ASSESSING SUCCESS FACTORS OF BROWNFIELDS REGENERATION: INTERNATIONAL AND INTER-STAKEHOLDER PERSPECTIVE

Bohumil FRANTÁL (corresponding author)
Josef KUNC
Petr KLUSÁČEK
Stanislav MARTINÁT

Abstract

The paper presents the results of an international comparative survey of stakeholders from four European countries (the Czech Republic, Germany, Poland and Romania). The aim was to identify and classify the 'success factors' of brownfields regeneration and to detect significant convergences and divergences concerning the drivers and barriers of regeneration processes in different geographical and institutional contexts. The existence of ecological burden or site contamination, overall regeneration costs and clarified ownership relations are considered the most important factors of regeneration internationally. Especially in Romania but also in Poland, the factors at national level (legislation, incentives, and foreign direct investments) are perceived to be more influential than in the Czech Republic and Germany, where a stronger emphasis is put on the location factors (whether a brownfield is located in rural, urban or inner city area) and transport links. Physical attributes such as the site's area and terrain are also considered among the most significant factors in Romania. While representatives of public administration emphasized more the importance of legislation, state incentives and general localization, the investors and developers highlighted local factors (landscape protection limits, place marketing, and previous use of brownfields). The emphasis on political and geographical factors increases with the level of experience of stakeholders, while the emphasis on site specific factors decreases with the length of experience.

Keywords: brownfields, regeneration, success factors, perception, stakeholders.

Bohumil FRANTÁL
Scientific worker, Department of Environmental Geography, Institute of Geonics, Academy of Sciences of the Czech Republic, Brno, Czech Republic
Tel.: 00420-545.422.720
E-mail: frantal@geonika.cz

Josef KUNC
Visiting researcher, Department of Environmental Geography, Institute of Geonics, Academy of Sciences of the Czech Republic, Brno, Czech Republic

Petr KLUSÁČEK
Scientific worker, Department of Environmental Geography, Institute of Geonics, Academy of Sciences of the Czech Republic, Brno, Czech Republic

Stanislav MARTINÁT
Scientific worker, Department of Environmental Geography, Institute of Geonics, Academy of Sciences of the Czech Republic, Brno, Czech Republic

Transylvanian Review of Administrative Sciences,
No. 44 E/2015, pp. 91-107

1. Introduction

The issue of regeneration and redevelopment of underused, derelict and often contaminated lands and premises or so-called brownfields (Alker *et al.*, 2000) remains one of the greatest challenges for urban planners, developers and local governments. Generally, brownfields have received increasing political credence in recent decades, since vacant agricultural or natural developable lands become less available, more expensive and more protected in densely populated areas. The increasing number of projects and research platforms demonstrates the increasing interest of policy makers, too (see the summary reports on activities, products and tools developed by previous brownfield projects by Tölle *et al.*, 2009 or Frantál *et al.*, 2012). However, the redevelopment has not been as effective as expected in many regions and it is still constrained by many barriers and associated with several dilemmas (Alexandrescu *et al.*, 2014; Frantál *et al.*, 2013; Ganser and Williams, 2007; Payne, 2013). Significant differences among national legislative, economic and procedural contexts also raise questions about the functionalities and effects of would-be 'universal' solutions and tools being produced by those projects.

Many previous studies have investigated and conceptualized drivers and barriers of brownfields redevelopment – whether on the basis of stakeholder surveys (Alberini *et al.*, 2005; Letang and Taylor, 2012), interviews with experts (Adair *et al.*, 2000; De Sousa, 2000, 2003), assessments of a limited number of local case studies/sites (Coffin and Shepherd, 1998; Dixon, 2007; Dixon, Otsuka and Abe, 2011; Nijkamp, Rodenburg and Wagtendonk, 2002), or spatial analyses of differences in the distribution of existing and redeveloped brownfields (Frantál *et al.*, 2013; Frantál *et al.*, 2015; Longo and Campbell, 2007; Novosák *et al.*, 2013). However, the absolute majority of these surveys and analyses were case studies concerning just few sites or groups of stakeholders from one city or a specific region within one country. If there is an international comparison of results reported, it was made *post factum* and was not verified by the usage of consistent survey methodologies. Also, very few studies aimed at exploring differences between the priorities and barriers concerning brownfield redevelopment as perceived by decision-makers (experts, planners, and local governments) and preferences and barriers as perceived by stakeholders (investors, developers, and local citizens) (see *e.g.*, Brill, 2009 or Kunc *et al.*, 2014).

In this paper, the authors present selected results of international comparative survey carried out in 2012 with different groups of stakeholders from four countries: the Czech Republic, Germany, Poland, and Romania. The main objective of the survey was to identify and classify success factors of brownfields regeneration and to detect significant convergences and divergences concerning the drivers and barriers of regeneration processes in different geographical, institutional and social contexts. Confronting perceptions and experiences of specific groups of stakeholders (urban planners and other experts, representatives of public administration, land owners, investors and developers) from countries with different political and economic back-

grounds may help to better understand the complexity and multidimensionality of brownfield regeneration processes and to create a vision for change across the different constituencies, stakeholder groups, and administrative boundaries which constitute the scope of urban planning and decision making processes and land use policy.

