Industrial legacy towards brownfields: historical and current specifics, territorial differences (Czech Republic)

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Abstract: *Industrial tradition in the Czech Republic spans across the last two centuries, it has established deep roots, and the significance of industry in the contemporary national economy is virtually irreplaceable. Industrial brownfields originated along with the first industrial estates in the 19th century but brownfields as an independent object of study came into focus among political representatives and scientists only in the second half of the 1990s. This article describes the most remarkable milestones of the industrial expansion on the territory of the Czech Republic focusing on: several peaks of capitalist booms during the era of the Habsburg monarchy and of independent Czechoslovakia before the World War II; the following period of socialist industrialization; the economic transformation period after 1989. These historical milestones exerted decisive influence on shaping the spatial mosaic and the current concentrations of old and vacant locations of past industrial production. Using large data sets and graphic outputs, the article discusses the issues of industry and brownfields from the viewpoints of time, space (territory-specific), and industrial branches. The final section notes brownfields' reflections in the cultural landscape and the options of their regeneration.*

Keywords: *industry, brownfields, historical legacy and current state, territorial differences, regeneration options, Czech Republic*

Introduction

Brownfields are defined in the Czech Republic as *real estate (land, buildings, and premises) which is insufficiently used, neglected, and possibly contaminated* according to the *National Brownfields Regeneration Strategy* (CzechInvest 2008a). *Brownfields originate as relics of industrial, agricultural, residential, and military or some other activity. It is impossible to suitably and effectively use brownfields without going through a process of regeneration.* The *Brownfields Locations Search Study*, which formed the background for the National Strategy framework, has identified 2,355 such locations, with a total area of 10,400 ha. The actual estimated number and area of all these locations is 4-5 times higher, though (CzechInvest 2008b).

As implied by the above-mentioned definition, the wording of which is quite different across various countries and contexts (e.g., Alker et al. 2000, Cabernet 2006, Cobârzan 2007, Vojvodíková et al. 2011, Tang and Nathanail 2012, Krzysztofik et al. 2013 and others), brownfields originate as a consequence of structural changes in a wide number of different economic activities. This article will discuss mostly those brownfields with original industrial functions. Within the set of identified locations, the post-industrial brownfields make up approximately one-third (790), which, along with the agricultural brownfields, makes up the largest number in the survey; their surface area exceeds 4,400 ha, making them the type of brownfield with the largest area, though.

The historical legacy of industrial production: a theoretical framework

Where to search for the origins of industrial brownfields? First of all it is necessary to take a look at the economic cycle which started in the territory under study at the beginning of the Industrial Revolution, i.e. in the first half of the 19th century, when previously scattered industrial activities started to be gradually concentrated into premises with instruments, tools, or devices used to increase not only production itself but also labour productivity (Hudson 2005, Stutz and Warf 2007). Some industrial premises were abandoned even during the early stages of industrialization; they were usually unable to compete with areas featuring better natural conditions. For example, ironworks in high-elevation mountainous and near-mountainous regions, which had traditionally used local deposits of iron ore and charcoal as fuel, ended their operations in the 1850s because they were unable to compete with bituminous coal mining regions (in the Ostrava and Kladno regions). In this connection, it is necessary to note, however, that new usages for cyclically abandoned premises were mostly found for over 150 years, with only certain exceptions, mostly for further industrial purposes, either in the same or in quite different (new and promising) fields of business.

Extensive expansion of factory operations and the building-up of related service, administrative, or residential complexes in the vicinity of the factories as well as a quantitative increase in production were other characteristics of this period (Coe et al. 2007, Săgeată 2013). This natural trend reached absurd levels during the period of the centrally-planned economy between 1948 and 1989, when the priority status of industrial activities (mostly heavy industry) resulted in insensitive interventions into the urban design of cities and municipalities and the increased risk of contamination and general deterioration of the environment (Klusáček 2005, Barta et al. 2006, Pickles 2010, Filip and Cocean 2012, Frantál et al. 2013).

The problem of areas historically used for industrial activities is frequently exacerbated by their location in space. Industrial premises were founded, in the so-called gründer (founder) period (since the 1870s), not only in the vicinity of raw material deposits (as in the case of metallurgical works, glass and porcelain factories, etc.), but due to the ever growing demand for labour also on greenfields in the immediate vicinity of city walls (as in the case of textile factories, machinery factories, chemical operations, etc.). In the following decades, with their dynamic processes of urbanization and fast population growth, this turned out to be a rather unfortunate solution. These industrial premises, located in the immediate vicinity of historical city centres, were very quickly incorporated into the city structures and became barriers for urban planning (Rae 2003, Hutton 2010).

The establishment of strong industrial regions during the period of maximum development under a market economy (the 1920s), and during the subsequent period of the implementation of a centrally-planned economy in the forty-year period after WWII, are the basic economic background of industrial brownfield origination on the territory of the Czech Republic. Excessive focus on the eastern markets of the so-called socialist block, the lack of competitiveness of many industrial fields, low labour productivity, and limited absorption of new technological developments in the then-Czechoslovakia are the macroeconomic factors that caused a decline in non-competitive industrial fields and real growth in brownfield numbers after the changes of the late 1980s (Spěváček et al. 2002, Myant and Drahokoupil 2010).

