

## ARTICLES

**BROWNFIELDS, GEOGRAPHY AND GEOGRAPHERS IN CEE COUNTRIES - HOLISTIC APPROACH***AUTHORS***Lučka Lorber**

*Department of Geography, Faculty of Arts, University of Maribor, Koroška cesta 160, 2000 Maribor, Slovenia, e-mail: lucka.lorber@um.si*

**René Matlovič**

*Department of Geography and Regional Development, Faculty of Humanities and Natural Sciences, University of Prešov, Ul. 17 Novembra č. 1, 081 16 Prešov, Slovakia, e-mail: rene.matlovic@unipo.sk*

**Zoran Stiperski**

*Department of Geography, Faculty of Science, University of Zagreb, Marulićev trg 19/II, 10000 Zagreb, Croatia, e-mail: zstiper@geog.pmf.hr*

UDK: 911.3:338.45(4-191.2)

*ABSTRACT****Brownfields, geography and geographers in cee countries - holistic approach***

*The occurrence of brownfields areas is related to fast development within industrial activity. Conventional labour-intensive industrial activities were losing their significance and new highly-productive activities, based on educated labour force and higher added value, developed. De-industrialisation occurred. The external signs of negative de-industrialisation are mostly degradation of space, unemployment, social endangerment, increase of crime and marginalisation of the population in the affected areas. Based on the experience gained working on an international project ReTIInA - Revitalization of Traditional Industrial Areas in South East Europe we came to the conclusion that the role of Geography and geographers is too inconsiderable and not in accordance with global trends of interdisciplinary approach to problem solving. We see the problem in an inadequate approach to solving revitalisations from top to bottom as well as in the ill-defined role of Geography and geographers. Findings, gained through multiyear work on the project are the following: the place and role of Geography and geographers solving the problem of brownfields need to be defined anew.*

**KEY WORDS** *brownfields, geography, holistic approach, deindustrialization, economic changes.*

## **1. Introduction**

Socialist economies of the East Europe were based on planned economy, closed internal market of trade in goods and labour force, and industrialisation that was based on heavy industry, mining and electrification. The principle of full employment meant less social pressure; however, the extensive employment policy at the same time meant low productivity and the associated uncompetitiveness in the increasingly open and globalised markets. Economic ineffectiveness reflected in low accumulation of the economy and thus in limited investments into maintenance and reformation of economic systems.

For the majority of economies, this meant that the system was operating strictly monitored and according to the top-down principle which resulted in blocked development of local communities and increasing regional disparities. The developed world was solving problems by endogenous approach (Porter 1990) and by holistic approach towards solving economic problems.

The process of economic restructuring was different from country to country. State authorities were introducing economic changes, demanded by market economy and the EU, at their own pace (Lorber 1999b). The processes of deindustrialization and tertiarization meant the movement of employees from secondary into tertiary and quaternary activities, a fundamental characteristic of the post-industrial period. Due to the achievements of science, the new industrial production increasingly required new information and financial services, and the existing stereotype of industry changed. The industrial giants, once the pride and driving force of development, were confronted with major difficulties. In the most developed countries, this process began at the end of the 1950's and became a problem in the 1960's. Labour-intensive branches of industry could not compete with the rapidly growing "footloose" industry in creating added value (Lorber 1999a).

The latter has mainly had an adverse effect on old industrial centres where neither local authorities nor economic management detected any danger. Due to inactivity of the economic management the endangered conventional industrial activities did not experience the crucial structural adjustment of the economy in a timely manner. Consequently, that brought the decline of the old industrial areas featuring mainly labour-intensive, energy-wasteful and environmentally problematic manufacturing activities in the second half of the past century. In addition to textile industry and heavy industry, the crisis reflected on primary energy production in particular – coal mining. Development of science and technology and new energy sources pushed the old industrial regions into a crisis, which reflected in declining income, high rate of unemployed unskilled labour force and in severe degradation of physical space.

The reason for that was in the increasingly globalised world economy and, consequently, the development of global maritime commerce, which, in addition to the too high labour costs in developed countries, was the main reason for the decline of the entire individual processing industries (Lorber 2014).

The process of industrial change has resulted in the creation of so-called “brownfield” across Europe. Almost all European countries recognize that the presence of brownfields is a complex problem that goes far beyond single economic, environmental or urban and social concerns and that need some political and methodological solution.

Over the past decades the “brownfield” issue was a particular topic of discussion in the traditional industrial regions of Europe. Countries such as the UK, France, Germany and Belgium are particularly affected by derelict land and also most European cities as well as in peripheral locations. De-industrialisation processes in Western Europe and the shock of transformation in Central and East European (CEE) countries have savaged many industrial places on the continent. Communities of former economic heartlands have often become notorious for bankrupt companies, massive unemployment, derelict factories and decrepit infrastructure (Domanski 2000). The general image of brownfields is usually negative due to the pollution generated by the industrial activity and the derelict image of the buildings. A positive aspect is the fact that the same industrial activity is seen as having offered job opportunities in the past and having potential of offering them again. One of the most important aspects in developing the new identity of the brownfields is identifying the value or resource that makes the area and its people unique and valuable. It should be the core element in creating a distinctive image and the cultural and architectural heritage can represent such an element. This wide range of different circumstances and conditions means that different strategies and programmes will be needed to support redevelopment.

In the Central-East European area revitalization is delayed and hindered because of legal, financial, organizational and image problems. It weakens competitive investment position for the cities and for CEE as a whole. Built and expanded around the requirements of a command economy, CEE cities now have to respond to market economy challenges. Polluting industries in inner cities have to make place for cleaner office buildings in an economy that is rapidly shifting from industrial production to services. The pressures of suburban development have to be countered with effective reuse of derelict and underused sites in inner cities, while minimizing greenfield development and reducing sprawl for more environmental sustainable cities (Ionescu-Heroiu 2010).

Suburbanization has its morphological, functional and socio-demographic dimensions and belongs to the complex transformation processes and to the most visible changes on the face of cities (Ptáček and Szczyrba 2007). Brownfield sites present particular challenges to national and regional policy makers in terms of the ways of improving European global competitiveness in sustainable way in CEE region.

In this respect successful brownfield redevelopment policies and strategies need quality research recommendations in setting and meeting public policy objectives and improving practice.

Geographers at the University of Maribor participate in Transnational Cooperation Programme in the project *Revitalization of Traditional Industrial Areas in South-East Europe*. In majority of cases, old industrial zones developed land that was suitable for industry, in the then suburbs or the outskirts which today represent excellent urban locations close to the very heart of urban centres. Since these sites have all the infrastructure and exceedingly good transport links, they rise great interest in investors and tend to reach high prices on real estate markets. Due to this interest, they are losing their former function and are undergoing an intense revitalisation (Lorber 2011). Investors were influenced by inner political stability of a given country and investor friendly environment.