2. Success factors of brownfields regeneration: theoretical and methodological foundations

According to a general definition, a factor is anything that contributes to a result or a process. In the context of brownfields regeneration, the 'success factors' are considered facts (conditions, circumstances, actors, agencies) that are determinants and contributors to successful regeneration of brownfields. They are the causes of the fact that some brownfields have become objects of concerns of investors, politicians, experts or other actors, they have been prioritized as the most critical, urgent or profitable to invest money, time and energy, they have been regenerated and newly used, while other sites are out of attention, they stay neglected and derelict, or the process of their regeneration has not been successfully completed. In the existing brownfield literature, the success factors are alternatively called determinants, drivers, criteria or site parameters. The survey, identification and classification of factors which are significant for a successful regeneration process are required as a key precondition of the assessment of brownfields redevelopment potential, their effective prioritization, and marketing.

Many success factors are more or less complex phenomena that can be expressed in general terms (*e.g.*, spatial peripherality) as well as in number of measurable indicators (*e.g.*, distance from the city centre, proximity to main road network, etc.). It has been suggested by previous studies (Bacot and O´Dell, 2006; De Sousa, 2000, 2003; Dixon, Otsuka and Abe, 2011; Filip and Cocean, 2012) that among the crucial success factors for redeveloping brownfields are decontamination and regeneration costs and acceptable return rates for investors, government incentives, focused urban development policy and political leadership, strong place branding, and local stakeholders' involvement and collaboration. It has been also demonstrated, however, that – in addition to general legislative, political and economic factors acting at national or regional scales – local geographical factors play an important role (Frantál *et al.*, 2013). Brownfields do not exist by themselves, independently or in a vacuum, but they are products of the interrelationships between places and social and ecological processes (Bjelland, 2002). Brownfields are placed and rooted in a certain geographical space and time, which is hierarchically and functionally structured. Therefore, brownfields have to be perceived in their spatial context and we should take into account when assessing them not just their site-specific attributes (such as the level of ground contamination or property relations) but also contextual factors acting at higher hierarchical levels (Heberle and Wernstedt, 2006).

It is not possible to say *a priori* which of the general factors, location factors or site specific factors are the most important ones; to identify and analyze the relative im-

portance of each of them is a task for comprehensive research. The studies from the US, Canada and UK (Adair *et al.*, 2000; De Sousa, 2000) demonstrated that the primary reason why the private sector invests in some regeneration areas is the perception of achieving some target rates of return. Conversely, the principal reasons for non-investment include the negative image of the locality or neighboring environments, lack of capital (funding), and the perceptions of bureaucratic grant regimes (Adair *et al.*, 2000). Similarly, Coffin and Shepherd (1998) identified four key barriers to regeneration including legal liability, limited information, limited financial resources, and limited demand for the properties. In many cases even good conditions for prosperity of a locality and for brownfields regeneration may not be utilized if there are subjective problems and barriers, such as a weak local political involvement, deficit of information, bad communication and cooperation of stakeholders.

With respect to the existing literature discussed above – even despite of the prevailing terminological, conceptual and methodological divergences – we can argue that there is a partial consensus in two aspects regarding the success factors of brownfields regeneration: first, the multidimensionality, which means that factors form certain dimensions or groups according to the spatial level (*i.e.*, national, local and site-specific factors) and/or according to factors' character (*i.e.,* political, economic, environmental, social and other groups of factors).

Second, the *relativity*, which means that different individuals or groups of stakeholders within one country or across countries may perceive and assess different factors as important or irrelevant based on their personal or collective concerns, experiences or values (*i.e.*, intra- and inter- stakeholder group variance). Therefore, the process of exploring and classifying success factors presupposes the following two key phases: first, the stakeholder segmentation, which means a segmentation of the general public to specific categories of stakeholders (see *e.g.*, Doak and Dixon, 2005); second, the factors determination, which means an identification and categorization of specific factors and their measurable indicators. It is hypothesized that some factors being relevant in most geographical contexts can be identified (there are some basic factors generally agreed upon by the majority of previous studies even though sometimes different terms were used for their description).

Various research strategies and methods can be applied for the identification and classification of factors, including spatial-statistical analysis, expert choice (*e.g.,* the Delphi method) or more complex surveys. The strategy of our research involved a combination of both qualitative and quantitative methods. On the basis of existing literature review and information obtained by exploratory preliminary researches we created a standardized questionnaire form including a set of relevant factors and barriers respectively, which may potentially affect brownfields regeneration; each single factor and barrier were then assessed and rated by respondents on a ten-level rating scale.

3. Geographical context of the study

Developed countries such as the US, Great Britain, France or Germany have long-term experience with the problems of brownfields, which had already emerged during the 1970's as a result of massively declining mining, heavy industries and textiles. In comparison, in post-socialist countries such as the Czech Republic, Poland or Romania, brownfields appeared in large quantities only after the collapse of socialism and the return to a market economy, with the restructuring of traditional industries, and following globalization trends during the last decade of the 20th century. In our comparative survey, Germany is the representative of developed economies with a highly skilled labor force, a large capital stock, high level of innovation and longer experience with deindustrialization processes, urban renewal and brownfields regeneration. The Czech Republic is regarded as one of the most developed, industrialized and prosperous (gross domestic product at purchasing power parity per capita) economies of the countries in Central and Eastern Europe (World Bank, 2014). The Czech Republic entered EU together with Poland in 2004. The Czech Republic is one of the most successful transition economies in terms of attracting foreign direct investment (annual FDI per capita have been twice higher than in Poland and thrice higher than in Romania) (World Bank, 2014). Romania has entered the EU in 2007. It is still regarded as a laggard in exploiting the European Structural Funds (also because of unexecuted transformation of public administration and decentralization of power, and higher levels of corruption, see Mihailescu, 2012).