The efforts of planners between the 1950s and the 1980s to achieve general industrialization of the Czech Republic's territory by founding new industrial factories both in suburbs and in the countryside resulted, one decade later and in connection with the transition to a market economy, in their abandonment and subsequent (mostly unsuccessful) searches for new (industrial) occupants (Kunc and Toušek, 2000, Toušek 2003). This is the deindustrialization process, which has been repeated in all developed and even transitional economies within the European space. The above-mentioned trend brings about powerful social forces and risks that

society is forced to face under new conditions, including structural unemployment, demographic specifics such as population ageing (Keller 2011, Hoff 2011), and an indisputable shift in the perception of health and environmental risks related to industrial activities and their vestiges (Kahn 2008, Popescu and Pătrăşcoiu 2012).

Other countries with industrial traditions face the problem of abandoned industrial premises and their regeneration, just like the Czech Republic. The oldest brownfield locations could be found in regions of primary energy raw material extraction (mostly coal), which were of decisive importance for the development of industrial fields in the period of the Industrial Revolution (Knox 1984, Cumbers et al. 2006, Bruland and Smith 2013). Establishment of "old industrial regions" and the appearance of related brownfields were results of the transition from the period of Ford-like mass production to a flexible accumulation mode after about 150 years of intensive industrialization without any significant regard for both landscape and society. This transition was bolstered by the oil crisis of the early 1970s, which exerted pressure on energy-intensive manufacturing operations and industrial fields (Lash and Urry 1987, Dicken 2007, Knox et al. 2008). The long-term and difficult process of regenerating old and abandoned industrial locations started in economically developed countries about 25 years earlier than in Czechoslovakia and other countries of the former Eastern Bloc.

This article aims to briefly and sequentially introduce the history and presence of industrial production in the Czech Republic, which is the basic cause of the contemporary physical existence of brownfields. Emphasis is placed on analysis and evaluation of the main developmental milestones decisive in the origination and shaping of industrial brownfields – i.e. the individual periods of industrial development under the Habsburg monarchy and independent Czechoslovakia before WWII, the socialist period (1948-1989), and the subsequent period of economic transformation and integration into global structures. Using processed data files and graphical outputs, we evaluate and discuss the origination and development of industrial regions, structural changes to them, and regional disparities in the areas and functional specifics of industrial locations and industrial brownfields. In conclusion we also mention some aspects regarding regeneration of the brownfield locations.

Methods and data

The area under study encompasses the present territory of the Czech Republic. The above-mentioned Brownfield Locations Search Study was used as a database of brownfield locations; this study was undertaken by CzechInvest in cooperation with individual administrative regions between 2005 and 2007. The capital city of Prague was an exception: no data collection was performed there. For a comprehensive republic survey and graphical interpretation in the figures, we used data from Sýkorová (2007), which mapped Prague at the same time. The Study was expected to compile a catalogue of significant areas and buildings within each administrative region that would require revitalization. Brownfield locations with surface areas exceeding 1 ha or individual buildings with a floor area over 500 m^2 were the targets of the search. Methodological differences in the approaches of individual bodies (especially of the individual administrative regions and Regional Development Agencies) caused the data for individual regions to be rather variant, both in the numbers of locations found and in the numbers of identified items, their structures, and sizes (often smaller than 1 ha), and they were also delivered in various formats (xls, mdb, etc.). This is the only official database of brownfield locations in the Czech Republic and therefore the persons responsible for its original creation were contacted with regards to its 2010 update. The authors of this article know that even this updated database does not contain all brownfields (not all industrial) in the Czech Republic (one of the reasons could be their small surface areas) but it is certain that this database can be considered representative at the national level (see Table 1 and Figure 6).

Before we used the data for our analyses, we had to take several decisive measures. In the first step, an analysis of the studied variables for each administrative region was performed and those indicators were selected which matched those of all or most of the administrative regions. Data homogeneity was studied in the second step, i.e. the actual tracing rate of the indicator in the same categories. If an indicator was not traced everywhere, or if the categories were mutually incompatible, the indicator was excluded. Out of the large number of total indicators, the following were used for the purposes of this article: location within municipalities, surface area, previous use, and future use according to the municipal plan.

The third important step consisted of the conversion of data into a graphical format. It was necessary to perform certain corrections here as well. Using data about the previous use of the locations, we selected those locations where the activity was industrial according to the NACE international classification (especially manufacturing and, to a limited extent, also mining and energy distribution), and the selection was also limited to a minimum location surface area of 1 ha. In the end, we have identified 520 such locations (plus 63 locations in Prague), out of 790 industrial locations without a surface area limit presented by CzechInvest (2008b, see above). The 583 selected locations were grouped by municipality, and the result was 280 municipalities (plus Prague) with an occurrence of industrial brownfields with a surface area over 1 ha (see Figure 6 and 7). The resulting database covers the area of whole country and according to the previous experience of the authors is unique at the scale of Central and Eastern Europe.

