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Sustainable urban development in a city affected by heavy industry and mining? Case study of brownfields in Karvina, Czech Republic

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ABSTRACT

Due to recent societal changes 'brownfield' sites have gradually become a significant element in planning urban development. Brownfields can occur as a barrier and obstacle to the development of the urban organism but simultaneously they also represent unrealised potential. Brownfields, ex-industrial sites, are greater in those cities whose development was based on heavy industry or mining. In the first part of this paper theoretical concepts linked to the regeneration of brownfields are discussed, the second part is devoted to a case study of Karvina, in the Czech Republic, where the driving forces behind the occurrence of brownfields, their spatial distribution, and their prospects for regeneration are analysed. It was found that 28 brownfield sites on 121 ha are located in surveyed city with the majority having industrial and mining origins. Majority of local brownfields are owned by a local mining company. The perception of individual sites by the local population was ascertained via a questionnaire survey (n = 150). This found that awareness about problems connected to brownfields is quite limited and that local population perceive post-mining brownfields, located in more distant locations, as an opportunity for new industries to create job opportunities in city with significant unemployment problems.

1. Introduction

According to official statistics, the Czech Republic has experienced an enormous growth in built-up areas in the last two decades. Almost 4700 ha of land have newly been covered by different types of constructions, meaning that the same amount of green space has also been irrecoverably lost. Simultaneously, many abandoned sites of various original uses have appeared as a result of recent societal and economic transitions, in both urban and rural areas. The questions arise whether such 'wild' building development at the expense of open landscapes is in line with the proclaimed 'sustainable' development strategies of cities and villages, and whether this form of development threatens the future use of land-based resources. This near-future threat is consistently emphasised by scientists and international organisations, which propose solutions based on more environmentally friendly uses of the landscape. One such direction that could help to reduce such negative development is a systematic and well-planned policy for the regeneration of abandoned sites, for which the term 'brownfields' is usually used. The problem of brownfields has recently raised public debates among representatives of the public administration, private companies, and academia. This issue is increasingly becoming a part of the research agenda of not only geographers (Osman et al., 2015; Frantál et al., 2015a; Kunc et al., 2014a; Hercik et al., 2014) but also of economists (Bartke and

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Schwarze, 2015; Bartke, 2011; Rydvalová and Žižka, 2006), sociologists (Alexandrescu et al., 2014a, 2014b), urban planners (Raco and Henderson, 2006), environmental scientists (Carlon et al., 2008), and scientists in technical fields (e.g. Morio et al., 2013). If we focus more on socio-spatially oriented research into brownfields, the following research directions may be stressed: 1) the development of databases with various social, economic, and environmental data on brownfields (e.g., Leigh and Coffin, 2000; Vojvodíková et al., 2011); 2) studies analysing the process of brownfields regeneration and approaches of the public administration in different regions or countries (e.g., Klusáček et al., 2011); 3) studies reacting to the limited financial sources available for the regeneration of brownfields through the development of prioritisations and classifications of these sites (Doleželová et al., 2014; Pizzol et al., 2016); 4) studies on the specificities of the spatial development of brownfields within cities (Kunc et al., 2014b; Frantál and Nováková, 2014; Novosák et al., 2013); 5) application of GIS tools to brownfields research (e.g. Sun and Jones, 2013); and 6) studies focussing on analyses of specific types of brownfields according to their original use (agricultural – Krejčí et al., 2014; Klusáček et al., 2013; Klusáček, 2014; Skála et al., 2013; military – Hercik et al., 2014; cultural – Andres and Grésillon, 2013; Slach et al., 2013 etc.). From the geographer's point of view, it can be stated that the discipline significantly contributes its expertise in spatial coherences and relations between natural and socioeconomic components of the landscape to deepening knowledge of the various spatial aspects of brownfields. Although the significance locational context of brownfields has often been underestimated as it is dynamically reshaped by other driving forces, it can be stated that the spatial dimensions of brownfields and their regeneration are of crucial importance (Frantál et al., 2013).

