 m^3s^{-1} (Vlček, 1984). The Haraska belongs in the Trkmanka river basin (No. 4-17-01-012). Watershed

area is 51 km^2 (6 % of the area of Czech Republic) and the length of mostly modified channel (Fig. 2) is 15.2 km.

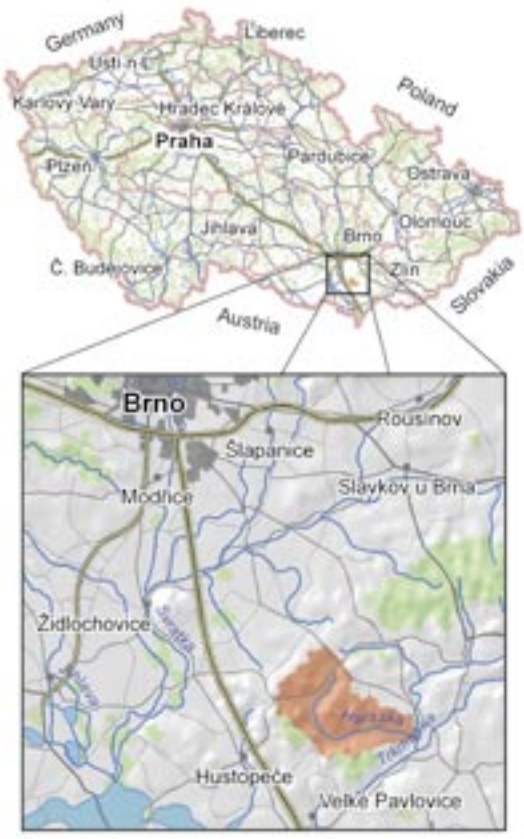


Fig. 1: Area under study – The Haraska watershed, South-East Moravia

Demek (1987) ranked the Haraska watershed into the geomorphological unit of Boleradická vrchovina Upland that is the south-western part of Ždánický les Uplands in the geomorphological sub-province of the Outer West Carpathians. Rounded ridges and broad valleys (Fig. 3) characterize the erosion–accumulation landforms modelled on Quaternary processing Flysch sediments. Of them, Přední kout (410 m above sea-level) is highest and the Haraska outlet (175 m above sea level) is the lowest point of the watershed. Average slope is 7 degrees. Soil cover consists of high quality black soils (chernozem), brown soil, pararendzina soil and fluvisols on flysh and loess (Šefrna and Vilímek, 2003). Erosion processes are significant on 50 % of the area, small landslides can be found there, too.

Characteristic climate of the studied area is very warm with dry summers and a very short transition period with warm springs and autumns up to dry winter with a short duration of snow cover. Annual temperature is approximately 9 °C, annual amount of precipitation is between 500 and 550 mm (Quitt, 1971). Five water reservoirs were built up in the watershed because of the dry climate and low precipitation.

The watershed belongs in the bioregion of Hustopeče (Culek, 1996). Potential natural vegetation consists mostly of *Primulo veris-Carpinetum* (Neuhästlová et al., 1998). Original natural vegetation is nearly completely replaced by commercial forests and farming land (Fig. 4). Cropland takes up more than 55 %, forests cover 25 % of the area, vineyards occupy 6 % and gardens and orchards are on 4 % of the area. Two percent of the watershed is a built up area. Cropland is without any vegetation cover during a significant part of the year. Together with growing corn and sunflower and non-contour ploughing the fact increases the risk of soil erosion.

Digital landscape model

Environmental conditions and land-use dramatically change on a relatively small area in the conditions of Central European agricultural landscape. This fact increases the amount of data required for a complex landscape description. Therefore, the authors focused on a relatively small area (51 km^2) of the Haraska watershed.

The area geospatial database was established in 1998 (Kolejka et al., 2003). The digital landscape model consists of three logically integrated polythematic data layers: 1) **elevation** – elevation data used for digital elevation model; 2) **nature** – natural background with geological, soil, and climatic data; 3) **use** – land-use and land-cover. Land-cover data also contain information about fertilization, pesticide application and crop yield.

The data set is based on digitized basic topographical maps (1:10 000), thematic maps, aerial photos, satellite images and field surveys were used for data corrections and completion. ArcView 3.x was used for data management.

Erosion modelling

The data structure and contents of the Haraska spatial database allowed us to apply a complex model for the simulation of water erosion. There is a set of utilities that integrates erosion models with the GIS database (Engel et al., 1993; Pullar and Springer, 2000). It was decided to use the AnnAGNPS - Annualized Agricultural Non-Point Source Pollution Model (Bingner, Theurer, 2001). The AnnAGNPS is an advanced version of AGNPS (Young et al., 1989) used by for example Nykl (2001). It is a continuous simulation watershed-scale program that simulates quantities of surface water, sediment, nutrients, and pesticides leaving the homogeneous land areas (cells) and their subsequent travel through the watershed – some of the sediment, nutrients, and pesticides reach the watershed outlet while the remainder are deposited in the stream system.

Fig. 2: Modified channel of the middle part of Haraska stream (Photo: H. Svatoňová, April 2003)

Calculations are carried out on a daily time step, all run-off and associated sediment, nutrient, and pesticide loads for a single day are routed to the watershed outlet before the next day simulation. Run-off quantities are based on the run-off curve number while the sediment is determined using RUSLE (Renard et al., 1996). Special components are included to handle concentrated sources of nutrients (feedlots and point sources), concentrated sediment sources (gullies), and added water (irrigation). Output is expressed on an event basis for selected stream reaches and as source accounting (contribution to outlet) from land or reach components over the simulation period. The set of computer programs of AnnAGNPS model system consists of: 1) input generation and

Fig. 3: The landscape of Haraska watershed is characterized by rounded ridges and broad valleys of the erosion-accumulation relief (Photo: H. Svatoňová, August 2003)

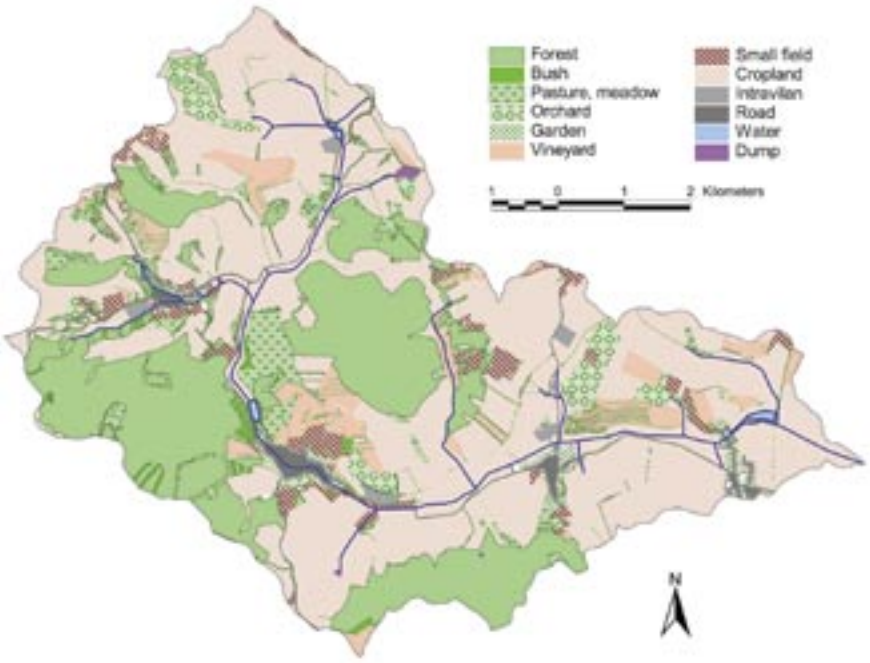
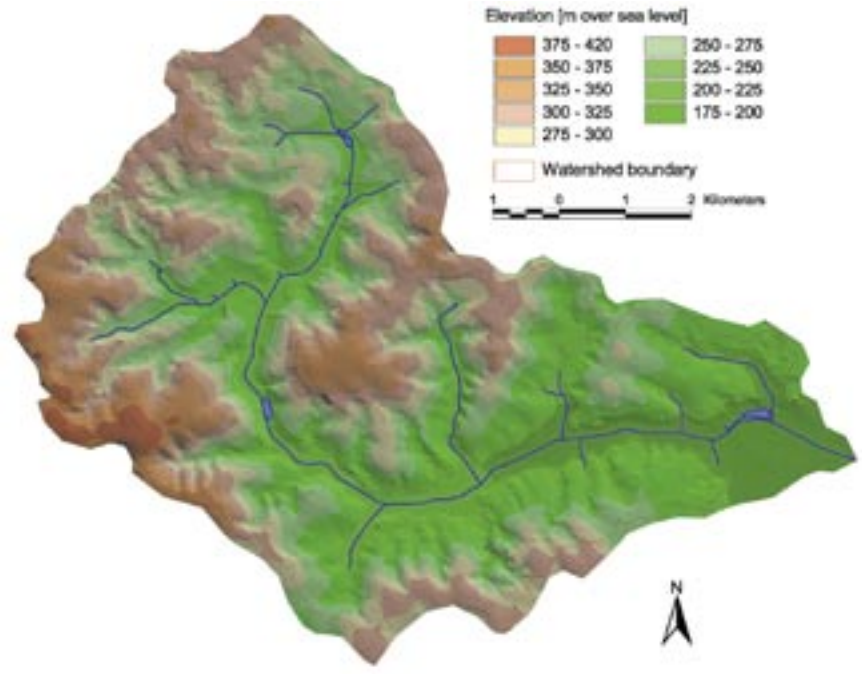