Tab. 1*: Essential characteristics of the brownfields database (CzechInvest) in the Czech Republic*

Original use (according to surface area, %)	Future use (acording to frequency, %)	Representation in municipalities (according to frequency, %)
Industry (42.8)	Mixed industrial function (20.8)	less than 2,000 inhabitants (48.6)
Army (23.2)	Mixed urban function (20.7)	2,001 – 10,000 inhabitants (25.4)
Agriculture (17.8)	Industry (16.5)	10,001 – 50,000 inhabitants (14.6)
Communal facilities (4.0)	Communal facilities (12.4)	over 50,000 inhabitants (11.8)
Housing (0.9)	Mixed agriculture (11.4)	
Tourism, spas, hotels (0.2)	Agriculture (7.0)	
Other (11.1)	Housing (4.2)	
	Tourism, spas (2.3)	
	Other (4.7)	

Source: CzechInvest (2008b), modified by authors

To compare the basic developmental phases of industrial production in the Czech Republic, we used one of the fundamental works of the Czechoslovak geography of industry, the work of Mareš (1976) *Vývoj rozmístění československého průmyslu, tabulky a mapy* (Development of the Distribution of the Czechoslovak Industry, Tables and Maps); which was continued by the same author twelve years later (Mareš 1988). After some adjustments it was possible to acquire information about the distribution of industry in 1930 (the first milestone of brownfield formation) and, partially, at the end of the 1980s from these works. To introduce the situation of industry before the breakup of the Eastern Block (the second milestone) we used, besides Mareš (1988), also the Czech Statistical Office database *Podniky ústředně řízeného průmyslu* (1989) (Centrally-planned industry business units), from which we selected businesses with over 100 employees. Their locations were updated to match the territorial division in 2010, and industrial businesses were grouped by municipality (see Figure 5). A similar procedure was used to process the data for industrial businesses from 2010 to make them comparable with the situation at the end of the 1980s. The database of *The Research Center for Regional Development at the Masaryk University in Brno* became our source in this case (see Figure 5).

Results

Czech industry before 1989 and the first trends in the brownfield origination

The Czech Republic is one of the European countries with a rich industrial tradition. The earliest manufacturing facilities (textile works, iron mills, hammer mills, tanneries, breweries, and others) were dependent on available fuel sources, and therefore they were mostly established in forest-covered areas at higher elevations (these regions offered abundant quantities of wood), which in turn were mostly located in border regions (Krajíček 1982). The onset of the Industrial Revolution saw modernization in textile manufacturing, the beginnings of coal mining, and the development of related metallurgical and metalworking industries and other fields of endeavour. Most industrial capacity was built in Bohemia and Moravia during the Monarchy period. The Kladno and Ostrava coal basins saw rapid development before the mid-19th century; the brown-coal basins in the Krušné hory foothills followed. Less than 2,000 industrial plants (units) existed in the Czech lands at that time (Mareš 1976). The center of gravity of industrial production moved from the forest-covered border regions into the interior (especially to the large cities, such as Prague, Brno, and Pilsen) and to the north and northwest of the Czech lands, close to the border with the then-Prussia, in the course of the 19th century (Mareš 1988). A great, if not decisive, impact on the rapid development and transfer of the industrial base was the rise of railway transportation, which gradually interconnected all the significant mining regions with the growing agglomerations (Hlavačka 1990).

The first half of the 20th century was marked by the further concentration of industry in the traditional regions. Uneven distribution of industrial production was preserved and the manufacturing base was mostly scattered in many small plants. Industrial production became the most significant branch of the national economy as far as outputs and numbers of workers are concerned. At the beginning of the 20th century there were over 10,500 industrial units and industry employed over 700,000 persons in the Czech lands (Mareš 1976). In connection with the territorial transfers of industrial capability and its subsequent concentration, many regions started to feel pain from an insufficient capacity of the decisive manufacturing factor – the labor force. This resulted in large transfers (migrations) of the agricultural population into cities and other industrial cores.

Besides spatial (territory-concentration) modifications there were also modifications in the branch-structure of the industry. The textile industry represented about three quarters of industrial employment in the mid-19th century. The cement and brick industries, the glass and porcelain industries, the food-processing industry, chemical production, and especially the machine industry gradually joined textile manufacturing. The dominance of the machine industry and the gradual decline of the textile industry represented the most significant adjustment in the industrial branch structure after the 1930s. The final establishment of industrial regions in Bohemia and Moravia in the 1930s and the stagnation or decline of the textile industry were the first milestones for the future origination of industrial brownfields.

Localization economic dependencies, which had determined the distribution of industry from the first half of the 19th century, ceased to apply a few years after the end of WWII, and government planning institutions took over control of this process. Over 19,500 local industrial units existed in the whole territory of Czechoslovakia in 1945, and just a small part of them was located in Slovakia (Mištera 1978, Kulla 2013). Considerable expansion of industrial production (see also Figure 2) was achieved by expanding existing plants and by the, frequently spatially insensitive, construction of new industrial plants, especially in regions with underdeveloped industry. This huge expansion of industry, called *socialist industrialization* in specialized literature, was implemented to varying degrees in all countries of the former Council for Mutual Economic Assistance (Toušek 2003, Kunc 2006). A decisive spatial aspect of industrial distribution related to the industrialization of less exposed regions was the transfer of the centre of gravity of industrial production growth not only to Moravia but especially to Slovakia, and this process peaked in the 1960s (Kopačka 1992).