The term brownfields itself has numerous definitions which all differ from country to country. The initial definitions were bound to abandoned old industrial centres. In project ReTInA we defined brownfields as the unused or underused degraded areas that emerge in urban and natural environments, in which degradation of space occurred as a consequence of human activity. In a longer term, brownfields become physical and functional obstacles for development of their neighbouring areas and significantly influence physical and functional structure and development of larger city areas and even the city itself (Lorber et al 2012).

Brownfield land (also known as 'Previously Development Land' or PDL) is principally defined as: Land that is or was occupied by a permanent structure (excluding agricultural or forestry buildings), and associated fixed surface infrastructure. The definition covers the curtilage of the development. Previously developed land may occur in both built-up and rural settings. The definition includes defence buildings and land used for mineral extraction and waste disposal where provision for restoration has not been made through development control procedures (Internet 1).

The regeneration of European brownfield sites is an essential part of improving European global competitiveness in a sustainable way. A 'brownfield land dimension' is critical to the pursuit and attainment of many aspects of the EU's structural change. Brownfield revitalization is of transnational relevance to South-East Europe (SEE). The quality and attractiveness of the urban environment is one of the decisive factors for foreign investment. If SEE wants to position itself at a global investment scale, it must concentrate on solving the brownfield development problem which is more dominant in SEE compared to other EU regions (AuerandReuveny 2001).

## **2. Need for holistic approach – lesson from ReTInA project**

Similarly to other social and humanist sciences, geography as a science in the CEE/SEE countries still falls behind in regard of its development compared to geography in developed economies. The reason lies in the exogenous policy approach and in the dependent status of science towards the state. Higher education falls in the domain of the state in most of the CEE/SEE countries; it is of predominantly public nature and depends on public funding. At the same time, historically speaking, it has not freed itself from the political influence of the socialist heritage, both in the approach to teaching content as well as in terms of human resources. The objective of this article is to promote awareness in the younger generation of geographers of the importance of personal efforts to achieve change in the way of thinking and the approach to solving social problems in a modern way while considering equity and sustainable spatial development. Adequate revitalization of degraded industrial areas also falls into this category.

The transfer of knowledge opens new employment and specialisation opportunities for new generations of geographers. Historical experience and knowledge of the preceding economic and political system should serve as a basis for any action. To achieve changes, good practices and modern trends of development of the science of geography should be studied. At the same time, the ambition of this article is letting the geographers and the broader scientific community in the developed economies know that in order to successfully solve the issue of brownfields in old industrial areas in the transition countries, we need to share knowledge and understanding of the influence of the heritage of political, social and economic specificities of the socialist system on perception of the population of the transitional countries. Studying the literature and maintaining contacts with the western experts from different profiles we can conclude that their knowledge of the essence of the problems of transitional countries is not deep enough. We can actually say that they see the problem in an exogenous way, from top to bottom. The suggested solutions might be economically efficient; however, they do not take into consideration

the consequences of the decades-long socialist history that influenced the mentality and difference in the values of the population, including work of the intellectuals. Socialism (communism) built its identity on common well-being and equality. It denied private ownership and personal initiative. By limiting these key goods it infringed basic human rights to personal development and simultaneously limited the possibilities of the much-needed economic development. Its extensive employment policy however did assure full employment, the right to free education and health care. Consequently, by its planned economy, low productivity and limiting entrepreneurial initiative it established an uncompetitive and developmentally backward economy that was unable to withstand the public expenditure burden. Social and economic changes that occurred at the end of the eighties brought in a new situation. The newly established independent countries in different stages of development using different approaches in the transition period emerged.

Therefore, more than merely copying good practices from the developed countries is needed here. What is needed here is a mentality shift. The latter can only be achieved by knowing the trends in the modern global society. Transitional countries, in addition to restructuring their economies, also need the change of educational system contents, which will affect the change of mentality and establish new values in society in the long run. The area of revitalization of the old industrial zones is precisely the case where geography and the transitional countries' geographers can see their opportunity, both professionally as well as in creating new jobs. To be able to achieve these objectives, we need to know the reasons as to why the holistic approach is needed.

The authors emphasize interdisciplinary approach in their early scientific articles, publications of research findings from scientific projects and papers at scientific conferences. It was the holistic approach used by the researchers of regional development that showed that space less model of economy does not provide satisfactory results. So the economists realised that in the course of their scientific work researching regional development both place and space should be considered. Following this, Krugman introduced the term economic geography. "There are three reasons in particular why it is important to start doing economic geography. First, the location of economic activity within countries is an important subject in its own right...

Second, the lines between international economics and regional economics are becoming blurred. However, the most important reason to look again at economic geography is the intellectual and empirical laboratory it provides" (Krugman 1991). Later, Krugman's theory was criticised and upgraded by Martin (Martin 2003).



"Therefore one needs to consider the "Mulej/Kajzer law of the requisite holism of behavior" (MulejandKajzer 1998; Mulej2007) providing for middle way between the impossible real holism and the dangerous fictitious holism" (Mulej 2013).

## **2.1. ReTInA project**

Geographers at the University of Maribor participated in Transnational Cooperation Programme in the project Revitalization of Traditional Industrial Areas in South-East Europe (ReTInA), project code: SEE/AF/A/147/4.1/X. Expanding the scientific knowledge base and developing a clear understanding of the socio-economical, legislative, environmental and spatial dimension that impact on brownfield revitalization were important aspects of our research programme.

Maribor (Slovenia) an old industrial city was one of the ten partners on the ReTInA project. The partner cities were located in or near urban areas and were subjects to revitalization schemes. Regional case studies included industrial areas in Athens (Greece), Komotini (Greece), Ferrara (Italy) and Iași (Romania), contaminated sites in Galați (Romania), Fidenza (Italy), Csepel, municipality of Budapest, 21st District (Hungary), brownfields in traditional heavy industrial centres in Pernik (Bulgaria) and Košice (Slovakia).

Partners realised that they were facing a common challenge which was also a challenge for the SEE areas as a whole and they decided to commit themselves to developing a method to assist them to take the right steps at the right time, involving the right stakeholders along these steps. In this context, ReTInA project defined the main objective of how to ensure growth, competitiveness and quality employment in the areas by preparing a series of concrete revitalisation and investments plans to catalyse revitalisation while contributing to a quality urban environment. A specific objective for the ReTInA project was to develop an innovative Brownfield Revitalization Method (BRM) following the same cross-sectoral approach that is reflected in the programme and in the Commission Communication on 'Cohesion Policy and Cities'.