Fig. 4: Land-use in the Haraska watershed



Fig, 5: Digital elevation model of the Haraska watershed

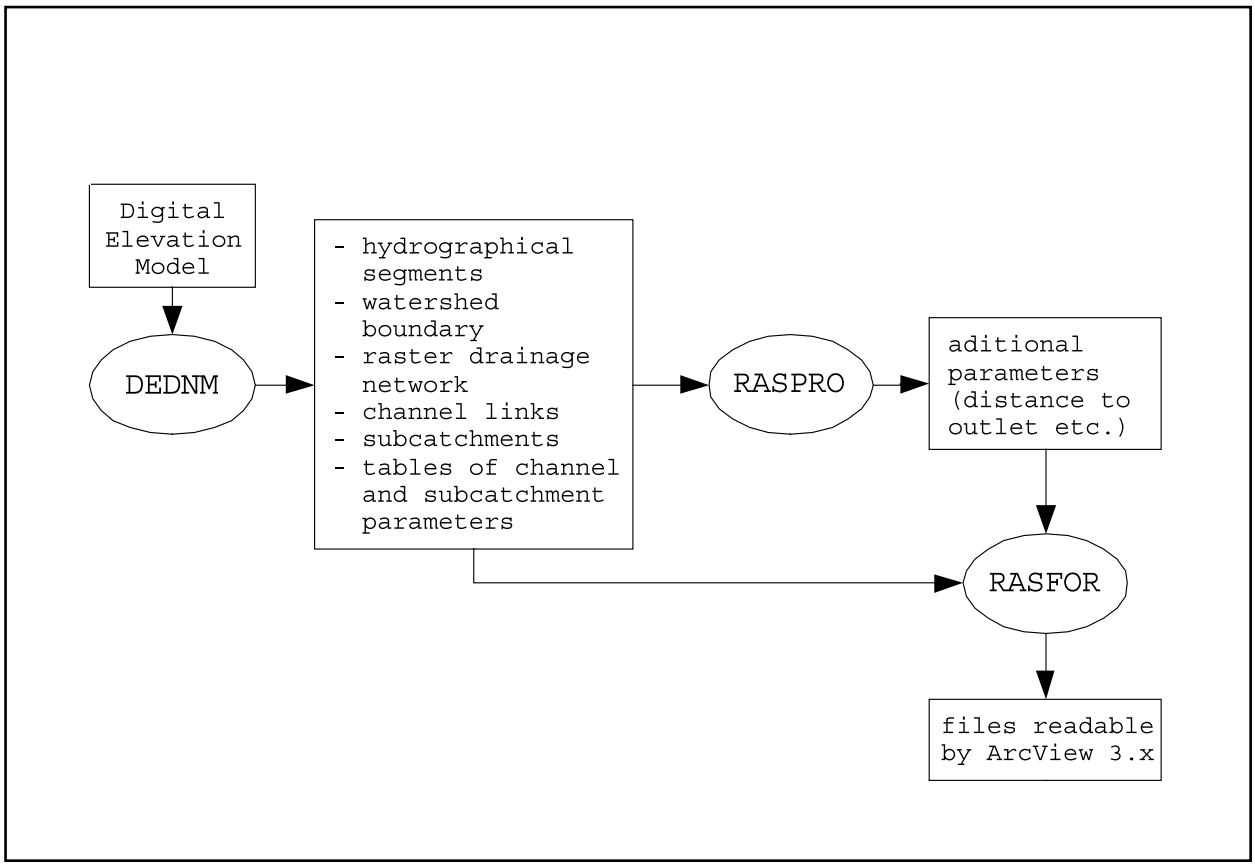


Fig. 6: The TopAGNPS flowchart

editing; 2) the "annualised" science and technology pollutant loading model (AnnAGNPS); and 3) output reformating and analysis.

Data preparation

AnnAGNPS assumes spatial data in UTM projection but most of the data available in the Czech Republic are in S-JTSK projection. Projection transformations were made in the AutoCAD Map 2000 (Vranka and Kolejka, 2000). Then a derivation of parameters based on topography was carried out. The authors used AnnAGNPS Flownet Generator – a set of programs for the generatation of AnnAGNPS amorphous grids with certain stream reach characteristics. The program set consists of 1) TopAGNPS (Garbrecht, Martz, 1999) – the subset of TOPAZ (TOpografic ParameteriZation) model; 2) AGFlow; and 3) VBFlonet.

Terrain-following cells were developed with hydrological drainage areas and connections from the digital elevation model of the Haraska watershed (Fig. 5) with TopAGNPS programs (Fig. 6). This set consisted of: 1) DEDNM (Digital Elevation Drainage Network Model) that reads and checks the input DEM; 2) RASPRO (RASter PROperties) deriving additional parameters from the DEDNM results; and 3) RASFOR (RASter FORmatting) program for raster files reformating into GIS specific files readable by ArcView 3.x.

As a following step, reach and cell characteristics were generated from the DEDNM output with the AGFlow program. The parameters include drainage network, elevation, length, slope, drainage area, aspect, average land slope, slope and length for sheet flow, shallow concentrated flow, and concentrated flow and receiving reach. In the next step, data were added on soil, land-use, management operations, crops, fertilizers, channel geometry etc., to each homogeneous cell or reach generated by the AnnAGNPS Flownet Generator.

Time data were represented by meteorological data (daily temperature minimum and maximum, precipitation, dew point, sky cover and wind speed), sequence of agrotechnical operations (tillage, fertilization etc.) and plant growth parameters.

Although there are some semi-automatic processes for it in the program set, a significant part had to be done manually (Svatoňová and Vranka, 2003b). The initial file AnnAGNPS.ini contains 34 different categories of data used to describe the watershed and the time variant parameters (not all of them are required for each job but most of them are mandatory) and the initial file matrix had 3160 rows. Several data were added during data preparation but most of them were taken directly from the spatial database (Svatoňová, Vranka, 2003a; Vranka, Svatoňová, 2004).