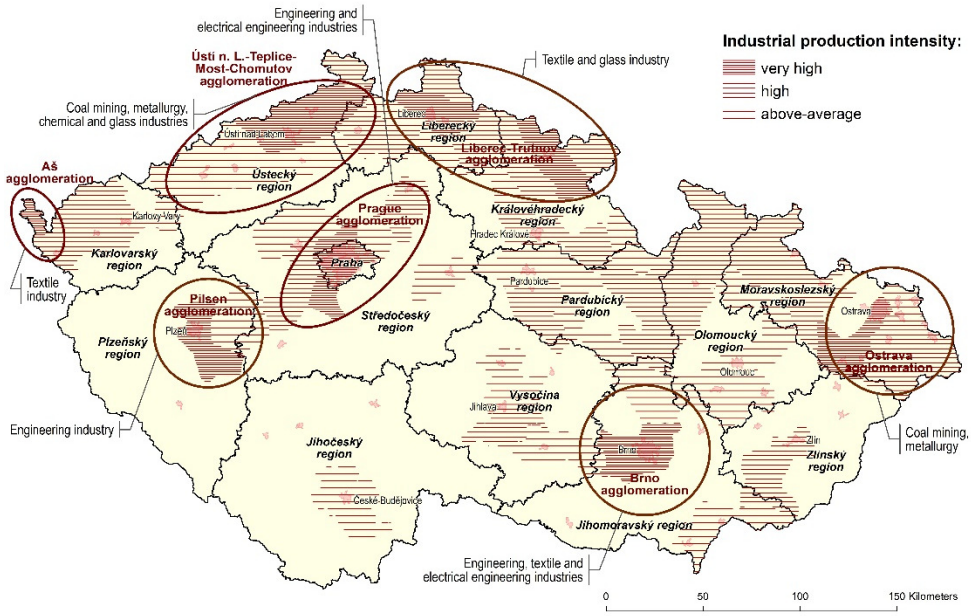

Fig 1. *The regions with industry concentrations in the area of the Czech Republic in 1930;*

Legend:

- *very high - increased concentration of industry (over 12,000 employees in industry per district; more than 150 employees in industry per 1,000 inhabitants)*
- *high - regions with developed industrial production (over 6,000 employees in industry per district; over 100 employees in industry per 1,000 inhabitants)*
- *above-average - other significant industrial regions (one of the indicators exceeds the national average; at least 2,500 industrial employees in industry per district)*
- *other regions - regions with poorly developed industrial production*

Source: Mareš (1976, 1988), processed by authors

As far as industrial branches are concerned, after 1948 heavy industry was much preferred – coal mining, metallurgy, the power industry, chemistry, and heavy machinery. Industrial concentration resulted in the growth of the average size of an industrial plant and in the decrease in the number of industrial units and, consequently, in the number of industrial municipalities. The traditional industrial regions especially saw the closing of many small plants, especially in the textile industry, or significant declines in the numbers of workers employed in these plants (Střída and Koreň 1983, Kopačka 1992); these were the steps that resulted in the appearance of brownfields.

The 1960s and 1970s saw the gradual technological lagging of Czech, or rather Czechoslovak, industry behind the developed Western European countries and this process peaked in the 1980s. The main cause of this lagging was the decline of investment into industrial plants and virtually no reaction by the Czech economy to the oil shocks and crisis of the 1970s. Most businesses in the country suffered from high overemployment, which was, among other things, caused by a socialist system with a formal non-existence of unemployment. As a result of the country's incorporation into the COMECON group, huge emphasis was placed on fostering certain industrial branches (such as electrical engineering, nuclear technology, production of machinery and devices, the metallurgical and chemical industries) in order to cover the needs of the common market and, to a lesser extent, also the needs of the domestic market (Toušek 2003).

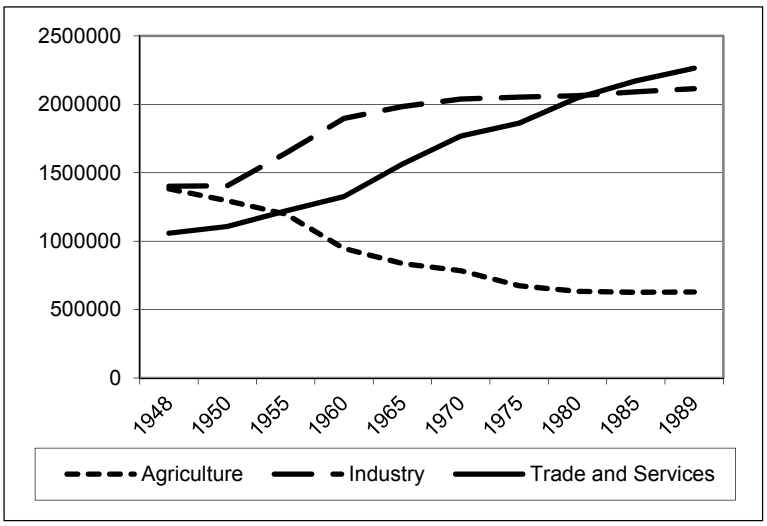

Fig. 2. *The development of the number of workers in agriculture, industry, trade and services in the area of the Czech Republic between 1948 and 1989; Source: Czech Statistical Office (1998): Time series for basic labour statistics indicators (1948-1997); processed by authors.*