Besides the historical factors affecting the evolution of brownfields in different countries, it is argued that also internal geographical factors affect the actual situation and patterns of redevelopment. Most countries encourage brownfield regeneration as a means of sustainable development but they define 'brownfield' differently (Tang and Nathanail, 2012). Oliver *et al.* (2005) identified significant regional trends amongst conceptualizations of brownfields, which reflected the national policy strategies regarding land regeneration and development in Western Europe, Eastern Europe and the Scandinavian countries. These authors documented how population density and economic competitiveness at a country level determine the perception of what brownfields and derived regeneration priorities are (*i.e.*, definitions and policies) – from pure contamination problem focus to development potential gaining understanding (*cf.* Oliver *et al.*, 2005).

Furthermore, we can say that even the conceptual delimitation and definition of brownfields is a dynamic element and has been changed and modified in the course of time (see Table 1). A conceptual diversity still prevails concerning the brownfield definition across European countries (NICOLE Brownfield Working Group, 2011). This international diversity of definitions and approaches then goes hand in hand with the problem of availability and comparability of data, including official statistics, inventories and registers of existing brownfields, documentations of successful regeneration case studies, etc. Mapping and inventorying of brownfields have not been centrally organized in most countries; detailed inventories with specific information about the

Table 1: Definitions of 'brownfield': divergences in time and among countries

Country	Definitions based on the responses of CLARINET and CABERNET network members summarized by Oliver *et al.* (2005)	Definitions based on the responses of TIMBRE project members summarized by Frantál *et al.* (2012)
Czech Republic	Sites that have been affected by the former uses of the site and surrounding land; are derelict and underused; may have real or perceived contamination problems; are mainly in developed urban areas; and require intervention to bring them back to beneficial use. (*Source*: Czech Brownfield Regeneration Strategy)	Properties (lands, objects, areas), that are underused, neglected, and can be contaminated. They are relics of industrial, agricultural, residential, military or other activities. They cannot be appropriately and effectively utilized without the regeneration process. (*Source*: National Strategy for brownfield regeneration, Ministry of Industry and Trade, 2008)
Germany	Inner city buildings not under use. Inner city areas for redevelopment and refurbishment. (*Source*: Federal Environment Agency Berlin)	No legally fixed or a common definition. Various definitions are used in different contexts. Instead of brownfields, legislative focus is on precaution that must be taken to avoid the occurrence of harmful changes to the soil – *i.e.* on potential contamination.
Poland	Degraded areas due to diffuse soil contamination – high density of landfill sites. (*Source*: Ministry of Environment)	No officially agreed definition. There are many definitions used in different legislative documents, *e.g.*: 'Areas designed for recultivation include degraded or desolated grounds, such as closed dumps, dumping grounds, depressions (hollows), post-industrial areas, post mining areas, post military training ground, for which the administrative bodies approved recultivation projects.' (*Source*: Report No. Dz. U. Nr 38, poz. 454, Ministry of Regional Development, 2011)
Romania	Polluted lands (soils). (*Source*: Ministry of Waters and Environment)	No official definition of brownfields. The term is related to contaminated sites which are defined as 'Geographically defined area, bounded to surface and depth, polluted with biological or chemical substances.' (*Source*: Government Decision No. 1408/2007 regarding the investigation and assessment modalities of the soil pollution)

Source: Authors' compilation

location and are not available, they are inconsistent, or otherwise methodologically problematic (Frantál *et al.*, 2013, p. 7), and registers owned by private companies and consortia of owners are often protected or provided only with limited descriptive information, without any possibility of publication.

Altogether 2,355 brownfield sites were identified on the basis of the national 'Search Study on Location of Brownfields in the Czech Republic' provided by the CzechInvest agency within the period 2005-2007. These brownfields covered an area of approximately 10.3 thousands of hectares with circa 14% of built-up areas (1,412 hectares). The database comprised brownfield sites with an area greater than 1 hectare from all regions of the Czech Republic excluding the capital Prague. However, the actual total number of brownfields in the Czech Republic is much higher; last estimations are working with numbers between 8.5-11.7 thousands of brownfield sites, which cover an area of 27-38 thousands of hectares. In Germany, many guidance documents, manuals or directives for most diverse tasks in the frame of brownfield regeneration have been provided by different institutions (*e.g.*, European Land and Soil Alliance, Federal Environmental Agency, Federal Ministry of Statistics, etc.); however, there is no offi-

cial national database of brownfields. For example the Länder-Arbeitsgemeinschaft Bodenschutz (State Working Group on Soil Protection) under the Ministerium für Umwelt und Verbraucherschutz (Ministry of Environment and Consumer Protection) provides data on number of sites suspected of being contaminated and contaminated sites in Germany. Similar data are provided by the Federal Environmental Agency. The Federal Environmental Agency estimated the potential number of brownfield sites at about 362,000 (Oliver *et al.*, 2005). In Poland also any central brownfield database does not currently exist. Ministry of Environment of Poland estimates 3,230 potential brownfield sites; however, that number seems to be undervalued (Frantál *et al.*, 2012). Only in the regional database of Silesia voivodship have been recorded about 700 sites. A similar database was prepared for Małopolskie voivodeship including an inventory of potentially degraded areas and areas which were qualified as priority degraded. All these databases are not open-sourced. Apart from these databases, registers of degraded and contaminated areas are developed by Regional Directorate of Environmental Protection. Similarly, in Romania there is not any official inventory of contaminated sites. National Environmental Protection Agency (NEPA) manages a database made according to Governmental Decision no. 1408/2007 regarding the investigation and assessment modalities of soil and subsoil pollution, which is a register of holders or owners of land, on which sites of potential contamination exist. NEPA has collected a database of circa 2,200 contaminated sites; for 800 objectives of this inventory there are punctual analytical data showing the presence of significant contaminations.