The principal methodological approach of ReTInA was to analyse and evaluate the then current practice in brownfield re-development via practical regional case studies (UM 2009a). Regional case study (RCS) (UM 2009b) provided a lot of information concerning the specific needs, weaknesses and existing tools that were used in brownfield regeneration activities. A confrontation of the results of these RCS's allowed the project to identify a common approach to be discussed in three thematic task forces which resulted in a Brownfield Revitalization Method. Each Task Force (TF) covered one field of interest for the project:



- TF 1 - Legal Framework
- TF 2 - Urban planning and environment
- TF 3 - Imaging and branding

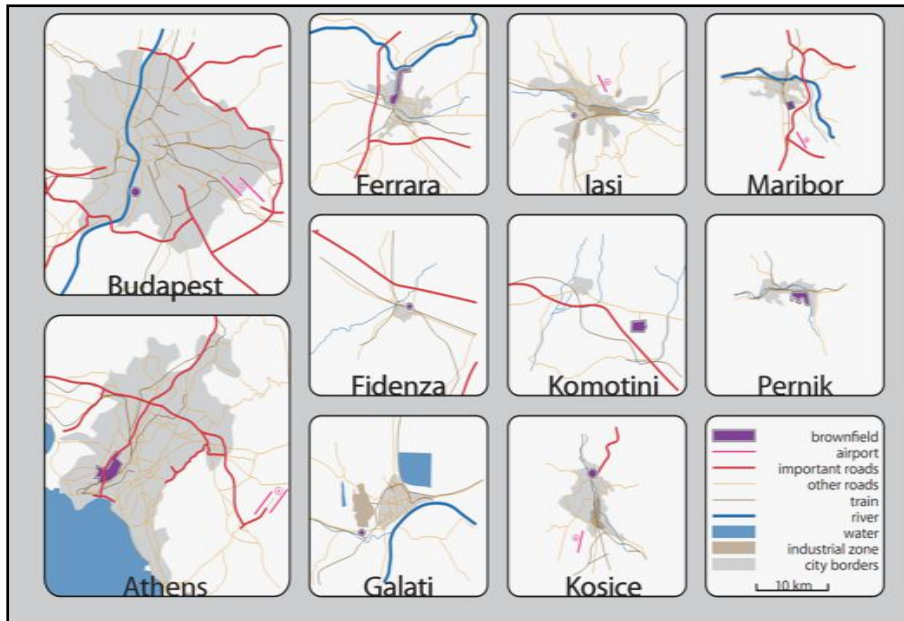


Figure 1: The partner cities on the ReTInA project.  
 Source: ReTInA working materials (Vicol 2011).

Within each Task Force a Transnational Case Studies (TCS) was carried out focused on an intensified development and transfer of know how. Within the task forces a system of peer reviews and benchmarks was established, too.

The results of all three Task Forces were meant to compose the Revitalisation Method of Brownfields. After sorting out all deviations, the remaining would be the most appropriate or the most successful method of Revitalisation of Brownfields.

Brownfield revitalisation is an extremely complex and multi-layer issue and the solutions are very demanding from urban/spatial, environmental, social, and economic aspects of the site itself, immediate neighbouring communities and also broader regional political, economic, social, cultural and other aspects. Accordingly, planning of the brownfield revitalisation needs to consider and integrate these diverse aspects in an appropriate, efficient and non-conflicting, yet cost-efficient way.

No matter in which stage the actual planning process in an individual brownfield site starts using the methodology, it is important that the process is based on:

- A thorough understanding of the site, its qualities and constraints against the needs and preferences of a broader community
- Involvement of stakeholders, individuals and entities, in a constructive way
- Clear vision and sufficiently flexible strategy as to what changes should be made and which outputs are to be expected
- Well-organised and coordinated action among all involved
- Focusing on quality throughout the process, and
- Monitoring the achievements at milestones against measurable planned outcomes.

Why considering a broader socio-economic context?

Brownfield areas are not seen only as a physical issue in urban use of the land, but could have (adverse) impacts also on the city's social structure, its image and the status of the environment.

Apart from pure site revitalisation aspects (as decontamination, improvement of infrastructure and building stocks), revitalisation of unused land is often combined by broader goals the municipality tends to attain, such as economic (bringing new economic activities into the city and creation of new jobs), social (eliminating the „pockets of poverty“ or provision of new socially-related functions in the site), cultural (preserving the building stock and introducing new culture-related activities), or city sustainability in general, etc.

It should be pointed out that some general economic and social objectives might be regulated at national level (e.g. strategic documents, regional plans, operative programmes regulating cohesion and structural funds), but the use of land and fine-tuning of local development issues are under competences of local/regional communities (municipalities, cities and/or regional authorities).

Elements to be considered:

Assessment of (the site's role in) a broader socio-economic context may include the following elements and to some extent depends on its desired (envisaged) role in the future:

- Development plans (municipal, city, regional), including their main goals and strategies and any site-relevant priority projects
- Demography – status and main trends (total population, trends, migration, specific groups like active population, young, older, ageing index, etc.)

- Economic context of the community (city, region – depending on the present and estimated or desired future area of influence the site should have)
  - BDP (or GVA), share in national / regional BDP (or GVA)
  - Main economic sectors and their recent development trends (e.g. 5 years)
  - Recent trends in income, profits, exports, innovation, investments
  - Number and main characteristics of companies (by size, sectors, exports, renowned brands, etc.)
  - Incoming direct investment trends and trends in real estate market
  - Overview of local/regional/national policies and measures related to the promotion of economic growth
- Labour market, in particular:
  - Employment, i.e. general trends, trends in job creation by sectors (sector-specific demand for labour force)
  - Unemployment: rate, recent trends, specific groups
- Education and science sector, culture and entertainment, sports (particularly with an emphasis on the sectors that could have a significant role in planned/envisaged future functions of the site)
- Social issues, particularly in case the site is planned to include any functions related to purchase power (i.e. retail trade / shopping centres, new residential units)
- Purchase power and trends
- Poverty threshold (if necessary)
- Trends in housing (particularly if the site is planned for residential functions) and characteristics of real estate markets (Lorber et al 2012).

The ReTInA project lead us to the conclusion that the leader responsible for the project needs to plan revitalisation in such a manner so as to consider different outlooks on revitalisation as well as meet partial and general interests of all sets of interested public. Taking these principles into consideration, we achieve the synergy of optimal solutions needed for successful revitalisation of old industrial areas.

### **3. Brownfields –from Problematic Areas to New Economic Value**

Regional planning was tackling the issues about where and how to locate the industry so as to serve society's interests, economy and spatial conditions, while simultaneously observing different implications and social effects brought by installation of the new and/or the results of development /stagnation of the old industry. Installation or location of an industry in the landscape

depended on various factors which usually do not have an effect each on their own but were associated with each other. The meaning of location factors was changing during the different development stages of industrialisation. Those which had been important when industry began have lost their significance with development of the new industry.