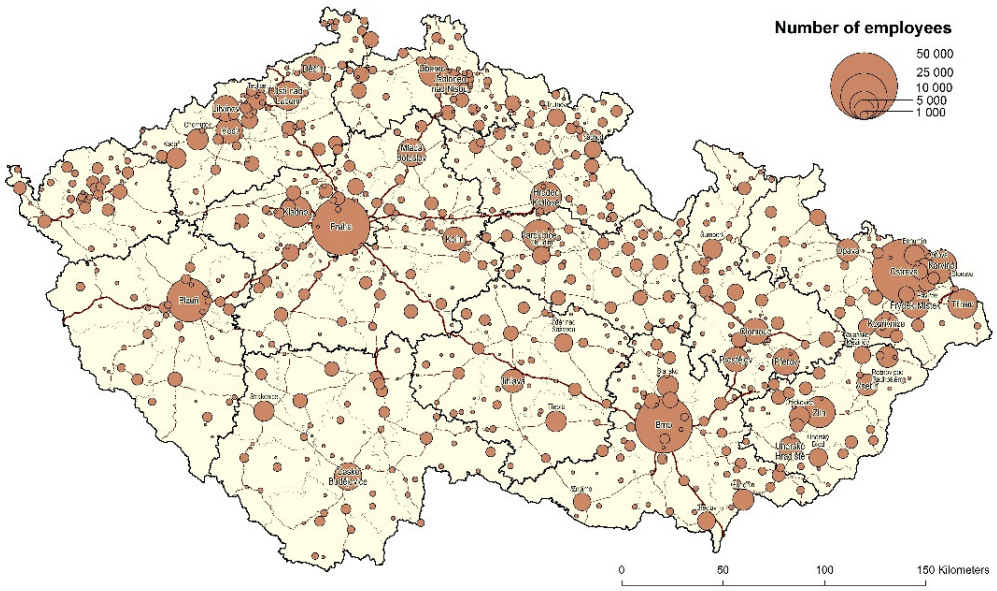

Fig. 3. *The industrial production in the area of the Czech Republic at the end of the 1980s (industrial plants with more than 100 employees); Source: Mareš (1976, 1988), Czech Statistical Office (1990): Centrally-planned industry business units (1989); processed by authors.*

Declining tendencies in industrial production started to be clearly visible in the 1980s. It wasn't possible anymore to include the new labour force in industrial production in such numbers as before (see the industrial employment stagnation in Figure 2) or to keep building

new production capacities (industrial production at the end of the 1980s see in Figure 3). Black and brown coal mining was significantly reduced. These years saw the stagnation of economic growth in most centrally planned economies of Central and Eastern Europe (Kunc and Toušek 2000). It is not possible to stamp the 1980s as the first period of massive brownfield origination and occurrence (brownfields appeared even earlier) but this was the decade that laid the groundwork for the appearance and spreading of abandoned industrial locations in the critical 1990s.

Period of industry transformation after 1989 and the key period of the brownfields origination

The first phase of transformation was characterized a decline in production activity in the processing industry, especially in the electrical engineering, machine industry, textile, clothing, and tanning industries and, before the mid-1990s, also in the transportation equipment industry. The industrial transformation also resulted in steep declines in worker numbers; these declines rather varied across individual branches and regions. The most significant and intense worker decline in industry was recorded in 1990 and 1991 (see Figure 4). This was the period of the highest lay-offs of white-collar workers and, to a lesser degree, also of blue-collar workers (a total of 0.25 million persons). A large percentage of the people released from industry transferred to what was then an "unsaturated" tertiary sector. The speed of decline in the number of people employed in industry was much slower from the beginning of 1992 (see Figure 4); nevertheless, many businesses still faced sales problems and the process of production restructuring, which was supposed to bring about higher labour productivity, took longer than first expected (Kunc and Toušek 2000, Spěváček et al. 2002).

