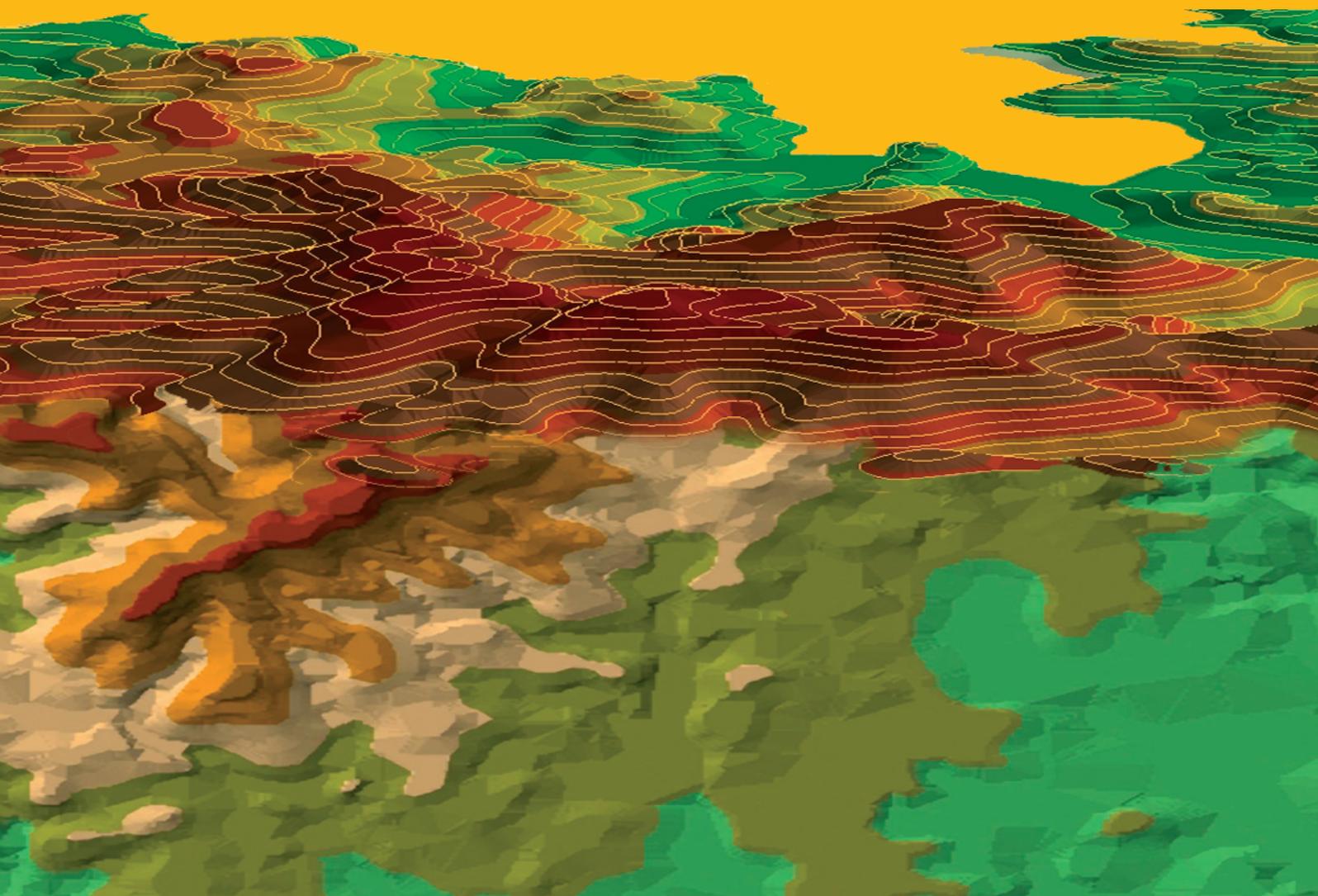


Vol. 24/2016

No. 1

MORAVIAN GEOGRAPHICAL REPORTS



MORAVIAN GEOGRAPHICAL REPORTS

SCIENTIFIC BOARD

Bryn GREER-WOOTTEN (*Editor-in Chief*),
York University, Toronto
Pavel CHROMÝ, Charles University, Prague
Marina FROLOVA, University of Granada
Jan HRADECKÝ, University of Ostrava
Karel KIRCHNER, Institute of Geonics, Brno
Sebastian LENTZ, Leibniz Institute for Regional
Geography, Leipzig
Damian MAYE, University of Gloucestershire
Ondřej MULÍČEK, Masaryk University, Brno
Jan MUNZAR, Institute of Geonics, Brno
Philip OGDEN, Queen Mary University, London
Ján OŤAHEL, Institute of Geography, Bratislava
Michael SOFER, Bar-Ilan University
Metka ŠPES, University of Ljubljana
Milan TRIZNA, Comenius University, Bratislava
Antonín VAISHAR, Institute of Geonics, Brno
Dan VAN DER HORST, University of Edinburgh
Miroslav VYSOUDIL, Palacký University, Olomouc
Maarten WOLSINK, University of Amsterdam
Jana ZAPLETALOVÁ, Institute of Geonics, Brno