Industrial geographers (W. Launhardt, A. Weber, T. Palander, E. Hoover, A. M. Greenhut, W. Isard, I. Vrišer, D. Feletar) were involved in studying hierarchy of location factors in a comprehensive manner, however, it can be noticed that they divided them into two basic groups. The first group consists of the factors that decided about the installation and the choice of the place for an industry in a broader sense. To this "macro aspect", the important issues were usually: the social system, regional policy, some macroeconomic and economic-geographic reasons (e.g. available labour force, transport links, etc.) and not that rarely also technical reasons. In regard of the installation of an industrial plant, the decisive factors were other location factors like: available space, infrastructural network, technology process and organisation of the production (Vrišer 1978; Lorber 1999b).

The newly established countries in transition, especially those that emerged from disintegration of federal states, have the beginners' problems of recognizing themselves as independent countries. They needed to establish their statehoods, new democratic systems, and adequately transform their economies under the new conditions. To be able to integrate into the global economic system, they must develop their own competitive advantages.

M. Porter's theory (Porter 1990) on the evolution of global competitiveness points out that in the case of the least developed economies it is based primarily on structure of costs. This means that in the case of technologically undemanding product and service lines sold in low price classes, the factors determining competitiveness are the substantially lower wages, social contributions, government expenses, and neglect of the environment.

Inversely, the competitiveness of technologically demanding programs with high added value is based primarily on the high level of technological and innovative capacity of companies, the economy, and the society (Lorber 1999a). According to this theory, due to the lack of available greenfield areas in urban environments of the transition countries, brownfields areas became interesting. Brownfields are often of great social and economic importance to a city or region because of their strategic location and economic value. Environments that recognised the value of these areas have investors in adequate ways. In this manner, the goal of rehabilitation of abandoned old industrial centres, the image of the broader brownfields environment has improved and negative social trends have stopped.

#### **4. Inclusion of Geographers in Solving Brownfields Issues – Overview Slovenia, Slovakia and Croatia**

The role of geography and geographers in solving problems of brownfields areas in the new EU member states is closely related to economic transition and its main results – the de-industrialisation and tertiarization of urban space. One of the characteristics of urban space in transition countries was that, in addition to a polyfunctional capital city with developed tertiary sector, there were more smaller old industrial cities, usually with conventional labour-intensive and/or energy-wasteful industry. In majority of transitional countries, spatial planning belonged to the domain of politics, architects and economists, following the top-to-bottom principle. The need for active inclusion of geography and geographers has shown to be necessary only in the last period. New economic conditions demand for broadest possible consensus and cooperation of experts from different fields and the interested public when searching for solutions to revitalise brownfields areas.

They need the triple helix approach (Davidson2006) that integrates the state/local administration, the universities and institutes, and the economy. Geography as a science and the geographers with specific knowledge play a role in the transfer of knowledge. They are involved by co-drafting the legislation on the government level, co-shaping the objectives of revitalisation while considering broader social effects and results of revitalisation on spatial and social changes in a broader area of brownfields and assuring equity to the population on the local level. Revitalization of brownfields can, in addition to positive effects such as improving the living conditions, bring also some negative effects like gentrification of the broader revitalised area, which can have adverse effects particularly on the socially disadvantaged population in the area. This is why holistic approach to revitalisation of brownfields is so important and why geography as science and geographers with their expertise are such important factors when searching for optimum solutions to revitalisation of brownfields. This is why we decided to research the inclusion of geographers in revitalisation of brownfields in Slovenia, Slovakia and Croatia by preparing an overview of scientific articles.

##### **4.1. Slovenia**

Slovenian geographers focused their research work mostly onto researching physical and regional geography of Slovenia. The first to face the issue of brownfields were the geographers who were dealing with industrial geography and the part of geographers who studied regional disparities. The leading Slovenian geographer who dealt with industrial geography after the World War II was Vrišer.

In his works (Vrišer 1977; 1990; 1997; 2000), he was dealing with locational factors for distributing industry, industrialisation and de-industrialisation in urban space, and regional distribution of industry in Slovenian space. With the beginning of socio-economic changes after the fall of the Berlin Wall and the beginning of transition, industrial geographers faced the new situation. The first problems in industrial activity emerged in 1988 in the once most highly developed industrial city of Maribor. After Slovenia's independence in 1991, Maribor was the first one under attack in the time of transition. The reason for that laid in the inadequate infrastructure of industrial activities. The first brownfields areas emerged in the areas of the bankrupted companies. Economic issues of the industry were addressed by Lorber (Lorber 1993) by researching socio-economic influences of development of the industry on development of the town of Maribor, restructuring the industry and its influence on transformation of space (Lorber 1999a). During the same period, Slavec (1995) was involved in a similar issue. In the time when Slovenia was approaching the EU, Lorber widened her research to studying socio-economic changes in transition countries with emphasis on Slovenia and the effects of these changes on regional disparities (Lorber 2003; 2005; 2011; 2012a; 2013).

The changed social and political conditions encouraged Slovenian geographers to intentionally focus their research on different individual areas. In regard of brownfields areas, the importance of Plut's work in the area of ecology geography and publishing *Geografske metode proučevanja degradacije okolja* (Plut 2004) and *Mesta in sonaravni razvoj: geografske razsežnosti in dileme urbanega sonaravnega razvoja* (Plut 2006), need to be pointed out. Great changes influenced the image of the urban areas, which was a topic also addressed by Ravbar (1997; 2009a; 2009b), Černe, Kušar (Černe and Kušar, 2010), and Rebernik (2004; 2008; 2009) from the regional point of view on degraded areas in the context of internal specialisation of the regions regarding local advantages and potentials alongside with researching the business zones in the suburbanised areas. An important contribution to studying degraded areas from the aspect of urban geography, the influence of economic conditions on functional changes of usage of urban areas in particular, has been made by Bole (2008), Drozg (1999; 2004), Nared (2007), Nared and Kavaš (2009) and Kušar (2008).

The first systematic work in the area of studying degraded areas can be considered the research and development project by the Ministry of Environment and regional Planning Project and Ministry of science and technology of the republic of Slovenia, Project Code: MZT S2 – 6461 – 0791 (1994-1998) Degraded urban areas. The responsible for the project were the architects of the University of Ljubljana, Faculty of Architecture. Project holder Koželj (1998) published a scientific monograph.

Unfortunately, no geographers were involved in the project. Nevertheless, the project was designed in an interdisciplinary manner and has recorded and methodologically characterised the degraded areas by manner of their formation and offered basic directions for professional way for addressing the issue. It was established that in the mid-nineties, the shares of degraded areas were as follows: industrial 34%, mining 19%, military 5%, urban grey zones 24%, housing neighbourhoods 9% and 9% were in the suburban areas.