4. Research procedure

In the first phase, a preliminary explorative research using qualitative methodologies (questionnaires with open questions, semi-structured interviews and focus groups) was realized during several workshop sessions with stakeholders, organized in 2012 in all countries. Respondents were asked to answer open questions dealing with determinants and barriers of the brownfield regeneration process. The aim was to obtain as detailed and comprehensive set of factors related to the process of successful regeneration as possible. The acquired set of factors includes both the wider geographical characteristics of the area where brownfields are located (affiliation to region, peripherality of area, socio-economic potential of area, etc.), the attributes of specific sites (size of the site, type of previous use, extent of contamination, ownership structure, etc.), and also general (country-specific), local or procedural factors which are difficult to measure and quantify (*e.g.*, national policy, engagement of local politicians, stakeholders awareness, and lack of information, communication and cooperation of stakeholders during the planning process, etc.). The following table (Table 2) summarizes a categorized list of 25 success factors of brownfield regeneration that were reported by respondents within our exploratory research. The factors are subdivided into three subgroups in respect to spatial levels and several categories according to their character (political, economic, etc.).

Table 2: Inventory of success factors identified within preliminary research

General factors	Specification
National policy (legislative, regulative and control tools)	political
Availability and quality of information (about existing sites, tools, best practices, etc.)	information
Availability of financial incentives (grants, subsidies, funds, tax allowances, etc.)	economic
Foreign direct investments	economic
General public opinion (political engagement, adoption of innovations, etc.)	social/cultural
Location factors	
General localization (regional location within a country)	geographical
Specific localization (location within a local spatial-functional structure)	geographical
Concentration of other brownfields in the locality (site competition)	geographical
Transport links (proximity to arterial road network, railway, airport)	geographical
Physical conditions of the area (terrain, subgrade properties, etc.)	physical
Landscape protection limits	environmental
Economic status of the locality (unemployment rate, entrepreneurial activity)	social/economic
Social status of the locality (social structure and cohesion of the local community)	social/cultural
Place marketing (local development strategy, land-use plan, place marketing)	social/economic
Local involvement and collaboration of stakeholders	social/cultural
Site specific factors	
The size of the brownfield area	technical
Type of the previous use (industrial, agricultural, military, etc.)	technical
Type of the expected future use (quality and feasibility of the project)	technical
Extent of the built-up area and technical conditions of buildings	technical
Attractiveness of the site and objects (historical and architectural value)	social/economic
Ecological burden (extent of the contamination of soil and groundwater sources)	environmental
Infrastructure networks (water supply, sewerage, electricity, etc.)	technical
Property relations (structure of property owners, availability for selling)	social/economic
Price of the land and property	economic
Regeneration costs and return-time of investments	economic

Source: Authors' survey

As the result of preliminary research a questionnaire form with closed questions and standardized rating scales for the assessment of factors according to their significance was created. The questionnaire form was translated into Czech, German, and Romanian languages. The distribution of questionnaires was realized via electronic mail (the project partners provided email addresses of potential respondents in their countries), and face-to-face, as a printed version during sessions of several workshops and seminars organized in all countries in the scope of the project. The sampling of respondents was made with respect to gain a balanced structure of the sample according to various groups of stakeholders and countries (see Table 3). In our survey we have detected significant differences among countries in the average number of years of stakeholders' involvement in the brownfield issues (see Table 4). It is evident that brownfields are the object of attention of politicians, experts and researchers for much longer time in Germany than in all other surveyed countries.

Table 3: The structure of survey sample

Country	Stakeholder group						
	state administration	local government	investor, developer	academic, researcher	expert, consultant	not-specified	**Total**
Czech Republic	18	24	6	36	17	0	101
	17,8%	23,8%	5,9%	35,6%	16,8%	,0%	
Germany	12	5	8	14	15	5	59
	20,3%	8,5%	13,6%	23,7%	25,4%	8,5%	
Poland	9	17	1	28	12	1	68
	13,2%	25,0%	1,5%	41,2%	17,6%	1,5%	
Romania	33	27	8	12	30	9	119
	27,7%	22,7%	6,7%	10,1%	25,2%	7,6%	
Total	72	73	23	90	74	15	347
	20,7%	21,0%	6,6%	25,9%	21,3%	4,3%	100%

Source: Authors' survey

Table 4: Average number of years of stakeholders' involvement in brownfield problems

Country	Stakeholder group					
	state administration	local government	investor, developer	academic, researcher	expert, consultant	**Total**
Czech Republic	5	5	6,5	4,5	10	**6 years**
Germany	15	11	18	12	14	**14 years**
Poland	8	8	8	7	6	**7 years**
Romania	6	3	8	11	8	**6,5 years**

Source: Authors' survey

5. Results

The main objective of the questionnaire was to classify the 'success factors', *i.e.* the factors that have a decisive influence on the fact that only some brownfields have been successfully regenerated and newly used, while others stay idle and derelict, or the process of their restoration has not been successfully completed. The factors have been assessed by stakeholders according to their perceived importance for successful regeneration in the context of their country, using a ten-level rating scale (where 0 means 'no influence' and 10 means 'very strong or predominant influence'). The mean values were counted for each specific factor and were ranked according to their significance for each country. The results are summarized in Table 5.