EDITORIAL BOARD

Bohumil FRANTÁL (*Executive editor*), IGN CAS
Tomáš KREJČÍ (*Technical editor*), IGN CAS
Stanislav MARTINÁT (*Marketing editor*), IGN CAS
Martina Z. SVOBODOVÁ (*Linguistic Editor*), BM
Business Consultants, s.r.o., Brno

PRICE

280 CZK (*excluding VAT*) per copy plus the postage
800 CZK (*excluding VAT*) per volume (four numbers
per year) plus the postage

PUBLISHER

The Czech Academy of Sciences
Institute of Geonics, v. v. i.
Identification number: 68145535

MAILING ADDRESS

MGR, Institute of Geonics of the CAS, v. v. i.
Department of Environmental Geography
Drobného 28, 602 00 Brno, Czech Republic
(fax) 420 545 422 710
(e-mail) mgr@geonika.cz
(home page) <http://www.geonika.cz>

Brno, March 31, 2016

PRINT

NOVPRESS s.r.o., nám. Republiky 15, 614 00 Brno
© INSTITUTE OF GEONICS OF THE CAS 2016

ISSN 1210-8812 (Print)

ISSN 2199-6202 (Online)

Articles:

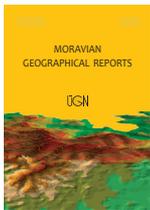
Bohumil FRANTÁL, Jiří MALÝ, Martin OUŘEDNÍČEK,
Jiří NEMESKAL
**Distance matters. Assessing socioeconomic impacts
of the Dukovany nuclear power plant in the Czech
Republic: Local perceptions and statistical evidence ... 2**

Jiří MALÝ, Ondřej MULÍČEK
**European territorial cohesion policies: Parallels to
socialist central planning? 14**

Josef KUNC, František KRIŽAN, Kristína BILKOVÁ,
Peter BARLÍK, Jaroslav MARYÁŠ
**Are there differences in the attractiveness of
shopping centres? Experiences from the Czech
and Slovak Republics 27**

Robert KRZYSZTOFIK, Maria TKOCZ, Tomasz SPÓRNA,
Iwona KANTOR-PIETRAGA
**Some dilemmas of post-industrialism in a region
of traditional industry: The case of the Katowice
conurbation, Poland 42**

Jana SPILKOVÁ
**Teenage overweight and obesity: A pilot study
of obesogenic and obesoprotective environments
in the Czech Republic 55**



Distance matters. Assessing socioeconomic impacts of the Dukovany nuclear power plant in the Czech Republic: Local perceptions and statistical evidence

Bohumil FRANTÁL^{a*}, Jiří MALÝ^a, Martin OUŘEDNÍČEK^b, Jiří NEMEŠKAL^b

Abstract

The effect of geographical distance on the extent of socioeconomic impacts of the Dukovany nuclear power plant in the Czech Republic is assessed by combining two different research approaches. First, we survey how people living in municipalities in the vicinity of the power plant perceive impacts on their personal quality of life. Second, we explore the effects of the power plant on regional development by analysing long-term statistical data about the unemployment rate, the share of workers in the energy sector and overall job opportunities in the respective municipalities. The results indicate that the power plant has had significant positive impacts on surrounding communities both as perceived by residents and as evidenced by the statistical data. The level of impacts is, however, significantly influenced by the spatial and social distances of communities and individuals from the power plant. The perception of positive impacts correlates with geographical proximity to the power plant, while the hypothetical distance where positive effects on the quality of life are no longer perceived was estimated at about 15 km. Positive effects are also more likely to be reported by highly educated, young and middle-aged and economically active persons, whose work is connected to the power plant.

Keywords: nuclear power plant impacts; spatial analysis; risk perceptions; geographical distance; social distance; Dukovany; Czech Republic

Article history: Received 21 September 2015; Accepted 15 February 2016; Published 31 March 2016

1. Introduction

Growing concerns over global climate change, energy sustainability and energy security over the last decade have led to rapid and widespread development of renewable energies. The generous feed-in tariffs for renewable energy in Germany have been so effective that Chancellor Merkel was able to announce the closure of Germany's nuclear program after the Fukushima nuclear accident (Jahn and Korolczuk, 2012). Nonetheless, renewable energy development has been uneven around the world and it still represents but a small part of total generation in most countries (Eurostat, 2015). For this reason, governments need to reconsider conventional sources, such as fossil fuels and nuclear power.

Although it has always been associated with significant social controversy, nuclear power capacity worldwide has been increasing steadily. Today there are more

than 435 nuclear reactors operating in 31 countries, with a total installed capacity of over 375 GW. In 2014, these provided 2,411 TWh, which is over 11% of the world's electricity (WNA, 2015). Some 60 new reactors are currently being constructed in 13 countries, while significant further capacity is being created by existing plant upgrading and rebuilding programs (ibid.).