The second national Target research project was implemented by the University of Ljubljana, Faculty of Arts, Department for Geography: Sustainable rehabilitation of environmental burdens as a sustainable development opportunity for Slovenia, project code:V1-1088 (2010-2012). Set Degraded areas (DA) “dealing with the degraded areas (brownfield sites, the main objective was the definition and analysis of the degraded areas in Slovenia, with the main focus on the theoretical – methodological definition of the term and the complex definition of the criteria to define and distinct the variety of degraded areas in Slovenia. The field survey, description and the analysis of the present degraded areas as well as the formed digital database of the degraded areas will be the tool for the future spatial guidance of the business investments... In the final project phase the important contribution were the public presentations of project results to various relevant stakeholders on national, regional and local level (Kreus et al 2012; Lampič and Špes 2011). National register of degraded land has already been transmitted to Ministry of Infrastructure and Spatial Planning” (Špes et al. 2012). In total, 194 DAs were registered, with a total area of 979 ha. DAs are represented in 82 municipalities. The highest number of DAs can be found in the Osrednje slovenska statistical region, namely 32, followed by Savinjska with 26 and Gorenjska (22 DAs). In the area of Koroška, there was no DAs that matched the chosen criteria and in Zasavska, there were as many as 9 despite the small size of the region. The most DAs in the terms of area are located in Podravska and Osrednjeslovenska regions, whereas they take up the least areas in Zasavska, Goriška and Notranjsko-kraška statistical regions.

## 4.2. Slovakia

The initial interest of Slovak geographers in the issue of brownfields can be traced to the broader scope works, focused primarily on the issue of unused or devastated urban areas and urban fallows. P. Radváni and M. Hriňová (1982) addressed this issue already in 1980s. Later on, R. Poušand T. Hlásny (2007) dealt with the classification and inventory of unused areas under the new socio-economic conditions after 1989. These works, however, did not deal with the concept of brownfields explicitly.

Other approach already explicitly using the concept of brownfields may be encountered in the works focused on transformation processes of intra-urban structures in the post-communist cities (Matlovič 2001; 2003; 2004). The conceptualisation of de-industrialisation and demilitarisation processes ongoing on the level of functional intra-urban structure seems to be relevant in this context. As a result of these processes brownfields come into being and emerge in some urban zones. On the other hand, the process of revitalisation is also interesting since it transforms brownfields into the fully utilized areas. In the recent years, the interest of Slovak geographers in the phenomenon of brownfields has increased. The works of several authors such as Lukáčová, Klamár, Sovičová (2012, 2013) provide direct evidence of this growing interest. I. Sovičová (2013) also offered own definition of brownfields: “the site (zone, area, property or a part of it) which is derelict, vacant, unused or underused. It is localised in urban or rural areas. It is a relic of any former socio-economic activity. It may have real or perceived environmental load and it inevitably needs an active intervention for its redevelopment.” In the empirical part of her work, she inventoried brownfields in the town of Prešov and evaluated the possibilities of their revitalisation.

Besides geographers, the issue of brownfields in Slovakia is also addressed by architects, urban planners, economists, and environmentalists – e.g. M. Baloga (2011), M. Finka (2011), A. Holmanová (2011), K. Kysel'ová, P. Hajaš, V. Švač (2009), D. Petříková (2011), M. Muchová, J. Gonos, I. Cehlárová(2010), H. Pavolová, K. Kysel'ová and T. Bakalár(2012). Particular attention was paid to the brownfields also by SARIO (the Slovak Investment and Trade Development Agency), which conducted the mapping and inventory of brownfields in Slovak Republic during the years 2008-2009. According to Kysel'ová (2013) based on this mapping, there were identified 682 brownfields with the total area of 1783.3 hectares. However, this survey failed to identify all existing brownfields in Slovakia. The major identification problems have occurred at brownfields in private ownership and former agricultural zones.

Spatial differentiation of identified brownfields reflects the signs of unevenness. Košice Region has reached the highest proportion (21.7%) of their overall area, followed by Žilina Region, Banská Bystrica Region, and Prešov Region. In terms of their previous use, the most common were former industrial (44.4%) and agricultural (20.4%) sites. While evaluating their structure according to the level of environmental loads, the greater proportion of brownfield sites are sites without environmental loads (53.7%). High levels of environmental loads were identified for 33 brownfields (Kysel'ová 2013).



### 4.3. Croatia

The term brownfield occurs rarely, and merely in the newer literature. The most interest for rehabilitation was shown by miners and foresters in regard of quarries. The articles were published in mining-geology-petrol, forestry, building, architecture-and-urban-planning, and geography scientific papers. The issue of brownfields, including mentioning the term itself, has been addressed most commonly by economists and sociologists, while geographers have not published even one article directly associated with this topic. The geographers have been addressing the problems of ports and industrial zones but have never tackled the issue of rehabilitation and repurposing of brownfield locations.

In Croatia, especially in central Croatia, there is a multitude of quarries. Despite the obligation of rehabilitation of a quarry after its exploitation is over, this does not happen very often. Several articles have been written about this. Tušar (2002) states that quarries tend to have unfavourable impact on the environment and that they ruin natural ambient. The paper brings different opinions about the safeguard measures regarding different environmental impacts. The article does not, in fact, say anything about any form of rehabilitation or seeking any new functions. The topic Perić et al. (2009) are featuring is biological rehabilitation of a quarry. Biological rehabilitation actually means reforestation. They are trying to determine which types of trees prove to be the most successful, first and foremost from the point of survival. Nuić et al. (1997) are also involved in rehabilitation of quarries in the territory of the Pagisland. Considering the distinctive features of the locality, they believe that the adequate solution to the rehabilitation of the former quarry should be done in a form of controlled disposal of municipal waste. Pranjić and Mesec (1992) are engaged in revitalisation of a quarry using indigenous and non-indigenous plants after the end of exploitation. The intended new role of the revitalised, reforested quarry is rest and recreation.

Kanajet et al. (1995) suggest that the former asphalt mine "Škrip" on the island of Brač should be reopened again; however, it should be intended for scientific, educational and tourist purposes. This suggestion is a result of the fact that this abandoned asphalt mine is reasonably well-preserved, and of the potential educational value it can offer. In case the mentioned happens, the interior of the mine will have to be restored, tools and equipment from the mining period will need to be acquired, and the furnace restored. Jug et al. (Jug et al 2008) have been dealing with pollution in the vicinity of the abandoned mine "Zrinski" on Medvednica. The mine has not been operative for a long period of time and its capacity was also quite small. Today, the mine is situated in the Medvednica Natural Park, close to some well-populated hillwalking trails.

The mine is open for public but with few entrances. Lower rates of pollution have been detected. The Žitnjak industry zone in Zagreb was the first and largest industrial zone in the former Yugoslavia. Kunšten (1997) notes numerous problems related to the concentration of industrial activity at Žitnjak, as well as its intermingling with housing units. The multitude of factories had a degrading impact on the environment significantly. There is no plan for rehabilitation and potential functional changes. It is stated and believed that problems will be solved in a rational manner while the term rational valorisation is being mentioned.

Sić (1982-83) is engaged in dealing with contemporary tendencies of development of the Rijeka port. He emphasizes that this is a medium-size port on a global scale. Owing to its size we can see the development of the port in accordance with the complex spatial structure, and further development of the port in the context of its port- and industrial functions. Sić does not address the issue of rehabilitation of the port area.