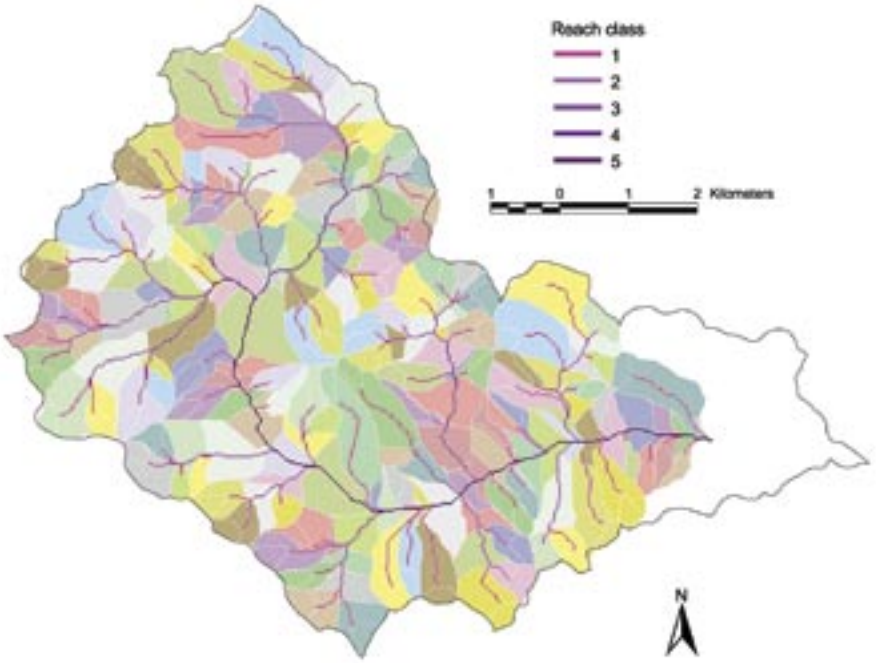


Fig. 7: Homogeneous cells and reaches derived by the AnnAGNPS Flownet Generator

Results

There were 511 homogeneous cells and 213 reaches obtained (Fig. 7) from the AnnAGNPS Flownet Generator. The eastern flat part of the Haraska watershed was not included into the model because the stream net was not generated properly in this flat area. The AnnAGNPS simulation was made for 2001 with using meteorological data from the hydrometeorological station in Velké Pavlovice (Tab. 1).

station	**Velké Pavlovice**
latitude	48°54'31"N
longitude	16°49'28"E
altitude	196 m
average maximum temperature	14.3 °C
average minimum temperature	5.5 °C
precipitation amount	549.5 mm

Tab. 1: Meteorological data used for the AnnAGNPS simulation (2001)

Annual average amounts of erosion and pollution loads for the whole watershed estimated by AnnAGNPS are shown in Tab. 2. Erosion was calculated for the entire watershed, but it was overestimated in forest areas. AnnAGNPS is suited particularly for agricultural areas and results for e.g. forest, urban areas etc.; can be inaccurate[MS1]. Therefore such areas were excluded from the map of spatial distribution of annual average erosion shown in Fig. 8.

	kg.ha^{-1}.year^{-1}
landscape erosion	159.000
sediment yield to the stream	129.000
sediment loading	26.500
nitrogen yield to the stream	1.889
nitrogen loading	1.863
organic carbon yield to the stream	1.669
organic carbon loading	1.192
phosphorus yield to the stream	11.929
phosphorus loading	11.185

Tab. 2: Annual average total amounts of erosion, sediment and nutrient yields to the stream and loading generated by AnnAGNPS for the entire Haraska watershed in 2001

Conclusion

The complex data integrated in the digital landscape model of Haraska watershed made it possible not only to describe the natural conditions and land-use of the area but also to perform simple spatial analyses. The authors were able to design a continual (4D) non-point erosion and pollution model AnnAGNPS. Some data such as meteorological ones were added during the data preparation but most of them were taken directly from the spatial database.

The preparation of AnnAGNPS input file is the most complicated and time-consuming part of the AnnAGNPS modelling process. Although there is a set of utilities that

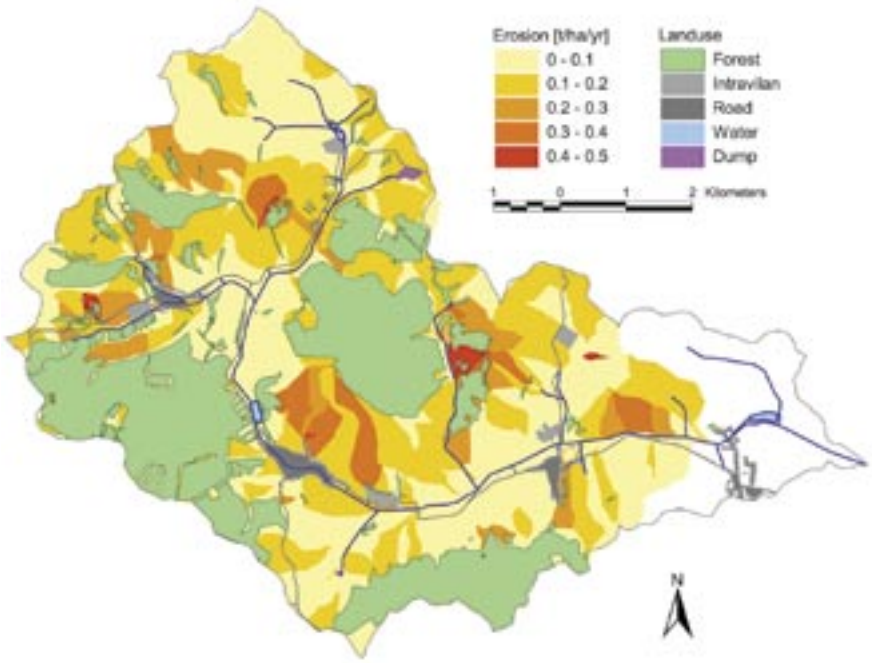


Fig. 8: Average annual erosion in the Haraska watershed generated by AnnAGNPS for the climatic data of 2001

integrates models such as AnnAGNPS with the GIS database and many routines are automated, a considerable part of data preparation had to be made manually.

There were several generalizations to simplify the model as the authors wished to test the model applicability in conditions of the Czech Republic – with only one set of management operations and one crop (winter wheat) being used for all cropland.

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URBAN ENVIRONMENT IN EUROPEAN BIG CITIES

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The project

The Institute of Geonics participated in the project "Mobilizing re-urbanisation in condition of demographic change[1]" within the 5th EU framework programme in the period from November 2002 – October 2005. The consortium was formed by nine research institutions (Umweltforschungszentrum Leipzig/Halle, GmbH., Queen Mary University of London, Sheffield Hallam University, Faculty of Architecture of the University of Ljubljana, Academia Istropolitana Nova Svätý Jur, Urban Planning Institute of the Republic of Slovenia, University of Ljubljana – Faculty of Architecture, Univerzity of Ljubljana – Faculty of Economics and Institute of Geonics, Czech Academy of Sciences Ostrava, Branch Brno) and 4 cities (Bologna, Leipzig, León, Ljubljana). The City of Leipzig managed the project.

The issue closely relates to social and demographic processes, with the changing household size and structure in particular. While a typical household some dozens years ago was represented by a multi-generation co-existence of several complete families with more children, the current trend develops towards single-generation, single-child and incomplete households. A certain exception is sometimes represented only by households of poor immigrants whose demographic features differ from those of the majority population. One of problems is therefore a mutual interaction between the original housing resources and the new structure of households.

The project concerned inner parts of second size European big cities (not capitals with a million and more inhabitants). The demographic changes mentioned above are in inner cities augmented by the process of suburbanization. Families of higher social status move from blocks in inner cities to houses in suburbs. Consequently, the respective demographic and social groups become missing in the inner cities. The population density of inner cities decreases, the demographic and social structure loses its natural diversity, inner cities become older and poorer. The process of gentrification changing the physical structure of selected parts of inner cities and creating rich islands is not able to stop the general trend. Initial remarks were published in the Moravian Geographical Reports (Vaishar, Zapletalová, 2003).