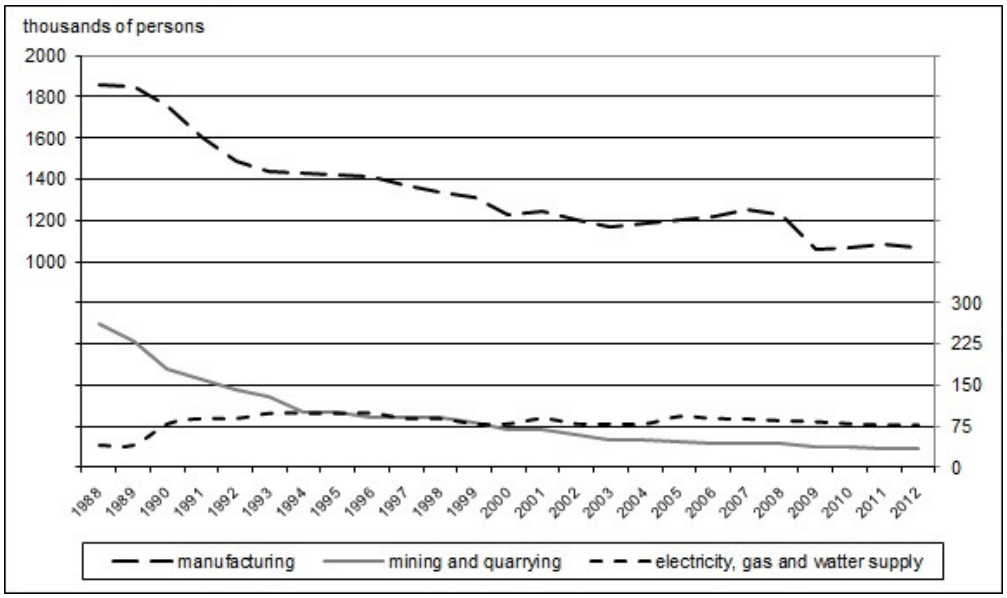

Fig 4. *The development of number of workers in industry in the area of the Czech Republic, 1988 – 2012 (in thousands of person); Source: Czech Statistical Office (1998): Time series for basic labour statistics indicators (1948-1997); Czech Statistical Office (2013): Average registered numbers of employees as persons (1988-2012); modified and processed by authors.*

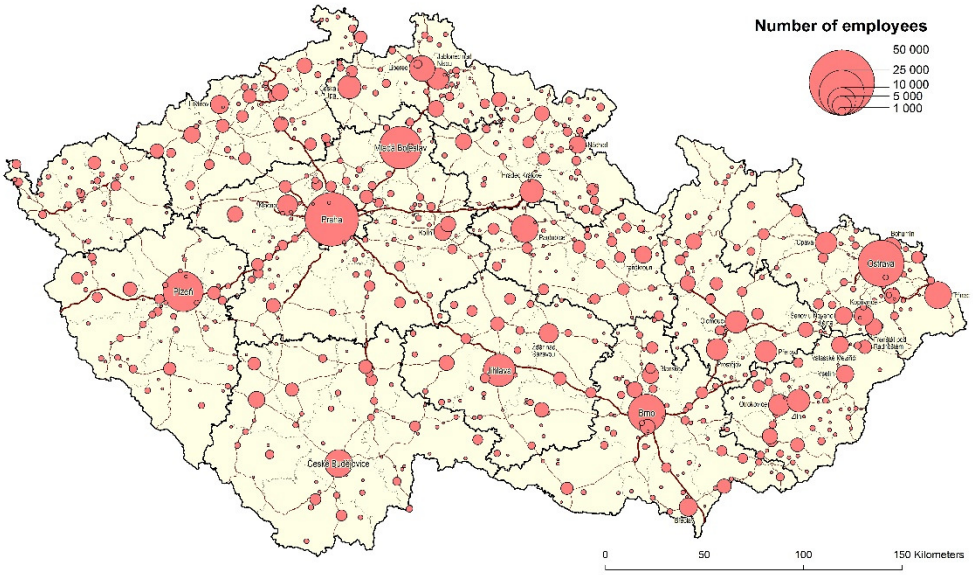

Fig. 5. *The spatial distribution of the industrial production in the Czech Republic according to industrial plants with more than 100 employees (2010); Source: The Research Centre for Regional Development, Masaryk University, Brno (2010); processed by authors.*

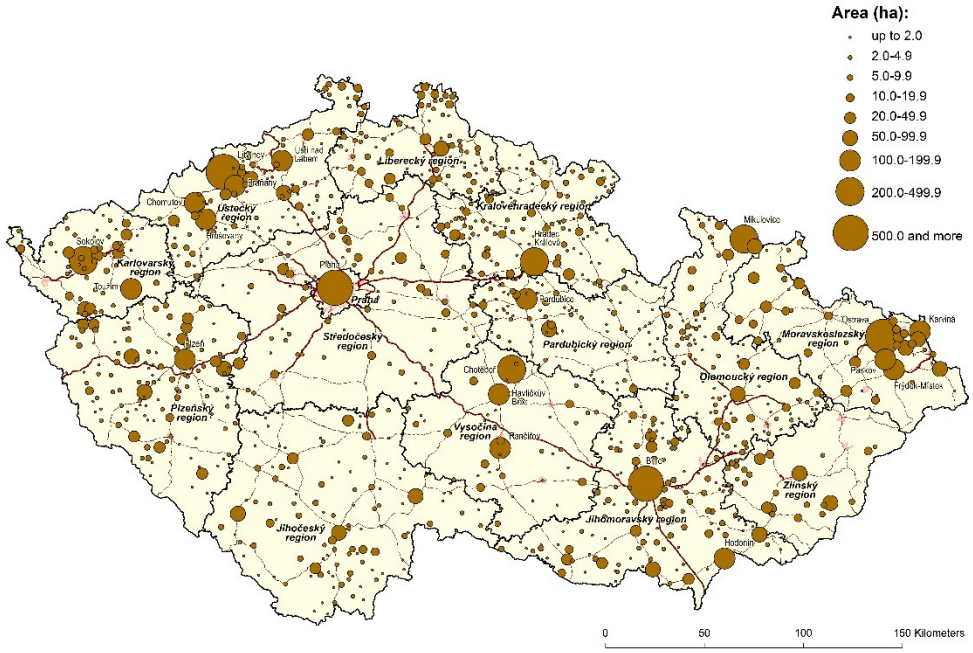

Fig 6. *The location of brownfields larger than 1 hectare in the Czech Republic (2010); Source: CzechInvest (2008b); own research, processed by authors.*