Existence of ecological burden on site (*i.e.* the extent of soil or groundwater contamination) and overall regeneration costs are considered the most important factors for a successful regeneration of brownfields in all four countries. Clarified ownership relations and availability of site for sale and development are the third crucial success factor (actually, it is regarded as the most important factor in the Czech Republic). For Germany, the Czech Republic and Poland, also the specific localization of brownfields (*i.e.*, whether they are located within rural, urban or inner city areas) and transport links (e.g., proximity of a brownfield to highway, airport or railway) are among the key factors. Actually, most of successfully regenerated brownfields are located

in inner parts of large cities (capitals or regional metropolises) with a high economic potential and rapid return on investment for developers (it can be called the 'capital city factor').

Table 5: Top fifteen most important success factors in each country

Czech Republic		Germany	
Factor	**Mean score**	**Factor**	**Mean score**
Property relations	8.7	Regeneration costs	8.3
Regeneration costs	8.5	Ecological burden on site	7.9
Ecological burden on site	7.8	Specific localization	7.6
Specific localization	7.6	Property relations	7.4
Transport links	7.6	Transport links	7.4
Project of the future use	7.5	Price of the land and property	7.1
Price of the land and property	7.5	Project of the future use	7.0
Infrastructure networks	7.2	Landscape protection limits	7.0
Availability of financial incentives	7.2	Local involvement and collaboration	6.9
Landscape protection limits	7.1	Availability of financial incentives	6.8
Attractiveness of the site	6.8	Place marketing	6.6
Local involvement and collaboration	6.5	Type of the previous use	6.3
Place marketing	6.5	Concentration of other brownfields	6.3
General localization	6.5	Attractiveness of the site	6.2
Economic status of the locality	6.3	National policy	6.1
Poland		**Romania**	
Factor	**Mean score**	**Factor**	**Mean score**
Regeneration costs	8.4	Ecological burden on site	9.2
Availability of financial incentives	8.0	Availability of financial incentives	9.0
Ecological burden on site	7.8	Regeneration costs	8.9
Specific localization	7.7	Project of the future use	8.6
Property relations	7.6	National policy	8.5
Landscape protection limits	7.2	Landscape protection limits	8.2
Transport links	7.2	The size of the brownfield area	8.0
Price of the land and property	7.2	Place marketing	7.9
Attractiveness of the site	7.2	Information availability	7.8
Local involvement and collaboration	7.0	Foreign direct investments	7.8
Project of the future use	7.0	Physical conditions of the area	7.7
Infrastructure networks	6.9	Infrastructure networks	7.7
Place marketing	6.8	Attractiveness of the site	7.6
Extent of the built-up area	6.7	Property relations	7.5
National policy	6.7	Local involvement and collaboration	7.5

Source: Authors' survey

Especially in Romania but also in Poland, the factors at the country level, such as national policies, legislation, availability of financial incentives and foreign direct investments are perceived to be more influential than in the Czech Republic and Germany. In Romania, stakeholders also stressed an importance of availability and quality of data and information about existing sites (there is so far no official and open-sourced database of existing brownfields in Romania), tools, technologies, and best practice

examples of regeneration. Other national specificities include for example facts such as the factor of existing infrastructure networks on brownfield sites is not significant for Germans (the investors receive subsidies for projects on brownfields which do not dispose of existing infrastructure) but is very important in other countries. On the other hand, the factor of concentration of more brownfields in a locality, which causes a local competition of sites, was perceived as much more important in Germany than in other countries.

In general, we can say that the site specific or physical parameters of brownfields (the size and physical conditions of brownfield sites, extent of a built-up area, type of the previous use) are not as important (except the extent of contamination) for successful regeneration as the specific localization of brownfields, attractiveness of sites for investors, market-price of the land, availability of financial incentives and a return time of investments (including regeneration costs). A bit of a specific situation is in Romania where the physical and technical attributes of brownfields are among the most crucial ones. It is related to the fact that in Romania just 'contaminated lands' are considered as brownfields. In this sense, the factors of size and topography have to be seriously considered. As concerns the 'soft factors', the quality and sustainability of a project of the future use, local involvement and collaboration of all stakeholders (politicians, investors, public), and place marketing are perceived as very important in all four countries.

Table 6: Factors with most significant differences in perceived importance among countries

Factor	Czech Republic	Germany	Poland	Romania	Eta
Foreign direct investments	0	—	+	+	0,607
Physical conditions of the area	–	0	0	+	0,456
National policy	–	–	+	++	0,446
Information availability	0	–	0	++	0,430
Financial incentives	–	–	0	+	0,429
Size of brownfield area	0	0	0	+	0,393
Ecological burden	0	0	0	+	0,355
Concentration of brownfields	–	+	0	+	0,355
Project quality and feasibility	0	–	0	+	0,353
Infrastructure networks	0	–	0	0	0,305

Notes: (+) indicates a significantly higher importance of the factor within a country, (-) indicates a significantly lower importance of the factor within a country, (0) the importance is about the mean value counted for all countries; the values of the coefficient of association (Eta) are statistically significant at 0,01 level.