Possibilities of re-urbanisation were in the focus of the consortium members. Re-urbanisation was defined as improvement of demographic structure keeping all advantages of the physical structure of inner cities. In other words, the question was how to make the inner cities more attractive for target groups of population. Institute of Geonics was responsible for the field of urban ecology and its team co-operated closely with the Cracow team which was responsible for urban greenery.

Methodology

It is obvious that a determining factor for the sustainable functional structure of inner cities is the preservation of their housing function. Apart from economic and legal issues the inhabitants will take into consideration at their decision-making whether to stay in their original abodes or to move to these town parts also the condition of environment and the environmental image of chosen housing districts (Špes, 1995). The environment is an attribute of life quality.

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Environment is a term whose meaning is not precisely specified. It is often confused with *ecology* (e.g. Eigenmann, 2003), in the case of human settlements with the term *human ecology*. Lawrence (2001) argues that it is not possible to simply use the biological concept of ecology to study human environment. There are some important differences consisting in its cultural and social regulatory mechanisms. "Human ecology is also a subjective ecology and it should include human perceptions and cognition of the environment, such as values and uses attributed to all kinds of resources". In addition, "human processes and products transform the constituents of the environment to meet prescribed aspirations, goals and needs. Human activities can provoke unintended consequences on abiotic and biological constituents of ecosystems and in return, have an impact on human health and well-being. This is one reason why studies of the interrelations between the biological, ecological and cultural characteristics of human ecosystems are crucial if an integrated perspective is to be effectively applied" (see also Journaux, 1979).

Environment is understood by geographers as a sum of general conditions surrounding the individual at any place on the Earth's surface (Haggett, 2001). People create their environment and get adapted to it. Human environment consists of natural environment (both biotic and abiotic), artificially created environment (buildings, technical facilities, cuts and fills and surfaces) and social environment (people as social elements). According to its functions, the environment can be divided into housing environment, working environment, leisure environment, etc.

Environment of humans is usually studied by using environmental analyses and syntheses. The environmental analyses – ever more detailed and refined – allow for the solution of individual environmental problems but do not make it possible to assess the environment as a whole. Attempts at the factor ecology of the town (Węcławowicz, 1988) have been withdrawn at the present time. This is why the team of researchers mainly deals with partial syntheses in reality. Partial syntheses represent an open set of relatively synthetic approaches to investigate the problem from various viewpoints. Methodology which makes it possible to apply the partial environmental syntheses is the methodology of regional geography (Marsh, Grossa, 2002).

In order to understand a wider philosophical context, we need to comprehend the concept of sustainable development of towns. Sustainable city can be defined as a town in which the contemporary decisions on resources are not contradicting the life quality of future generations (Digby ed., 1996). In more legible terms, this means that sustainable town can be considered a town that can provide to its inhabitants a sound and healthy environment, meeting at the same time their economic and social needs in such a way that the demand for their satisfaction takes into account the potential of local, regional and global resources and ecosystems as well as the needs of future generations (Huba et al., 2000). The main practical instrument to determine a critical boundary between environment and development is the Environmental Impact Assessment (Lee, George, 2002). As related to practice, there are five components of environmental research application: scientific assessment, risk analysis, public education, political action and follow-up monitoring (Raven, Berg, 2001).

With respect to the housing function, a suitable theoretical approach is represented by the concept of housing environment (Horký, 1984; Špes, Cigale and Lampič, 2002). Housing environment is defined as the part of living environment, which is connected with the function of housing. Housing is characterized as a complex of inhabitantss activities repeating in cycles and focused on the reproduction and development of their lives. It follows that housing does not include only the lodging itself but also the activities of the family life, household operation and maintenance, leisure time activities, self-realization, and recently also trades if run at the place of abode. Housing environment can be classified as internal (apartment and house) and external (usually housing district or neighbourhood) and it represents one of the main aspects of urban landscape. Lawrence (1999) shows that direct relations between housing environment (especially in extreme cases of poverty and deprivation in urban neighborhoods) can be observed. On the other side, he noticed that not only poor hygiene and sanitation but

also socio-demographic and socio-economic conditions impact on the population health. Of course, housing environment is only a part of housing characteristics (Lawrence, 1993).

Our attention is paid to the following four main housing environment categories (Mikulík, Vaishar, 1996):
– housing standard (technical quality and area size standards)
– functional conflicts (incl. all types of pollution and traffic problem)
– social environment (incl. issues of community control, personal security and occurrence of social pathologies)
– greenery (incl. other characteristics of outdoor areas and public spaces).

Spatial relations such as access to respective activities, neighbourhood effects etc. represent an important aspect in the assessment of housing environment quality.

Regarding the fact that it is the human environment that stands in the focus of our interest, the main criterion of assessment is a human being. The human being is on the one hand a biological element with his/her biological requirements (air, water, food, natural reproduction) which are more or less exactly defined, and a social element with social needs (social contacts, self-realization in the community, entertainment, recreation and many other) which develop in time, being more adaptable but inomissible. The relation between the population and the environment is of a complex character (Poulain, 1995).

The definition of housing environment in cities is particularly conditioned by the geographical location, by socio-economic functions and by the social differentiation of the population. Its assessment consists in the identification – and if possible quantification – of positive and negative aspects of the housing and life quality in different types of housing districts. Research methods include field research and mapping, statistic data and analysis of location. Since in addition to the objective characteristics it is also the perception of housing environment by local residents that plays an important role in the evaluation (sense of place – Billig, 2004), sociological methods are considered, too.

Empirical research

Based on the own field research and in combination with the study of literature and data, a comparison of housing environment quality was made. Two case study areas were selected in the cities participating in the project. Similar studies were elaborated for Brno. Not all the case studies were chosen according to the specification of the project. Therefore, our comparison included only the following housing districts: Altlindenau and Neustadt-Neuschönefeld in Leipzig, Bolognina in the city of Bologna, Miklošič Park in Ljubljana, El Ejido in the city of León, and Trnitá and Konečného náměstí Sq. in the city of Brno.

The peculiarity of Leipzig consists in the special situation of the city after the reunion of Germany. A part of the population left for the West. Opening of the housing market and new financial possibilities induced rapid construction of houses on the city fringe. It can be assumed that the condition of environment in the inner city acted only as an episodic circumstance. On the other hand, the great number of vacant flats makes it possible to substantially change the functions and the physical structure of a greater part of the inner city: to establish new green areas, playgrounds, parking places, open spaces, block inner areas etc. But the opening of individual blocks means their opening to noise and changing the semi-public spaces into public ones.

Similarly as other post-socialist big cities, Leipzig changed its character from the industrial town into the town of services with high ambitions in commercial, financial and sport spheres. As a consequence, the structure of pollution changed in the 1990s. The transport started to be the main source of environmental problems. Fortunately, the geographical position of the city in the lowland allows relocate a considerable part of the traffic from the inner city away. On the other hand, actual life has left the inner city together with the transport. The inner city

Fig.1: General view of Ljubljana from the castle hill. The old city is in front of picture. The case study area Miklošič park can be found in the middle of the image, behind the Franciscan church. (Photo: A. Vaishar)

Fig. 2: Krakovo protected area is a very special residential zone of the Ljubljana inner city (case study area Old Town). It consists of single family houses with the agrarian function. (Photo: A. Vaishar)

of Leipzig disposes of a green belt along the Weiße Elster River. This green belt forms a very good base for the creation of a system of ecological stability. There are rare green areas in the inner city. New ones are created at the present time (Lötscher, 2005).