Đokić and Sumpor (2010) deal with the possibilities of restoring brownfieldsites in Croatia, namely with investing in abandoned industrial, military and commercial locations. In some of them, there is an issue of pollution. Their analysis shows that such locations have occurred because of the transition, post-war problems and inadequate corporate governance. They believe that for restoration of the brownfieldareas, greenfieldinvestments are necessary. No specific brownfieldsits are mentioned, some of them are only casually mentioned in their work. The crystal glass factory in Samobor is mentioned as a possible rehabilitation of a brownfieldsite, as well as the successful transformation of military complexes in Zadar, Zagreb and Rijeka.

Miletić and Mišetić (2010) are dealing in their work with the conversion of a military complex into the university campus Borongaj in Zagreb. They conducted a survey among students and evaluated the level of acceptability of certain architectural and urban-planning solutions. Special emphasis was put on the manner of organizing transport within the campus and the location of public facilities. The transformation of the former barracks into the university campus is planned in two phases: the first one should be done with minimal intervention in the area in order for the existing buildings to accommodate the needs of the approximately 5,000 students and staff, after which (it's not even on the horizon) significant urban and architectural intervention, and the construction of new buildings for tens of thousands of students, teachers and researchers is planned. Research has shown the needs for three types of responsibility: environmental, economic and socio-cultural. In Zagreb, there have been several redevelopments of brownfield sites, but the researchers have not written any papers on the subject. Following are some examples:

On Kaptol (historical town centre), there was a former shoe factory. The factory was demolished, the earth was excavated for several floors and a shopping centre with five cinema halls, other smaller halls, and several apartments and multi-storey car parks were built. The centre became a certain meeting point for the people of Zagreb.

For a longer time, there have been on-going discussions about repurposing the Paromlin factory near the Main train station (south of the railway or opposite the town centre), changing it into a housing and business facility. The ruins of Paromlin, of which only the walls remained, are now protected monuments of industrial architecture. This fact hampers solving the problem.

In the west of Zagreb there was a cement factory dating back to the Austro-Hungarian period. The factory closed in 1988. The factory was not restored and the land was sold at very low prices to selected buyers. Different smaller companies, servicing facilities and factories entered the factory complex. The area looks like a scene after a disaster movie, or a neglected and ransacked former manufacturing plant with smaller, ill-defined activities. The area could have been used for commercial, business, and recreational functions, but it did not happen.

These examples illustrate the range of reality.

## **5. Conclusions**

It is crucial to each successful individual case of revitalization of old industrial areas to set up the revitalization project adequately, to use the existing knowledge and consider the examples of good practices. After reviewing scientific literature and based on the experience gained working on development of Brownfield Revitalisation Methodology as a final result of the international project ReTInA we came to the conclusion that the role of geography and geographers is too inconsiderable and not in accordance with global trends of interdisciplinary holistic approach to solving this issue. We see the problem in an inadequate approach to solving revitalisations from top to bottom as well as in the ill-defined role of geography and geographers. To this end, greater engagement of geographers in the initial stages of the revitalisation projects is necessary. The approach to solving the problem of brownfields in the developed Western world has come into its second stage based on sustainable approach, the use of alternative energy sources and complying with ISO 26000 Standard. Financial and economic crisis in the new EU members simultaneously poses a threat of slowing down solving the problem of abandoned and/or otherwise degraded industrial areas as well as an opportunity for thorough rethinking about the modern approach to the problem which needs to be based on interdisciplinary Requisite Holism approach.

The main danger of holistic approach is that by considering all the aspects of revitalization, the implementation of the project can be slowed down and/or made more expensive. The easiest way to avoid this is by using an adequately manned and managed team that is capable of co-operating with the participants involved in the revitalization process, from the initial stages of defining the aims of revitalization to productive co-operation with all the participants on all levels until the end. The advantages of holistic approach lie in the solutions which, in addition to purely economic aspects, also consider other social aspects, such as sustainable development and diminishing the risk of gentrification, and which, through new job opportunities, help reduce crime rate and social exclusion.

If we want to assure the endogenous approach, the first thing to be studied is the influence of making decisions from the bottom up. In the countries with a more centralised form of governance, the approach that proved to be successful at solving problems of urban areas is the so-called multi-institutional approach. Principally, it is about affiliation and joint action of the institutions that are important for the solution of the problem. When searching for solutions, it is important to evaluate the role of institutions correctly during the process of initial planning of revitalisation. Doing so, we draw on the existing legislation and the advantages of the local environment, which we enrich with examples of good practices and present them to the interested public in a way which enables all the branches to meet their interests to optimal fulfilment of general social and societal interest of the interested stakeholders in the revitalisation process of old industrial areas.

Brownfields revitalization must be coordinated with broader strategies of job creation, training, and career development which produce demonstrable benefits for the host community. The start-up and nurturing of locally-based businesses as a function of true economic development is a critical requirement. In order for urban areas to survive, new ways of creating and sustaining employment must be devised. If poor education, lack of training and other issues which have led to the deindustrialization of urban areas continue to prevail, and effort at urban revitalization will not result in significant benefits to urban communities (Lorber 2012b).

Geography science enjoys an advantage of complexity of understanding spatial issues. This enables geographers to coordinate and harmonize interests between the owners, stakeholders, legislation and human resources. In addition to geographical areas (economic, traffic, demographic, environmental, cultural and regional geography) directly involved in the project applicative research, this also includes collaboration of architects, lawyers and economists.

Geographer Matlović in his overview of the situation in Slovakia notes that the issue of brownfields in the field of Slovak academic research is better developed by urban planners, architects, economists, and environmentalists. In the recent years, however, there is increasing interest in this issue also by geographers.

According to Stiperski, in Croatia the economists and sociologists have only recently started to get acquainted with the issue of brownfields, while not even one article linked directly to the problem of brownfields has been published by the geographers. The geographers have been involved in studying the issue of ports and industrial zones but have never touched the issue of rehabilitation and re-purposing brownfield locations.

Findings, acquired during multi-year work in the field of economic geography, dealing with industrial geography and the problems of regional socio-economic disparities tell us that the place and the role of geography and geographers need to be reassessed and defined anew. The general finding is that Slovenian geographers do not co-operate with others enough or not at all. We do take part in interdisciplinary actions with other scientific fields but we are not practising holistic approach within different individual geography fields enough. This non-cooperation and uncritical keeping the development of individual geography fields under review is a hindrance to development of the entire geography science, which is shown in too little initiative for exposing the new role of geography in general, which is particularly true of the brownfields problem. Every initiative to complement the teaching content of geography subjects at tertiary study level taking into consideration theoretical findings by leading geographers and examples of good practices that is striving for change will be very welcome.