Concerning the inter-stakeholder variability, the differences of perception and assessment of factors are not as marked as differences among countries. There is an agreement among experts, researchers, politicians and developers about two most crucial factors which are interconnected: extent of contamination and overall regeneration costs. Then, for investors and developers in Germany and the Czech Republic the most important factors are the specific localization of a brownfield site, transport accessibility, landscape protection limits of development, and also existing infrastruc-

ture (for the Czech case). Representatives of local governments also highlighted the importance of involvement and collaboration of stakeholders in the planning process. On the other hand, developers and politicians in Romania (and partly also in Poland) emphasized over local factors a need of supportive national policy, financial incentives and foreign direct investments. While representatives of public administration generally emphasized more the importance of legislation, state incentives and general localization of brownfields (regional divergences in economic development potential), investors and developers highlighted local geographical factors (specific location of brownfields, landscape protection limits, local place marketing) and also the original use of brownfields.

Table 7: Factors with most significant differences in perceived importance among stakeholders

Factor	State administration	Local government	Investor, developer	Expert, researcher	Eta
Type of previous use	0	0	++	-	0,414**
General localization	+	++	0	0	0,279*
Physical conditions of the area	0	0	–	0	0,257*
Place marketing	0	0	+	0	0,245*
Landscape protection limits	0	0	+	0	0,236*
National policy	+	0	0	-	

Notes: (+) indicates a significantly higher importance of the factor within the stakeholder group, (-) indicates a significantly lower importance of the factor within the stakeholder group, (0) the importance is about the mean value counted for all groups of stakeholders; the values of the coefficient of association (Eta) are statistically significant at **0,01 level or *0,05 level.

We have detected significant differences even according to the level of stakeholder's experience measured as number of years of involvement in the brownfield problems. The emphasis on political factors (legislative and regulatory tools) and geographical factors (localization, transport links, landscape protection limits) increases with the level of experience of stakeholders, while the emphasis on site specific factors (physical conditions of the area, previous use of brownfields) decreases with the length of stakeholders' experience.

We can argue that the process of brownfields regeneration is generally limited by many barriers which can vary in terms of character and extent. In an additional question of the survey, the respondents were asked to assess specific types of barriers according to their degree of influence in the conditions of their country, using a ten-level rating scale (where 0 means 'no influence' and 10 means 'very strong or predominant influence'). It is evident from Table 8 that in all countries the economic factors are regarded the most obstructive barriers for brownfield regeneration. Then the legislative, procedural-administrative and political barriers are also very important. The legislative barriers are stressed especially in Romania. Generally, in Romania all types of barriers were assessed by higher scores (as more influential) than in other countries. Specifically in Germany the information and know-how barriers were voted as the second most obstructive barriers in the country.

Table 8: The assessment of regeneration barriers in different countries

Barriers	Mean score (ranking) in country				
	Total	Czech Rep.	Germany	Poland	Romania
Economic	8,8	8,6 (1)	8,6 (1)	8,7 (1)	9,1 (1)
Legislative	7,1	6,2 (4)	6,1 (4)	6,9 (3)	8,5 (2)
Procedural-administrative	7,0	6,4 (2)	6,5 (3)	7,0 (2)	7,9 (3)
Political	6,7	6,3 (3)	5,9 (5)	6,5 (4)	7,6 (6)
Information and know-how	6,5	5,5 (6)	6,6 (2)	5,6 (5)	7,7 (5)
Technological-ecological	6,2	5,6 (5)	5,3 (6)	5,4 (6)	7,8 (4)
Social-cultural	5,5	5,1 (7)	5,2 (7)	4,7 (7)	6,6 (7)

Source: Authors' survey

6. Conclusions

While some experts and researches have emphasized that brownfields regeneration is a highly individual process (*i.e.*, each project is specific and no generalization is possible), our survey demonstrated there are some 'common themes' that appear to be useful in understanding successful regeneration in a wide range of contexts. The crucial international factors governing brownfields regeneration are (i) the existence of ecological burden on site (i.e. the extent of soil or groundwater contamination), (ii) overall regeneration costs and return time on investment, and (iii) clear ownership relations and availability of site for sale and development. Our findings from four European countries with different political and economic backgrounds and a different level of experience from brownfields redevelopment are in accordance with previous studies from the USA, Canada, Japan and Great Britain (*cf.* Adair *et al.* 2000; Coffin and Shepherd, 1998, De Sousa, 2000; De Sousa, 2003; Dixon, Otsuka and Abe, 2011).

However, we have also detected significant differences concerning the importance of specific factors among surveyed countries and as concerns the perspective and experience of specific stakeholder groups. These findings raise legitimate questions about the functionalities and effects of would-be 'universal' solutions and tools being provided by some international projects financed by the European Commission. It seems that while in developed economies such as Germany or the Czech Republic the main current problem of brownfields regeneration lies in effective assessment and prioritization of existing brownfield sites (to distribute available public resources to those locations and sites where publicly (co-)financed regeneration is required (*i.e.*, locations where market forces are considered to be weak and display low levels of market efficiency), the first steps in Romania should be in improving the general legislative framework concerning regeneration of contaminated lands and in providing detailed and valid inventory of existing brownfields with all relevant information to spur potential foreign investors and stimulate redevelopment processes. The private sector is opportunity driven and invests in areas where it is comfortable and where returns are achievable commensurate with the risk taken (usually it is easier to develop projects on greenfields) – in this respect, grant regimes should be used as tools to lever investment.