Noise is a burning environmental problem, impacting large areas of the city of Bologna. The main source of noise is transport, not only road transport, but also air and railroad traffic. High level of noise pollution is observed also in the inner city. The majority of historical streets are extremely narrow and the most popular transport media are motor scooters there. These machines with their uncommutable noise create the image of the inner city of Bologna. Air pollution copies noise pollution to a certain extent. The solution of the pollution

Fig. 3: Area under re-urbanization in Leipzig: dilapidation houses contrast with reconstructed housing stock. (Photo: A. Vaishar)

from transport can be seen in the improvement of public transport. Its skeleton should be formed by electric rail traction. Structure and very large size of the medieval Bologna (forming the historical and cultural heritage) is the main obstacle.

The largest areas of greenery are concentrated in southern part of Bologna on the foothills of the Apennines. The extensive Parco Regionale dei Gessi Bolognesi can be found in the South-East. Important green belts occur along water streams (Fiume Reno and Torrente Savena). Within the framework of ecological stability planning, ideas about the connection of bio-corridors exist. Some of them are to be directed on railroad causeways.

The main peculiarity of Ljubljana is the fact that the city is the country's capital. It means that living in Ljubljana is extremely attractive without any respect to other factors. Next peculiarity is that a relatively small town at the beginning of the last century became to be a big city very rapidly. The consequence is that a relatively small city core is surrounded with modern blocks and houses. Level of sub-urbanisation is relatively high which is a reason of an extremely high level of individual motorization (Rebernik, 2005).

The issue of heating was solved with the change-over of municipal heating plant to the Indonesian coal of a very high quality. After that, the main environmental problem of Ljubljana has turned to pollution and noise from transport. Public transport is based on the system of bus connections. The solution is seen in the change of public transport organisation and in the development of express tramway. Also parking in the inner city is a great problem. On the other hand, bicycle tracks are very frequent. Among other problems, the condition of sewerage system is not exactly the best one; and this applies to old buildings as well as to houses of immigrants from other republics of the former Yugoslavia. Also, the situation of playgrounds for children is not good because of the content of lead, probably from transport.

Public greenery does not occupy too much of the inner city area, but the situation is compensated by extensive green areas in the city surroundings. Let us mention the Tivoli Park with ZOO or the castle hill. The Ljubljanica River is an element suitably complementing the urban space in Ljubljana. The deep regulation of the river is perceived as a problem, because it prevents free access to water in the inner city. Water quality corresponds to the 3rd degree of pollution.

León is the smallest city of the whole group. It can be found in a peripheral position, its history being evidently more famous than the present. After the end of coal mining and the decay of industrial function, there are tourist, educational, administrative and service functions remaining for León. But of them, only the tourist function can be of supraregional importance.

An unusually large share of the León's population lives in apartments. The composition of Bernesga River with its bridges and embankments into the urban grid of the town is very suitable. The waterfronts constitute a green corridor, passing through the whole town in the N-S direction up to the confluence with the Torío River. León is very clean.

Environmental problems correspond with the size of the city. Also in León, the environmental impacts of individual transport are the main conflict. Public transport is based on a network of bus lines. It does not represent a serious problem in comparison with other cities since the number of inhabitants is about a half million. On the other hand, the lack of public greenery in some parts of the inner city, not compensated with another greenery in the surroundings, can be problematic. Also the social milieu in respect to the housing estate character of a big part of the inner city could be quite interesting.

Brno is located in a typical contact zone between lowland in the South and hilly lands in other cardinal points. About 28 % of forests can be found directly in the territory of the town with a greater part of them being deciduous forests. Valuable parks can be found also in the inner city including The Lužánky (the first public park in Czechia), in the vicinity of the castle and on the cathedral hills. Only some industrial parts of the inner city are almost without greenery.

Brno was one of the most important industrial towns of the country. Leading industry used to be engineering and local cement works were the main source of air pollution. Because of the dispersed relief of the city, inversions often caused serious problems. The cement factory and most of other industrial facilities were closed down or transformed, which made industrial air pollution no more important. In connection with the gasification also heating plays a less important role. Transport began to be the main polluter producing both air and noise pollution. Well-functioning public transport is based on tramways and trolleybuses in the inner city and in the main radial and tangential directions. The problem consists in the fact that many people

Fig. 4: Ljubljana: The City Market hall situated on the water front is another work of J. Plečnik. (Photo: E. Kallabová)

Fig. 5: El Ejido in León performs a monofunctional structure of single family houses. Parking problems are typical for all inner cities under study. (Photo: E. Kallabová)

use cars as a symbol of freedom, rank and also for entrepreneurial activities. The increasing use of private cars is connected also with the process of sub-urbanisation.

Residential environment can be impacted by other causes. Old dumping sites represent a load mainly on the eastern part of the territory. The danger of floods exists along the Svitava River whereas the Svratka River is protected by water reservoirs. A serious problem is recently seen in the Brno water reservoir that used to be the main recreation area of the city some years ago. However, water nitrification in the dam lake – caused probably by fertilisation in territories up the city – makes summer bathing impossible there.

With an exception of El Ejido, virtually all the above mentioned town quarters are residential districts with mixed functions, originating from the end of the 19th and beginning of the 20th centuries. Bolognina is a typical neighbourhood situated between the railway station and suburbs, similarly as Trnitá in Brno. Trnitá is however of more industrial character, inhabited

Fig. 6: Plaza mayor (Big square) – the centre of ancient León. (Photo: E. Kallabová)

partly by unprivileged classes at the present time. On the other hand, the Konečného náměstí Square used to be considered one of neighbourhoods meant for the higher middle class, which is also corresponded to by the type and character of houses. The two town quarters in Leipzig are characteristic of their high percentage of abandoned flats (50 % and more) in some blocks. Miklošič Park was newly built after an earthquake and differs from all other case study areas by being a part of the country's capital, i.e. housing a considerable number of government authorities and institutions. Finally, El Ejido is a nearly mono-functional neighbourhood of attached family houses and apartment houses built in the 50s and 60s for the lower middle class next to the historical core of León.

Despite many differences, the chosen areas have a few common features concerning the quality of housing environment. Most significant variances in the housing environment quality should be sought in social aspects of the environment. The occurrence of unprivileged classes or population minorities impact the environmental image of the residential district in a conclusive way, social differentiation being also one of fundamental aspects of market economy.

A phenomenon typical for the post-industrial society is traffic becoming the main polluter of housing environment instead of industries and communal operation. Noise, air pollution, parking problems, danger of car accidents, artificial division of housing districts by traffic veins to be crossed with difficulties are only some of the main problems. The solution is a theoretically effective system of city public transport based on electric traction. Of the mentioned five cities, there are only two which have succeeded in the problem solution – Leipzig and Brno. But even there, traffic represents an ever more serious problem since an increasing number of residents use their cars not only as a means of transport but also to express their personal freedom, rank, etc.

Greenery is a very important aspect of environment and it is not only the green area size per inhabitant that is decisive. Important is also its quality and in geographical terms especially the development of bio-centers and bio-corridors combined with pedestrian zones, cycle tracks and sports facilities. However, large parks can also be zones with impaired personal safety of inhabitants.

The inner cities of mixed functions logically cannot avoid functional conflicts with environmental impact. The problem of traffic is further augmented by increasing tourism. The era of separated individual functions is over. A certain co-existence of various functions is at the present time generally considered very beneficial; on the other hand, mono-functionality becomes to be perceived as a problem. Furthermore, inner cities without traffic and tourism are considered to be areas of low prosperity.

Urban environment and re-urbanisation

Itself not having been defined unambiguously, the concept of housing quality plays an irreplaceable role in the structure of environment constituents, its fragile character requiring an investigation of the complex of human needs in the context of population demands and needs. The relation between re-urbanization and quality of housing resources falls into the segment of housing inquiries focused on social, psychological, economic and environmental issues. The relation results from the temporal and spatial changes in the structure of needs, life values and population priorities. Environmental research projects therefore pay an increased attention to space psychology – so called place identity (Peet, 1998). The idea that any place has its history, environmental value, natural starting points, current social functions and limits of use (e.g. in the sense of identifying its possibilities of sustainable development for instance in re-urbanization) is advocated as a dogma.