## WE MUST LEARN TO WORK TOGETHER

### 6. References

- Auer, M.R., Reuveny R. 2001: Foreign Aid and Foreign Direct Investment : Key Players in the Environmental Restoration of Central and Eastern Europe. FEEM Fondazione Eni Enrico Mattei, Research Paper no. 58. <http://papers.ssrn.com/abstract=278811>.
- Baloga, M. 2011: Hnedé parky pod Tatrami. *Urbanita* 23, 34-37.
- Bole, D. 2008: *Ekonomska preobrazba slovenskih mest*. Ljubljana, 232pp.
- Černe, A., Kušar, S. 2010: The system of indicators for regional development, structure and potentials. Ljubljana, *GeograFF* 6, 138pp.
- Davidson, B. 2006: *The Triple Helix*. <http://press.princeton.edu/links/greenhalgh/slides/chap4.ppt>

- Domanski, B. 2000: The Impact of Spatial and Social Qualities on the Reproduction of Local Economic Success: The Case of the Path Dependent Development of Gliwice. Prace, Geograficzne, fas.106, Krakow.
- Dokić, I., Sumpor, M. 2010: Brownfield Redevelopment Issues in Croatia. Privrednakretanja i ekonomskapolitika 123. Zagreb, 57-86.
- Drozg, V. 1999: Nekaterne značilnosti fizične strukture slovenskih mest. Dela 14, Ljubljana.
- Drozg, V. 2004: Spatial development of Slovenian towns in the last decade. Dela 21, Ljubljana.
- Finka, M. 2011: Brownfieldy – aktualny problém priestorového rozvoja. Urbanita 23, 6-9.
- Holmanová, A. 2011: Brownfieldy vo vidieckej krajine. Urbanita 23, 20-23.
- Ionescu-Herouiu, M. 2010: The Management of Brownfields Redevelopment, A Guidance Note, World Bank, Europe and Central Asia Region, Sustainable Development Department.
- Jug, N., Barudžija, U., Durn, G. 2008: Distribucije Hg u zraku tla i Hg u tlu oko napuštenog rudnika „Zrinski“ na Medvednici. Rudarsko-geološko-naftni zbornik 20. Zagreb, 1-11.
- Kanajet, B., Sakač, W., Šebečić, B. 1995: Nekadašnji rudnik asfalta "Škrip" na otoku Braču. Rudarsko-geološko-naftni zbornik 7. Zagreb, 87-95.
- Krevs, M., Lampič, B., Jarnjak, M. 2012: Learning by doing: essential contribution of students to establishment of a national register of brownfield sites. V: EUROGEO 2012 Conference, Dublin. <http://www.eurogeography.eu/conference/dublin-2012/dublin-presentations/Session%201102/krevs->
- Koželj, J. 1998: DUO Degradirana urbana območja. Ljubljana, 252 pp.
- Krugman, P. 1991: Geography and trade. MIT Press, Cambridge MA.
- Kunšten, V. 1977: Žitnjak–industrijska zona Zagreba. Geografski glasnik 39. Zagreb, 121-142.
- Kušar, S. 2008: Vloga prostorskega planiranja pri lociranju proizvodnih dejavnosti v Sloveniji, doktorska disertacija, Ljubljana, 303 pp.
- Kysel'ová, K. 2013: Projekty pre brownfield a ich mapovanie. <http://www.uzemneplany.sk/zakon/projekty-pre-brownfield-a-ich-mapovanie>.
- Kysel'ová, K., Hajaš, P., Švač, V. 2009: Brownfields research in Slovakia. Annals of the Faculty of Engineering Hunedoara – Journal of Engineering 7, 115-118.
- Lampič, B., Špes, M. 2011: Izstopajoči okoljski problemi kotovira "ekoregije". Spodnje Podravje pred izzivi trajnostnega razvoja, GeograFF, 9. Ljubljana, 193-211.
- Lorber, L. 1993: Vpliv industrije na razvoj Maribora, magistrska naloga, Zagreb, 266 pp.

- Lorber, L. 1999a: Procesi prestrukturiranja industrije Maribora i njihov utjecaj na transformaciju prostora, doktorska disertacija, Zagreb, 223 pp.
- Lorber, L. 1999b: The economic transition of Slovenia in the process of globalization. *Geografskizbornik* 39, 133-166.
- Lorber, L. 2003: Transfer of know-how and technology as stimulator for regional development. *Podravina* 2, no. 3, 76-89.  
[http://hrcak.srce.hr/index.php?show=clanak&id\\_clanak\\_jezik=117500](http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=117500)
- Lorber, L. 2005: Regional development problems of Podravje. *Podravina* 4, no. 8, Samobor 107-120.  
[http://hrcak.srce.hr/index.php?show=clanak&id\\_clanak\\_jezik=116624](http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=116624)
- Lorber, L. 2011: Recent transformation of economic inequality in NUTS 3 regions in Slovenia, *Geoadria* vol.16, no. 2. Zadar, 237-251.  
[http://hrcak.srce.hr/index.php?show=clanak&id\\_clanak\\_jezik=119562](http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=119562).
- Lorber, L. 2012a: Development of regional disparities in Slovenia. Regional development and regionalisation in the Adriatic space : proceedings of the 3rd Conference of Adriatic forum, Vienna, September 23-25, 2010, (ISR-Forschungsberichte, H. 38). Wien: Österreichischen Akademie der Wissenschaften, 97-108.
- Lorber, L. 2012b: Brownfield revitalisation methodology - developed under the ReTinA project. V: II Kongres revitalizacijamiast, Kraków 12-14 września 2012 r. Kraków: Instytut rozwoju miast, 2012, str. 54.
- Lorber, L., Godina, V., Lobnik, U., Rudl, V., Bende, G. 2012: BRM - Brownfield Revitalisation Methodology, Project ReTinA (program SEE, Project No.: SEE/A/14774.1/X), Maribor, Faculty of Arts, 90pp.
- Lorber, L. 2013: Revitalization of traditional industrial areas in South East Europe. *Podravina* 23, Samobor, 5-22.
- Lorber, L. 2014: Holistic Approach to Revitalised Old Industrial Areas, *Procedia - Social and Behavioral Sciences*, Geomed 2013, Elsevier Ltd. in press.  
<http://www.sciencedirect.com/science/article/pii/S1877042814016401>
- Lukáčová, A., Klamár, R., Sovičová, I. 2012: Dynamics of the Intraurban Structure of Prešov - Functional Intraurban Structure of Prešov and Brownfields. In: CCEDEP Proceedings. Climate change, economic development, environment and people. 2-nd International scientific conference. PU Prešov, 141-147.
- Martin, R. 2003: Putting the Economy in its Place: On Economics and Geography, Paper presented at the Cambridge Journal of Economics Conference, 26pp.
- Matlovič, R. 2001: Transformačné procesy a ich efekty v intra urbánnych štruktúrach postkomunistických miest. *Acta Facultatis Rerum Naturalium Universitatis Matthiae Belii, Geografické štúdie* 8, 73-81.
- Matlovič, R. 2003: Ville postsocialiste – nouvelle dynamique des structures intra-urbaines. *Hommes et Terres du Nord* 4, 28-41.