Another practical problem is to differentiate between different stakeholders' concerns. Our survey detected, for example, that representatives of public administration generally emphasized more the importance of national legislation, state incentives and general localization of brownfields (arguments about some economically less-favored regions), investors and developers stressed more the importance of local geographical factors, such as specific location, landscape protection limits, and local place marketing (there are often not available relevant and detailed information about existing brownfields being available for sale and development). Our survey confirmed the findings of Brill's previous study (2009) that there are significant differences among the perceived priorities of decision makers (state and local governments) and stated desires and experiences of stakeholders concerning drivers and barriers of brownfield redevelopment. Similarly, Yount and Meyer (1999) emphasized (according to interviews with developers and lenders in the US) that effective policies and programs need to be framed within an understanding of the different needs of smaller and larger redevelopments. While market forces were equally significant inducements for both types of regeneration projects, important needs of small developers were not met: they were less likely to receive government subsidies, had greater difficulty accessing private capital, and lacked information about processes associated with remediation, while developers of large projects were more likely to benefit from public financing and were able to mobilize a network of supportive organizations to help them manage barriers to project completion.

In this respect, it is very important to further study specific regional and local political, cultural and social structures and contexts of regeneration processes, the roles of specific actors, etc. In this sense, there is yet a broad area for future interdisciplinary research.

Acknowledgement

The paper is based on research realized in the scope of the projects 'TIMBRE – Tailored Improvement of Brownfield Regeneration in Europe' (funded from the European Community's Seventh Framework Programme under the Grant Agreement No. 265364) and 'New Methods for the More Effective Regeneration of Brownfields to Enable Optimizing of the Decision Making Processes' (funded by the Technology Agency of the Czech Republic, Reg. No. TD020259).

References:

1. Adair, A., Berry, J., McGreal, S., Deddis, B. and Hirst, S., 'The Financing of Urban Regeneration', 2000, *Land Use Policy*, vol. 17, no. 2, pp. 147-156.
2. Alberini, A., Longo, A., Tonin, S., Trombetta, F. and Turvani, M., 'The Role of Liability, Regulation and Economic Incentives in Brownfield Remediation and Redevelopment: Evidence from Surveys of Developers', 2005, *Regional Science and Urban Economics*, vol. 35, no. 4, pp. 327-351.
3. Alexandrescu, F., Martinát, S., Klusáček, P. and Bartke, S., 'The Path from Passivity toward Entrepreneurship. Public Sector Actors in Brownfield Regeneration Processes

in Central and Eastern Europe', 2014, *Organization & Environment*, vol. 27, no. 2, pp. 181-201.
4. Alker, S., Joy, V., Roberts, P. and Smith, N., 'The Definition of Brownfield', 2000, *Journal of Environmental Planning and Management*, vol. 43, no. 1, pp. 49-69.
5. Bacot, H. and O'Dell, C., 'Establishing Indicators to Evaluate Brownfield Redevelopment', 2006, *Economic Development Quarterly*, vol. 20, no. 2, pp. 142-161.
6. Bjelland, M.D., 'Until Justice and Stewardship Embrace: Or, How a Geographer Thinks about Brownfield Sites', 2002, *Christian Scholar's Review*, vol. 31, no. 4, pp. 393-412.
7. Brill, C.W., 'Using GIS to Contrast Perceived versus Preferred Priorities for Brownfield Redevelopment in Worcester, Massachusetts', 2009, *URISA Journal*, vol. 21, no. 2, pp. 49-57.
8. Coffin, S.L. and Shepherd, A., 'Barriers to Brownfield Redevelopment: Lessons Learned from Two Great Lakes States', 1998, *Public Works Management & Policy*, vol. 2, no. 3, pp. 258-266.
9. De Sousa, C., 'Brownfield Redevelopment versus Greenfield Development: A Private Sector Perspective on the Costs and Risks Associated with Brownfield Redevelopment in the Greater Toronto Area', 2000, *Journal of Environmental Planning and Management*, vol. 43, no. 6, pp. 831-853.
10. De Sousa, C., 'Turning Brownfields into Green Space in the City of Toronto', 2003, *Landscape and Urban Planning*, vol. 62, no. 4, pp. 181-198.
11. Dixon, T., 'The Property Development Industry and Sustainable Urban Brownfield Regeneration in England: An Analysis of Case Studies in Thames Gateway and Greater Manchester', 2007, *Urban Studies*, vol. 44, no. 12, pp. 2379-2400.
12. Dixon, T., Otsuka, N. and Abe, H., 'Critical Success Factors in Urban Brownfield Regeneration: An Analysis of 'Hardcore' Sites in Manchester and Osaka during the Economic Recession (2009-10)', 2011, *Environment and Planning A*, vol. 43, no. 4, pp. 961-980.
13. Doak, J. and Dixon, T., 'Actors and Drivers: Who and What Makes the Brownfield Regeneration Process Go Round?', 2005, Proceedings of the SUBRIM Conference, [Online] available at http://www.claire.co.uk/index.php?option=com_phocadownload&view=-category&download=159:2005-subr-im-conference&id=4:event-training-documents., accessed on January 15, 2015.
14. Filip, S. and Cocean, P., 'Urban Industrial Brownfields: Constraints and Opportunities in Romania', 2012, *Carpathian Journal of Earth and Environmental Sciences*, vol. 7, no. 4, pp. 155-164.
15. Frantál, B., Greer-Wootten, B., Klusáček, P., Krejčí, T., Kunc, J. and Martinát, S., 'Exploring Spatial Patterns of Urban Brownfields Regeneration: The Case of Brno, Czech Republic', 2015, *Cities*, vol. 44, pp. 9-18.
16. Frantál, B., Klusáček, P., Kunc, J. and Martinát, S., 'Report on Results of Survey on Brownfields Regeneration (Deliverable D.3.1 of the TIMBRE project)', 2012, [Online] available at http://www.timbre-project.eu/tl_files/timbre/Intern/4%20Work%20Packages/WP8/ Deliverables/timbre_265364_D3.1_V3.pdf, accessed on November 15, 2014.
17. Frantál, B., Kunc, J., Nováková, E., Klusáček, P., Martinát, S. and Osman, R., 'Location Matters! Exploring Brownfields Regeneration in a Spatial Context (A Case Study of the South Moravian Region, Czech Republic)', 2013, *Moravian Geographical Reports*, vol. 21, no. 2, pp. 5-19.