Housing quality should be viewed from several aspects (spatial arrangement of the flat, technical equipment, broader dwelling or social environment, etc.). User quality characteristics of housing include indicators of the technical equipment of the flats, area size, space distribution according to the number of rooms and other indicators derived from the number of persons

living in the apartment. The floor area / person (persons / room) indicator is affected by social situation and by demographic factors a basis being the change of family cycle that develops in time, at dynamics considerably higher than the housing environment. It is not only the number of household members that oscillates with the development of the family and life cycles but also their individual mobility, i.e. requirements of more room for individual members of the household. This relates to the function of locality in the life of an individual, whose action radius of a so called effective life space (extent of the world which a human being is willing to consider relevant for his/her behavior) changes in the course of life (Back, Geren, 1966).

Housing development itself creates an artificial cultural environment for people, which consists of either individual or mass form of housing. Together with the architectonic expression the spatial layout and arrangement of houses (both single-family houses and apartment blocks) affect the feelings of the population thus co-deciding on the climate of seats. Therefore it is necessary to apply regulations focused on the respect of public concerns at a simultaneous achievement of maximum moral valuability and viability. Also, the sociology of housing (Musil, 1971) puts an emphasis on the quality and arrangement of space whose positive effect may contribute to the improvement of human relations and to the humanization of society.

Fig. 7: Bologna´s historic centre, one of European largest, contains a wealth of Medieval, Renaissance and Baroque artistic monument of primary importance. (Photo: A. Vaishar)

Even the small micro-ecological elements may affect in housing complexes both the human communication and the social processes as a whole.

Not negligible either is the role of architectonic shaping of the housing space, and its influence on the behavior of people and social processes occurring in the given environment (Schmeidler, 2000). Any individual is affected by the surrounding environment as a whole with its expression and character, scale of the development, artistic, illumination, orientation, acoustic and hygienic conditions. Positive elements enhancing the quality of housing environment is their spiritual (aesthetic and cultural) dimension (of appropriately treated and to a certain measure also graphically identified spaces). Housing quality measured by these criteria is based on the building of human contacts which can over a time develop in phenomena such as topophilia, identity or genius loci, which combine, creating the place image, in other words "good or bad address".

Housing quality classified on the basis of physical features of the environment is focused especially on its size, vertical and horizontal dimensions. The housing quality research carried

out in multi-storeyed houses indicates that living on higher floors hampers the mobility of both children and adults (through the restricted contact with outer space), the multi-storeyed houses increase isolation between neighbors, they have to be locked day and night, etc. Essential are already differences in the perception of housing quality by children living in single-family houses and in apartment houses. Answers of children living in housing estates with family houses radiate more egocentrism, reserve and much stronger family links while children living in the apartment houses often act in the category of "we", feeling a greater appurtenance with other children and being more critical and immodest in their requirements concerning outdoor facilities of their housing environment.

Economic substance of the position of housing quality in the process of re-urbanization is based on the filter-down and trade-off theories (Maier, Čtyroký, 2000). This means that it is the offer of required housing quality that is decisive in searching a flat. In the case of successful modernization, the housing quality in existing inner towns may be higher than in new houses, which makes the originally centrifugal movement of upper classes from the inner towns at least a movement in both directions. A certain role is also played by a better accessibility of inner towns, highly valued by some groups of population. The trade-off theory puts into a ratio the household ability and willingness to spend a certain share of their income for housing. If the household income grows, it is possible to expect a demand for better housing quality which is in this case measurable by apartment size or by a newly appeared need of an own land property (house). Space requirements exceeding financial possibilities of the household bring about migration farther from the town center (model of west-European towns), or the dwelling of lower-income classes in inner towns.

Successful re-urbanization can also be contributed to by criticizing scattered developments in suburbs as well as by raising discussions on disadvantages of suburban life style and on the negative impact of suburban environment on inhabitants particularly at school- and young age. Other factors stimulating re-urbanization include environmental subconscious and protective attitude to town values, namely to housing quality in the traditional conception of urban environment. In this case, the "housing quality" includes the positive perception of the compact town structure and the environment protecting mobility, i.e. the system of vital streets (optimized traffic veins of inner town with pedestrian zones and with the functioning and qualitative public mass transport which may reduce the volume of private transport by up to a quarter). An important element enhancing the housing quality is the diversity of functions within the housing environment and a sufficient amount of possibilities of unforced and safe movement in public spaces and for contacts outside home with other people of all age categories. The quality of housing environment comprehended in this way should bear in it – in addition to specific character and resistance – signs of urban aesthetics and those of a so called sociability, i.e. features to support aggregation and communication of individuals. Socially significant are also elements following out from the climatic substance and those ensuring the transition between sun and shade and the regulation of heat and cold.

Each seat is a spatial formation with different functional zones. The spatial differentiation is explicit particularly in large cities, where complex residential, industrial, business, transport, recreation and other functional zones can be determined. And a number of mixed zones amongst them, where individual functions cannot be separated. The issue of functional conflicts answers best to the narrow understanding of the environment. In case of the multifunctional use of the territory of towns and cities the functions requesting high quality of the environment (residential, leisure, recreational) sometimes blend together with the functions bringing certain forms of impairment of the environment (manufacturing, transport). Certain functions (e.g. tourism) can range on both sides of the relation. Such an unsuitable mingling can take place directly in the territory of individual residential districts or we can speak about a negative affection by unsuitable functions in the neighborhood. In this case, the game is extended by further aspects, e.g. prevailing wind directions, aeration conditions, watercourse directions, natural or artificial barriers to transport of pollutants, etc.

The functional conflicts mentioned above can be new or can represent the so called old waste loads. Under typical issues of the old waste loads we understand for instance the places of old solid waste landfills, former manufacturing or exploitation premises, etc. Use of harmful materials for construction of buildings and structures is also worth mentioning here. Due to the fact that detailed log on stored or leaked materials was not carried out in the past or such unfavorable facts were even concealed, the old waste loads represent the real time bombs, the risks of which are not known precisely yet. On the other side, the known presence of old waste loads (e.g. unused industrial premises) reduces the environmental image of the place materially, though the real risks need not be very high in the specific case. The issues of the old waste loads of the period of industrialization are very often concentrated into the inner cities, where re-urbanization should become the very subject of solution.

The elimination of old waste loads is a material economic problem. The waste producer is often not existing any longer, insolvent or the guilt cannot be proved. Cities and urban areas do not have funds enough and private owners consider investments into the new construction on the greenfield site (where such problems do not exist) more effective. In spite of that there are examples of complex redevelopment of the old waste load places which on the contrary increase attractiveness of the respective locality. Old industrial premises are utilized as business and cultural centers or even as accommodation facilities.

Under the classic functional conflict of the industrial period we can understand industrial companies improperly located in relation to residential zones. Air and water pollution, solid wastes of most different kind, noise, odours, soil contamination represented the typical accompanying phenomenon of industries, particularly the heavy one. In the postindustrial society these problems are more and more switched to the position of old waste loads. Industrial production is pushed away, out of large cities and advanced countries in particular, and the remaining European industrial companies are subject to stringent legislation. Nowadays industrial pollution of the inner parts of large European cities can be met rather in specific cases only.

The present-day functional conflicts are most frequently connected with transport and traffic. In 1994 the sector of transport participated by 17% in total emissions, in 1997 the share rose to 30%. The share of motor vehicle pollution is naturally much higher in large cities. Traffic solution of big modern European cities is a serious environmental problem soluble with difficulties only. The issue is accentuated by a huge development of individual motoring that is understood as a symbol of progress and human freedom. Rapid development can be seen in this relation in post-socialist cities where car has become reflection of individuality as well as a necessary mean for developing business. Therefore the fight against cars is hardly realistic today. The traffic problems are concentrated just in the inner cities which were not dimensioned for such a development and where the local traffic of residents clash with the centripetal and even transit transport.