Mild growth in the number of workers in industrial production has been recorded since 1999, mostly in dynamic fields such as electrical engineering and the automotive and chemical industries. The end of the 1990s saw the peak of structural changes in Czech industry. Changes of the 1989-1999 period were unprecedented in the history of Czech industry. No large structural changes, either in industry fields or sectors, have occurred since the beginning of the new millennium until present. Yet this period witnessed ever increasing regional differences between the structurally affected regions with declining industrial fields such as coal mining, textile production, shoe-making and the glass industry (Ústecký, Moravskoslezský, partially also Zlínský and Liberecký regions) and regions with newly developing forms of industrial (hi-tech) production, especially in the hinterlands of larger cities (Toušek 2003, Kunc 2005).

The largest industrial production decline, as far as the volume and number of employees are concerned, was registered in the most heavily structurally affected regions since the beginning of the 1990s; these were the current Ústecký and Moravskoslezský regions (compare Figures 3 and 5). The unilateral focus of industrial activities on coal mining and metallurgical and oil-processing industries became clearly apparent there. Most large cities (currently regional cities) lost their industrial character: Prague, Brno, Plzeň, Hradec Králové, Olomouc, and others. Despite the huge decline in textile-related fields, the traditional industrial region in northern Bohemia, the Liberec region, has managed to maintain its significant position; it has been joined by the Zlín region in eastern Moravia and the centrally-located Vysočina region with their new and highly-promising fields (electrical engineering, automotive industry), which were, among others, supported by foreign capital.

Reduction and rationalization of production in industrial businesses – involving, among other things, a reduction in overemployment, the securing of external services (e.g., security, catering, etc.), and in the technological modernization of production – resulted in less intensive utilization of many traditional industrial premises and in the decisive impulse for the appearance of a large number of brownfields. With a certain level of simplification you could say that the polarity between the dynamic fields of the secondary sector and the reduced traditional fields has been reflected even in the spatial pattern. The centrally localized original industrial zones are now neglected while developing zones at the edges of cities or in suburban areas are favored (Mulíček and Olšová 2002).

Discussion and conclusion

The analysis of the long-term development of industry and current brownfield locations in the Czech Republic has demonstrated that the shaping and origination of industrial brownfields cannot be unilaterally assigned to the period of the planned socialist economy; it has to be searched for earlier, between the world wars and even in the 19th century. You can see the dynamism of industrial production growth and its subsequent reduction occurring in cyclic waves (milestones) corresponding to the individual phases of economic prosperity in both the Monarchy period and in the independent Czechoslovakia of the period between 1918 and 1938. Figure 6 (all brownfields) and 7 (industrial brownfields) show that the current existence of larger-area brownfield locations, i.e. locations with high regeneration costs and more difficulties in transferring to full-fledged new uses, is connected dominantly with three industrial regions: northeast Bohemia (Ústecký region), northeast Moravia (Ostravský region), and the region of the Brno agglomeration. All these cases are traditional industrial and heavily urbanized regions where the fast development of new zones of the greenfield type on the periphery of the cities is in strong contrast to the functional changes in these cities. We purposefully omit the capital of Prague and its specific position, which deals with the issue of brownfields conceptually differently.

As mentioned above, each of these regions has its own specifics; nevertheless, a general perception of brownfields at both the local and national levels has been demonstrated only in

recent years, often in connection with media attention. Northwest Bohemia and the Ostravský region are perceived as the "black lungs" of the country with thermal power plants burning brown coal; the vast majority of coal mining residues in an urban environment are concentrated here; the abandoned premises of metallurgical plants in the Ostrava region add to the picture (Vojvodíková 2006, Koutský et al. 2011). Brownfields in the Brno agglomeration (mostly relics of textile and machinery manufacturing) are perceived as a much smaller problem; the inhabitants do not demonstrate a fear of increased contamination and you can find dozens of successfully regenerated buildings in the city (Malachová and Kunc 2013, Kunc et al 2014b). At the same time, the policy of the Ostrava City Hall related to the brownfield issue is perceived by the local inhabitants as much more important and effective than in Brno (Kunc et al. 2014a). It is understandable that people in the Ostrava and Ústí regions naturally perceive the existence of the unused and decaying areas much more sensitively than people in Brno; here you can see the everyday reality of the negative impacts of mining and black coal processing in recent times (coal dust, ashes, etc.) still clearly visible in the cities.