18. Ganser, R. and Williams, K., 'Brownfield Development: Are We Using the Right Targets? Evidence from England and Germany', 2007, *European Planning Studies*, vol. 15, no. 5, pp. 603-622.
19. Heberle, L. and Wernstedt, K., 'Understanding Brownfields Regeneration in the US', 2006, *Local Environment: The International Journal of Justice and Sustainability*, vol. 11, no. 5, pp. 479-497.
20. Kunc, J., Navrátil, J., Tonev, P., Frantál, B., Klusáček, P., Martinát, S., Havlíček, M. and Černík, J., 'Perception of Urban Renewal: Reflexions and Coherences of Socio-Spatial Patterns (Brno, Czech Republic)', 2014, *Geographia Technica*, vol. 9, no. 1, pp. 66-77.
21. Letang, S.J. and Taylor, R.W., 'Community Perception of Redevelopment Changes and Its Impact on Brownfields Redevelopment Success', 2012, *OIDA International Journal of Sustainable Development*, vol. 5, no. 11, pp. 21-42.
22. Longo, A. and Campbell, D., 'What are the Determinants of Brownfields Regeneration? An Analysis of Brownfields in England', in *Proceedings of the Conference on the Science and Education of Land Use: A Transatlantic, Multidisciplinary and Comparative Approach*, Washington, DC, USA, 24-26 September 2007.
23. Mihailescu, G., 'Two Eastern European Countries with Different Paths: Why Polish Manage to Efficiently Absorb the European Money While Romania Remains With its Funds Blocked', 2012, article published within the project *Poor Governance in Public Spending in Romania between 2004 and 2012*, conducted by SAR (Romanian Academic Society) with the support of Open Society Foundations, the analysis was made by Institute of Local Development, [Online] available at http://www.researchgate.net/publication/255927094_ Two_Eastern_European_Countries_with_Different_Paths_Why_Polish_manage_to_efficiently_absorb_the_European_money_while_Romania_remains_with_its_funds_blocked, accessed on November 15, 2014.
24. NICOLE Brownfield Working Group, 'Environmental Liability Transfer in Europe: Divestment of Contaminated Land for Brownfield Regeneration – Report', Appendix C: Country specific information sheets, 2011, [Online] available at http://www.nicole.org/uploadedfiles/2011-wg-brownfields-finalreport.pdf, accessed on November 15, 2014.
25. Nijkamp, P., Rodenburg, C.A. and Wagtendonk, A.J., 'Success Factors for Sustainable Urban Brownfield Development: A Comparative Case Study Approach to Polluted Sites', 2002, *Ecological Economics*, vol. 40, no. 2, pp. 235-252.
26. Novosák, J., Hájek, O., Nekolová, J. and Bednář, P., 'The Spatial Pattern of Brownfields and Characteristics of Redeveloped Sites in the Ostrava Metropolitan Area (Czech Republic)', 2013, *Moravian Geographical Reports*, vol. 21, no. 2, pp. 36-45.
27. Oliver, L., Ferber, U., Grimski, D., Millar, K. and Nathanail, P., 'The Scale and Nature of European Brownfields', 2005, [Online] available at http://www.cabernet.org.uk/resourcefs/417.pdf, accessed on November 15, 2014.
28. Payne, S., 'Pioneers, Pragmatists and Sceptics: Speculative Housebuilders and Brownfield Development in the Early Twenty-first Century', 2013, *Town Planning Review*, vol. 84, no. 1, pp. 37-62.
29. Tang, Y.T. and Nathanail, C.P., 'Sticks and Stones: The Impact of the Definitions of Brownfield in Policies on Socio-Economic Sustainability', 2012, *Sustainability*, vol. 4, no. 5, pp. 840-862.

30. Tölle, A., Muszyńska-Jeleszyńska, D., Tadych, J., Jasińska, M. and supporting team, 'Report about Concepts and Tools for Brownfield Redevelopment Activities', WP 3, Output No. 3.1.1 of the COBRAMAN project, Bydgoszcz, Poland, 2009, [Online] available at http://www.cobraman-ce.eu/Portals/0/CM%20outputs/3.1.1_Report%20about%20concepts%20and%20tools%20for%20brownfield%20redevelopment%20activities.pdf.pdf, accessed on November 15, 2014.
31. World Bank, 'World Bank Open Data per Countries', 2014, [Online] available at http://data.worldbank.org/, accessed on November 15, 2014.
32. Yount, K.R. and Meyer, P.B., 'Project Scale and Private Sector Environmental Decision Making: Factors Affecting Investments in Small- and Large-scale Brownfield Projects', 1999, *Urban Ecosystems*, vol. 3, no. 2, pp. 179-193.