Transportation devalues the residential environment by noise, exhalations, vibrations, danger of accidents and creation of hardly surmountable obstacles in urban planning. Parking is a specific problem of inner cities. Re-allocation of remaining green areas to transport is a very serious fact. An effective, quick and financially acceptable public transport system is the basic conceptual solution of the traffic problem. The post-socialist cities that have often preserved the functioning el. traction public transport system reach a certain advantage. The cycle transport can become a certain alternative in the towns/cities with advantageous terrain and climatic conditions. The issue of transport has to be taken into account as the main environmental problem of the housing environment in inner parts of big European cities in the nearest future.

Tourism can become a specific problem of environment in inner cities. On the one hand, this sector needs a favourable environmental image, but on the other hand, a too high intensity of tourism or entertainment industry can to a certain degree impair the environment. We can speak about noise, disturbances, vandalism, pollution by wastes, rising incidence of crime.

Older or less educated inhabitants feel the presence of foreigners negatively in general, because they are not so adaptable.

Social environment is defined as that part of individual's environment, which is formed by other people, by the society. There are some opinions that social environment is not a part of the living environment. This would hold true if the subject of living environment is considered to be entire society. As to the living environment of human being with his/her biological and social needs, however, the social environment represents its integral constituent.

An individual needs social contacts for living, the need not being of such an exact character as the need of air to breathe, food, water, reproduction et cetera, though, but the requirement of social contacts is similarly important. Isolation is considered to be a very serious problem. This is why all individuals (or families as basic cells of the society) are interested in their residential preferences what kind of people they are going to be surrounded with on their possibly new address. In this conception, the quality of social environment is an important factor of re-urbanization.

Social environment can be perceived in two ways. Decisive on one hand is whether the individual can find in it suitable partners to establish social contacts. This motive is less important for working people who find alternative social contacts at work, in various professions and institutions. It is however more important for children and retired people who spend more time in the environment of their abodes.

The second dimension of social environment that has been increasingly important is whether the environment creates a feeling of danger. There are many levels of this problem starting with poor neighbourly relations and vandalism up to the extreme feeling of personal endangerment. The relations can be measured by various secondary indicators. These can be indicators of socio-pathological and undesirable social phenomena such as criminality, drug addiction, suicides, divorces, induced abortions, children born outside marriage etc. Demographic indicators and population statistics such as educational structure, social structure, occurrence of minorities, religiosity and its levels, in a closer analysis also the age structure of the population and composition of households can describe the social environment relatively very well, too. The analysis of social environment cannot however construct indicators valid on a European scale but it must rather take into account regional and national specificities.

Recent social problems are connected very often not only with social differentiation within the framework of national economy but also with international and global population problems. There is no doubt that differences between the rich North and the poor South create and will create pressures resulting in people migration due to ethnic, religious and cultural origin different from the local population. The feature has become a subject of the geographical study (Noin, 1993). Besides of the immigration mainly based on economic reasons, there are many political refugees from military conflicts and political oppression in various parts of the world. These people come to European countries and settle partly in border territories but usually in big cities, especially in their inner parts. Resulting conflicts between local and foreign inhabitants, among different groups of immigrants and inside such groups are or can be in the future one of big barriers for re-urbanization. Besides of social unevenness (as a rule, the refugees are usually from unprivileged social groups), cultural differences play a role, too.

The problem of creating ghettos is connected with social differentiation. Poor residential areas or quarters with large ethnic minorities are usually considered to be ghettos. But there are also the ghettos of rich people (gated communities). There are some attempts to mix flats of high and low standard to obtain socially mixed residential areas. This approach was criticized by Ostendorf (2000). He argues that moving to areas of similar population structure is one of the most important motivations for migration. From it follows that an attractive flat in an inattractive milieu would loose the value and vice versa. It seems that mixed quarters are hardly able to ensure better communication among people of various social strata. Social differentiation of cities is a natural consequence of market economy.

The problem of social security varies from homeless people and people who need social assistance (Egli, 2004) to the problems of crime (Herbert, 2002). Problem areas create so called social hot spots on urban territories. Vulnerable areas are hypothetically close to where offenders live, they are found on the edges of neighbourhoods and they are those that lack stability and social cohesion. Among tools, neighbourhood or block watch approaches, policing the city or street lighting and urban design are used.

The so called good and bad addresses that are so important with respect to the process of re-urbanization are first of all the result of social environment differentiation. Post-socialist towns and cities show a process of pronounced social differentiation and this is the point where all other aspects of living environment meet. It would be difficult to imagine a housing district with the markedly impaired natural environment, which would be at the same time sought for its social attractiveness. The opposite does not apply, though.

In European cities, there are as a rule several types of housing districts with either impaired or unstable social environment considerably hampering re-urbanization. This mostly applies to formerly industrial quarters inhabited originally by workers. In spite of the fact that industrial facilities located in these districts were closed down years ago, disturbance to natural environment was rectified and the location of the districts is favourable with respect to availability of town cores, the image of industrial quarters persists. The districts attract lower- and less adaptable population classes including minorities of immigrants. This results in the dilapidation of housing resources, unfavourable condition of public spaces and also in a minimum attractiveness for the process of re-urbanization. Re-urbanization is hardly possible at these places; considered is their gentrification instead. Adaptation of ethnic and/or religious minorities together with acceptance of different cultural patterns is the crucial point in many cases.

The second type of housing districts with impaired social environment are some inner parts of European cities that were originally inhabited by middle classes but later deteriorated due to various reasons. Their housing resources are of good standard as viewed by town planning and sometimes even architecture, but the social and age structure of the population is undesirable which may be a limiting factor for the process of re-urbanization. And it is these housing districts on which the process of re-urbanization should be mainly focused.

The third type of housing districts with unfavourable social environment occurring in European cities are large housing estates of blocks of flats built by industrial technologies (as a rule panel technologies), in which the disturbance of social environment shows among other things by the lack of place identity, by the anonymity of social environment, sometimes by the excessively one-sided age structure of the population due to the fact that the settlements were usually inhabited in a single and relatively short period of time. These housing districts can be re-urbanized by the form of social environment humanization.

The hitherto research results suggest that social environment is – apart from economic factors – the most significant agent of differentiation with respect to residential preferences of the population. In other words, people preferably select their addresses according to their financial possibilities so that they could feel secure and non-conflicting in their new abodes.

It is obvious that requirements concerning the quality of social environment differ – similarly as in all other environmental characteristics – according to age, family, social, ethnic and other population characteristics. It is therefore impossible to speak of social environment in general – it must be at all times related to a specific social population group. It appears that the existing social environment of inner towns consisting mainly of apartment houses is more attractive for singles, for young and so far instabilized people, pensioners, low-income classes and for minorities. On the other hand, families prefer living in single-family houses and in the inner town they are rather prepared to have a starting flat for a limited time. Demographic trends indicate, however, that the share of classical-form families in the population structure is rather decreasing. On the other hand, the proportion of persons living as singles (young people postponing their life commitments, divorced and widowed people), incomplete families,

childless married couples or couples with grown-up children has been increasing. These social groups rather require individual flats in apartment houses.

It follows from the above that re-urbanization of the inner towns in European cities is feasible especially in housing districts of high urban value and mixed functions, i.e. in housing districts offering also services and jobs in addition to the apartments. The success is realistic provided that such a re-urbanization is focused on starting flats, social flats and households of single-living persons. The social environment of these housing districts will be characterized by a somewhat impaired stability and by a lower level of social control which is the fact convening especially young people, people with a so far unstable social position and peripheral social groups. Pensioners who prefer an extremely stable up to unchanging social environment are likely to be facing a considerable problem. The problem of population ageing however concerns the entire society – not only the process of re-urbanization.