This paper deals with the issue of brownfields in the city of Karvina, a city where due to its mining and industrial history during the last one and a half centuries, and to dynamic socioeconomic changes in the last two decades, many relicts of industrial and mining activities can be found. In the first part of the paper theoretical concepts linked to the regeneration of brownfields are discussed, while the second part is devoted to the case study of Karvina, where the driving forces behind the occurrence of its brownfields, their spatial distribution, and their regeneration prospects are analysed. Attention has also been paid to the perception of individual sites by the local population, as ascertained in a questionnaire survey. Examples of regeneration projects are then presented. In the third part of the paper, selected results of the questionnaire survey focused on the perception of brownfields and regeneration preferences are analysed. The research questions of the paper were defined as 1) what is structure, distribution, specificities and driving forces of occurrence of brownfields in Karvina, and 2) how brownfields in Karvina are perceived by local population.

2. Theoretical remarks on the problem of brownfields

The National Strategy for Brownfield Regeneration (CzechInvest, 2008) defines brownfields as properties (lands, buildings) that are underused, neglected, and potentially contaminated. They usually occur as the relicts of former industrial, agricultural, residential, military, or other such activities. The above-mentioned strategy also draws attention to the fact that brownfields cannot be appropriately or effectively used until remediation has been carried out. In spite of the fact that brownfields are defined differently in different EU countries (Alker et al., 2000; Oliver et al., 2005; Thornton et al., 2007; Frantál et al., 2012), there is a common agreement in the Czech Republic over the definition of the term. Nevertheless, this methodological variation regularly gives rise to misunderstandings when cross-national analyses of brownfields are conducted (see Frantál et al., 2015b). As stated in the Search Study for the Location of Brownfields in the Czech Republic developed by the CzechInvest Agency in the period 2005–2007 (CzechInvest, 2008), within the territory of the Czech Republic there are 2355 brownfields covering 10 326 ha in total. Based on qualified estimations we propose that the number of sites and associated hectares of land is circa 11 700 sites with an area of 38 000 ha, almost four times higher than the previous estimate. The distribution of these sites within the districts and regions of the Czech Republic is uneven, owing to the different historical and economic developments of individual areas. However, the driving forces behind the occurrence of brownfields in the Czech context are essentially the same across the country. The key processes driving these changes stem from economic transition from central planning towards a market economy at the beginning of the 1990s. Alongside this process, is the shift of the societal paradigm towards a globalised (or Europeanised) post-industrial economy based on a service sector (Dorsey, 2003) along highly specialised manufacturing sectors (Turečková, 2014; Domalewski and Baxa, 2015), leaving traditional industrial sites unused. This shift brings increased social risks (Keller, 2011) that have a significant spatial expression, predominantly in densely populated urban areas (Mulíček et al., 2014) – especially in post-communist cities, where the intensity of the changes is multiplied – resulting in the displacement and spatial segregation of certain social groups within cities.

It is obvious that consequences of brownfields are not isolated within, or to, given sites. As stated by Kunc et al. (2014a,b), it is indisputable that the wider hinterland of brownfield sites is notably influenced by such abandoned, neglected, and devastated places, and they interfere with the functioning of the wider urban organism. As evidenced in many studies, the hinterlands of brownfields show greater occurrences of social (e.g., anti-social behaviour, unemployment), economic (decreased market values of land and properties – see Sun and Jones, 2013), environmental (real or perceived contamination), and even psychological (social stigmatisation, fear of crime) impacts. All these coherences strongly affect both local inhabitants and tourists (Navrátil et al., 2013), which make the perception of brownfields quite specific. As Kunc et al. (2011, 2014a,b) demonstrated in their studies on the perception of urban brownfields, differences in the perceptions of brownfields in individual cities in the post-communist context is driven both by the success of the socio-economic transition of given cities in the past two decades and by the educational level of the local population. Kunc et al. (2014a,b) also stress the differing preferences of the population concerning the possibilities for the future use of specific brownfield sites. In cities where a successful economic transition has taken place, housing or green space regeneration is more popular, whilst in cities with economic problems, public support for regeneration projects are focused on new employment possibilities. Specific cases are discussed by Martinát et al. (2014a,b, 2015), who focused on the perception of regeneration options for brownfields in cities heavily affected by mining. They point to the vital role of flagship regeneration projects undertaken by the public sector, predominantly in regions with structural problems. The importance of flagship regeneration projects is also discussed by Temelová (2007) in the case of Prague, and in the case of Vienna by De Frantz (2005).

Another approach to brownfield research is represented by Klusáček et al. (2011), who focused their attention on the attitudes of representatives of the public administration towards the regeneration of brownfields. As illustrated by their research, mayors see the position of local administration in the brownfield regeneration process as being negotiators between the clashing interests of different groups of stakeholders, rather than as initiators. Mayors also emphasised the necessity of involving