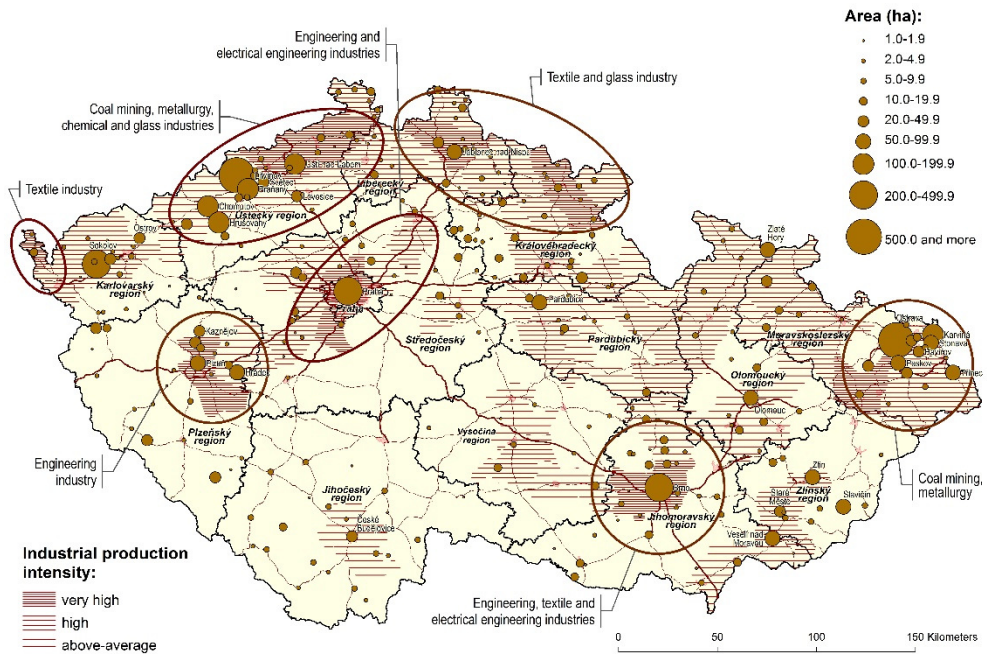

Fig 7. *The locations of industrial brownfields larger than 1 hectare (2010) grouped to the most significant industrial regions from 1930 in the Czech Republic;*
Legend:
- very high - increased concentration of industry (over 12,000 employees in industry per district; more than 150 employees in industry per 1,000 inhabitants)
- high - regions with developed industrial production (over 6,000 employees in industry per district; over 100 employees in industry per 1,000 inhabitants)
- above-average - other significant industrial regions (one of the indicators exceeds the national average; at least 2,500 industrial employees in industry per district)
- other regions - regions with poorly developed industrial production
Source: Mareš (1976, 1988), CzechInvest (2008b); own research, processed by authors.

The Czech Republic as a whole features a significant excess supply of manufacturing premises from all branches of industry. Low-quality and obsolete industrial zones prevail; industrial zones in the vicinity of city centres are the most desired but also most logistically challenging (Frantál et al. 2013). Lower attractiveness of the old industrial zones has to be attributed to the high investment costs required for their successful regeneration (tearing down, cleaning up). It has been estimated that the unit cost of creating a greenfield industrial zone is up to four times lower than a brownfield conversion in the Czech Republic (Šilhánková et al. 2006). The successful transformation of an industrial zone for some other function (possibly a non-production function) is the optimal solution but it requires compatibility between the revitalization goal and the location and state of the zone (Greenberg 2002). When taking into account the low willingness of local investors to invest in real estate (especially in the current difficult economic situation) and the low attractiveness of non-Prague locations for foreign developers, a successful resolution of the brownfield issue is a long-term matter, dependent, to a large extent, on public sector support (Kuda and Smolová 2007, Ouředníček and Temelová 2009, Ouředníček 2016).

Studies dealing with the issue of industrial brownfields (eg. Kiss 2004; Barta et al. 2006, Filip and Cocean, 2012, Krzysztofik et al. 2012, Martinát et al. 2014, Tafel-Viia 2015, Lorber et al. 2016) show that the countries of Central and Eastern Europe still face, after 25 years of transformation, the historical legacy of industrial production, which will not be easily solved. The current state of industrial brownfields has been influenced by the waves of intense building of the industrial base in the market (pre-war) economy, by the planned economy, and then by the subsequent massive deindustrialization after 1989. The Czech Republic, together with the former German Democratic Republic, was the most industrialized state in the region. In the Czech Republic, the public and the private sectors have, with varying intensity, been interested in the regeneration of industrial brownfields for approximately the last ten years (Klusáček et al. 2011, Osman et al. 2015). Therefore, the Czech Republic is about a quarter century behind, compared to the economically more developed countries of Europe and also to the US, Canada, and others. On the other hand, it is possible to learn from examples of the successful revitalization of brownfields and also the entire industrial complexes of these countries (Edwards and Llurdés 1996, Latz and Latz 1997, Kirkwood et al. 2001, Sarni 2010, Hollander et al. 2010, Hula 2010, De Sousa 2014, and many others), including an appropriate adjustment of cooperation between the public and private sectors (De Sousa 2006, Pizzol et al. 2016). Progress is still very difficult to achieve without this cooperation.

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