Should we intend to re-urbanize some housing districts for standard family housing, this would be likely calling for more essential changes. It would also have to be taken into account that families have specific requirements of social environment that would make possible to them to lead a proper family life including an optimum combination of intimate and social components, an optimum structure of private, semi-public and public spaces including all ranges of parents' and children's requirements. The presence of complete families would on the other hand mean a general stabilization of social environment. The co-existence of young people, families and pensioners in one housing district with the necessary infrastructure could be a good solution for the return to "normal" social environment in which all generations have their own place. A question remains to ask however whether and to what extent such a concept is on a larger scale realistic at the present time.

Social environment is a factor very sensitive to changes, to negative changes in particular, while positive changes come to effect over a relatively long time. Being formed by inhabitants of a concrete housing district it provides a large space for the community participation that should be one of the most important factors of re-urbanization.

As it was theoretically explained, in relation to environment man differs from other animals by being interested not only in biological demands of keeping the life. Human relation to environment is affected by cultural and social aspects. That is why a study of conditions for re-urbanization as creating of some ideal general environment has hardly any sense. Different demographic, social and cultural population groups have different environmental demands. Consequently, it is necessary to ask a question for which population groups re-urbanization would be suitable and which population groups are desirable for the cities.

There are two possible approaches to define the target groups. Using the results of the surveys in individual cities is one of them and a logical analysis is the second one. List of target groups in individual cities was elaborated within the WP of the Re-Urban project. These target groups were defined on the basis of the following criteria:
- who forms a considerable part of recent in-migrants (effective re-urbanisers),
- who wished to make stay in the areas for longer by the cities (preferred re-urbanisers),
- whose needs and wants correspond with the housing facilities given in the areas (potential re-urbanisers).

In the case of Leipzig, young families with small children, young cohabitation households, unrelated people sharing the flat aged under 40 years, in-migrants and young professionals (career starters) form the effective group. The city prefers maintenance of the socially mixed residential population, owner-occupiers, families with smaller children and younger cohabitation households (perspective families). Smaller households with lower income and unrelated people sharing a flat under 40 form the potential re-urbanisers.

In Bologna, unrelated people, sharing a flat under 40, immigrant households and single parents' households represent effective re-urbanisers. Families with children, younger

cohabitation households (potential families) and maintenance of social mix of residents are wished re-urbanisers by the city. Students and apprentices, career starters and city-minded households with smaller income are among potential re-urbanisers.

Concerning Ljubljana, students sharing a flat, young single professionals, young families, cohabitation households and city-minded better-off households in the post-family phase are typical for effective re-urbanisers, whereas younger urban professionals, students and city-minded better-off households form the potential group.

In León, families, couples without children and younger persons (alone or sharing a flat) represent the effective re-urbanisers, city-minded families with small children, better-off households – gentrifiers and younger persons are among potential re-urbanisers.

Coming out from the presupposition that houses of apartments can be found at the present time and due to the prices of land also in the future, we are of the opinion that people, who want to be mobile, not connected with a single family house, people, who are not able to own a single family house from economical reasons will prefer living in apartments. Single people (including students), career starters or professionals working in local companies temporarily, lonesome people (divorced, widows and widowers), childless couples and also socially weaker households and members of ethnic as well as religious minorities are among them.

It seems that the demographic and social development plays for re-urbanization, because shares of the mentioned groups in total population increase and will increase also in the near future. The problem consists in the fact that a less intensive relation to the residential area can be expected among the young mobile people and a lower economic power to take part in the maintenance and improving of the area is to be expected among the socially weaker households. That is probably why the wishes of cities usually disagree with the reality to a certain extent. The cities want to keep the mixed social population structure and to motivate families with small children for coming to the areas of re-urbanization. These wishes are logical but whether they are also realistic remains a question.

Demands of individual target groups for housing environment are the next question. Quite generally, it is possible to presume that young independent people prefer advancement, innovations and a limited level of social control inconvenient for them. On the other hand, older people prefer a quiet milieu, lower level of changes and a high level of social control. Families with children require in fact the both characteristics and on the top of it, they demand a safe space for children; at their later age also from the viewpoint of possible contacts with drugs, gangs and so on.

Better-off complete families (the participation of which is a must in the process of re-urbanization), will probably prefer buying or building a single family house in garden quarters or in a sub-urbanization zone. Ethnic and religious minorities demand a milieu corresponding to their cultural habits. Consequently, maintenance or creating of a socially mixed re-urbanized areas is less probable, if some of the above mentioned social groups are not able to conform their demand for the housing environment and to tolerate requirements of the other groups.

Conclusion

Our study was based on a hypothesis that objective as well as subjective criteria for quality of life in urban environments influence people's choice of living space in the re-urbanization area. This hypothesis was screened by theoretical foundation, surveys and workshops. It was found that environmental factors are probably not the most important ones. But environmental aspects are among those arguments which support or weaken primary decisions. Environment can be most important in extreme cases. On the other hand, for people who live in individual residential areas, environment is a frequently discussed issue.

Housing environment of the post-industrial European city is an application issue of extraordinary significance. It is not only the quality of environment in the cities that is at stake, but also the functioning and the further future of the entire settlement structure. In order to maintain the competitiveness of inner zones in European large cities it is necessary to do a bit of hard thinking about the instruments of re-urbanization.

From the viewpoint of re-urbanization, the question of competition with other forms of residential areas in cities and their surroundings is substantial. Values of residential environment in quarters of single family houses (villas), gentrificated areas, prefabricated estates, former rural suburbs and new suburbanized areas are to be compared with attractions of presupposed re-urbanized inner cities. Each of the mentioned forms of housing districts has general advantages and disadvantages which are modified in each of individual cases.

In general, there are two big groups of environmental aspects in inner cities, connected with re-urbanization. The first group contains all kinds of pollution and stress including social disturbances. Increasing the values of indicators in this group means worsening the housing environment as a rule. The second group includes aspects improving the environmental situation, e.g. greenery.

There are two possible strategies how to improve the environmental situation. The first one is based on regulation (of transport, manufacturing, housing) by the state or municipality. The other side of the coin is that each regulation imposes limits on economic and non-economic activities in the territory. The second group of strategies is based on the reclamation of permanent- and former pollutions and on environmental investments. The problem is that this kind of measures usually calls for huge funding. It follows that the question of price of environmental improvement is in the program.

It would be unrealistic to seek and ideal and universal housing environment. Taken into account must be the national, social and individual environments of any single housing district in a big city and efforts should be focused on a tailored environment for each of them. A part of the problem is also the question what target groups of population should live in the inner zones of large cities, what are requirements of these population groups and what they can offer in relation to the housing environment.

Consequently, the question is not only what tools lead to enhancement of housing environment. We have to ask for what target population group the re-urbanized parts of inner cities can be attractive. It depends on the economic power of individual target groups but also on their preferences, resulting from age, educational level, economic activity, households structure, cultural (ethnic) habits etc. Which brings the research to the dividing line between geography and sociology.

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Fig. 8: San Donato case study area represents a housing estate built after the WWII. Archways which are typical for the ancient Bologna were used also in the relatively new part of the city.
(Photo: S .Cetkovský)

Fig.9: Leipzig, Neustadt-Neuschönefeld: old vacant houses were sometimes substituted with green areas.

(Photo: E. Kallabová)

Illustrations to A. Vaishar´s et al. paper

Fig. 10: Santa María de León Cathedral (called also the House of Light) dominates the old city of León.

(Photo: E. Kallabová)

Fig. 11: The Lubljanica river plays a very important role in the physical structure of Ljubljana old town. View of the Prešeren trg (Sq.) with the Triple Bridge suggested by Jože Plečnik.

(Photo: E. Kallabová)

Illustrations to A. Vaishar´s et al. paper