- Matlovič, R. 2004:Tranzitivna podoba mesta a jeho intraurbánných štruktúr v ére postkomunistickej transformácie a globalizácie. *Sociológia* 36, 137-15.
- Miletić, G. M.,Mišetić, A. 2010: Sveučilišni kampus Borongaj u Zagrebu - Primjena conjoint analize. *Prostor* 18, 2, 40. Zagreb, 413-423.
- Muchov, M.,Gonos, J.,Cehlárová, I. 2010: Economic-environmental aspects of the industrial brownfields revitalization and reuse. *ActaAvionica* 12, 55-59.
- Mulej, M.,Kajzer, S. 1998: Ethics of Interdependence and the Law of Requisite Holism. *Proceedings of the 4th STIQE '98*. Maribor, Slovenia.
- Mulej, M. 2013: *Dialectical Systems Thinking and the Law of Requisite Holism Concerning Innovation*, Emergent Publications, Litchfield Park, AZ 85340.
- Nared, J. 2007: Prostorski vplivi slovenske regionalne politike, *Geografija Slovenije*, 16, Ljubljana, 202 pp.
- Nared, J.,Kavaš, D. 2009: Spremljanje in vrednotenje regionalne politike v Sloveniji, *Georitem*, 10, Ljubljana, 93pp.
- Nuić, J.,Krašić, D.,Galić, I. 1997: Oblikovanje i prenamjena otkopanih prostora pri eksploataciji tehničkog građevnog kamena. *Rudarsko-geološko-naftni zbornik*, 9, Zagreb, 57-62.
- Pavolová, H.,Kysel'ová, K.,Bakalár, T. 2012: Brownfields as a tool for support of destination tourism development. *ActaGeoturistica*, 3, 1, 26-30.
- Perić, S., Medak, J.,Pilaš, I.,Vrbek,B.,Tijardović, M. 2009:Prvi rezultati istraživanja mogućnosti revitalizacije kamenoloma Očura i autohtonim vrstama drveća i grmlja. *Šumarski list* 5-6, Zagreb, 309-317.
- Petriková, D. 2007: Udržateľnosť procesov revitalizácie brownfield lokalít. *Nehnutelnosti a bývanie* 2, 2, 54-57.
- Petriková, D. 2011: Klasifikácia a hodnotenie možností regenerácie brownfieldov. *Urbanita* 23, 10-13.
- Plut, D. 2004: *Geografske metode proučevanja degradacije okolja*. Ljubljana, 188 pp.
- Plut,D. 2006: Mesta in sonaravni razvoj : geografske razsežnosti in dileme urbanega sonaravnega razvoja. Ljubljana, 226 pp.
- Porter,M. E. 1990: *The Competitive Advantage of Nations*. New York. Free Press.
- Pouš, R.,Hlásny, T. 2007:Priestorová analýza mestskynevyužitýchplôch v intravilánemesta Banská Bystrica. *Geografická revue* (cd), 3, 2, 141.
- Pranjić, J.,Mesec, J. 1992: Revitalizacija kamenoloma „Srednji Lipovac“. *Rudarsko-geološko-naftni zbornik*, 4, Zagreb.99-104.
- Ptáček, P.,Szczyrba, Z. 2007: Current suburbanisation trends in the Czech Republic and spatial transformation of retail, *Journal for Geography*, 1-2, Maribor, 55-66.



- Radváni, P., Hriňová, M. 1982: Devastované a menejhodnotné priestory urbánnych systémov, ich periférií a možnosti ichvyužitia. Životné prostredie 16,1, 14-21.
- Ravbar, M. 2007: Slovene cities and suburbs in transformation. Geogr.zb. 37, 65-109.
- Ravbar, M. 2009a: Economic geographical assessment of investments : a development factor in regional development. ActageographicaSlovenica 49, 143-178. <http://giam.zrc-sazu.si/sites/default/files/ags49105.pdf>.
- Ravbar, M. 2009b: Razvojni dejavniki v Sloveniji - ustvarjalnost in naložbe. Georitem 9, Ljubljana, 139pp.
- Rebernik, D. 2004: Recent development of Slovene towns - social structure and transformation. Dela 21, 139-144.
- Rebernik, D. 2008: Urbana geografija: geografske značilnosti mest in urbanizacije v svetu. Ljubljana, 294pp.
- Rebernik, D. 2009: Novejši procesi v prostorskem razvoju Maribora. Geogr.vestn. 81, 47-59. <http://zgds.zrc-sazu.si/GV2009/gv81-2/gv81-2-rebernik.pdf>.
- Sić, M. 1982-83: Suvremene tendencije razvoja riječke luke s posebnim osvrtom na lučko-industrijske funkcije Bakarskog zaljeva. Radovi, 17-18. Zagreb, 55-66.
- Slavec, A. 1995: Značilnosti, vzroki in posledice procesa deindustrializacije v Mariboru. Dela 11, Ljubljana.
- Sovičová, I. 2013: Stav a možnosti revitalizácie areálov brownfields s empirickým príkladom mesta Prešov. Acta Facultatis Studiorum Humanitatis et Naturae Universitatis Presoviensis, Folia Geographica 20, in press.
- Špes, M., Krevs, M., Lampič, B., Mrak, I., Ogrin, M., Plut, D., Vintar Mally, K., Vovk Korže, A. 2012: Sonaravna sanacija okoljskih bremen kot trajnostno razvojna priložnost Slovenije, Degradirana območja. Ljubljana, 66pp.
- Tušar, B. 2002: Kamenolomi i okoliš. Građevinar 54, 6. Zagreb, 355-363.
- UM, 2009a: Guidelines for Methodology of the Work of Task Forces, University of Maribor.
- UM, 2009b: Regional Case Studies, Needs Analysis Guidelines, University of Maribor and Province Ferrara.
- Vicol, O.C. 2011: Transnational Case Study of Task Force 3 - Imaging and Branding, Vicol, expert of ReTInA, Working paper, Iași, 48pp.
- Vrišer, I. 1977: Industrializacija v Sloveniji, Ljubljana.
- Vrišer, I. 1978: Regionalnoplaniranje. Ljubljana.
- Vrišer, I. 1997: Metodologija ekonomske geografije. Ljubljana.
- Vrišer, I. 2000: Industrijska geografija. Ljubljana.
- Ženko, Z., Mulej, M., Mulej, N., Hrast, A. 2013: Solving the economic crisis with (requisitely) holistic approach and (ethics of) interdependence. Bus. Syst. Rev., 2013, vol. 2, iss. 2, 10-35.
- Internet 1: <http://www.londonbrownfieldsites.org/Content/Brownfield.aspx>