The Czech Republic – with its two nuclear power plants (Dukovany and Temelín) generating over 30 TWh – is among the top fifteen world nuclear producers. The Czech population is also among the largest supporters of nuclear power usage in Europe, with about two-thirds being in favour of nuclear power development (CVVM, 2015). Nuclear power is expected by the current Czech government to become the main source of electricity production, with its share increasing from the present 35% to between 46% and 58% in 2040 (WNA, 2015). Recently a new long-term plan for the

^a Department of Environmental Geography, Institute of Geonics, The Czech Academy of Sciences, Brno, Czech Republic (*corresponding author, B. Frantál, email: frantal@geonika.cz)

^b Department of Social Geography and Regional Development, Faculty of Science, Charles University in Prague, Prague, Czech Republic

nuclear industry – involving building at least three new units by 2040 – was approved, in order to be able to decarbonise the economy and to replace the dominant role of lignite in the energy mix.

Nevertheless, increasing construction costs, high state subsidies, and uncertainties concerning future decommissioning, nuclear waste disposal and possible accidents, remain the most common arguments of opponents of nuclear power (Cooper, 2010). On the other hand, the large power-generating capacity, low pollution and relatively low operating costs are stressed by its supporters. Saying that nuclear power supports the socio-economic development of host regions has also become a popular policy turn of phrase to stimulate social acceptance. The plans for a life-time extension of old reactors and the building of a new one at the Dukovany power plant site in the Czech Republic have been strongly supported by regional authorities and the Energoregion 2020 association, which includes representatives of 126 local municipalities (Energoregion, 2020). The Dukovany power plant is promoted not only as a key contributor to national energy security but also as an important source of jobs, a basis for increasing the educational level of the population, economic stabilisation and the overall standard of living in the region.

Thus, it is a question whether political proclamations about the positive impacts of the nuclear power plant (hereinafter NPP) are in accordance with the subjective perceptions of residents of the local communities and with more objective data sources. Some studies from other countries (e.g. Yamane et al., 2011) reported that impacts of NPPs on the economic welfare and well-being of local communities have not always been positive. Such may also be the case for the second Czech NPP in Temelín, where the local community's expectations of the benefits are said to be far from fulfilled (Baroch, 2010). Pidgeon et al. (2009) pointed out that 'geography matters' in this context. In other words, NPPs can contribute economically to nearby communities, but not to others farther away who might perceive themselves to be at risk.

To address this complex issue and the role of geographic space in this respect (i.e. to assess how much the positive and/or negative impacts of nuclear power plants are spatially differentiated), we elaborate two different approaches to research on the impacts of the Dukovany NPP. First, we explore how people living in municipalities in the hinterland of the power plant subjectively perceive the impacts on their personal quality of life and the development of their communities. Second, we assess the impacts of the nuclear power plant on regional development by analysing long-term statistical data about some selected socio-economic characteristics of the municipalities. The results of these two approaches are compared in the final discussion section of the paper.

2. Theoretical background

The theoretical background is provided by a review of the relevant literature, structured around the three main aspects of nuclear energy development which have been reflected in social science and particularly human geographical research. The first aspect is general public attitudes towards nuclear energy and the social acceptance of planned NPPs; the second is the socioeconomic effects of existing power plants on host regions; and the third is the perception of positive and negative impacts of power plants by residents of local communities. While the literature dealing with the first

aspect is vast and comprehensive, that relating to the more objective socioeconomic impacts of operational power plants, as well as perceptions of such impacts, is much more limited, including a few case studies, the majority of them from the United States and the United Kingdom.

2.1 Risk perceptions and public attitudes to nuclear power plants

The rapid rise of nuclear technologies in the 1960s revealed a marked discrepancy between the enthusiasm for a new, powerful, clean and safe energy source documented by scientific experts, and the fears of immediate disasters and unknown long-term health and environmental effects on the part of the general public. This discrepancy lay behind the boom in social science research on risk perceptions (Starr, 1969; Slovic et al., 1979; Fischhoff et al., 1983). Psychometric research (Fischhoff et al., 1978; Slovic, 1987) revealed that ordinary people perceive, evaluate and accept hazardous technologies and activities less on the statistical probability of the realisation of risks, than on the basis of qualitative attributes of these risks, such as novelty or familiarity, controllability, predictability, immediacy, etc.

The qualitative aspects of risks play a crucial role in public perceptions of nuclear energy, and reactions such as fear and anxiety seem to be the major determinants of attitudes to the building of NPPs (Van der Pligt, 1985; Van der Pligt et al., 1986). It has been shown that there are differences in the perception of risks according to gender, age, education and ethnicity, as well as according to cultural contexts (Dake, 1992; Flynn et al., 1994). Later studies criticising simple psychometric or cultural theory models of risk perception emphasised that risk perception is a much more complex, multidimensional and socially amplified phenomenon (Goodfellow et al., 2011).

Differences in the perception of risks, however, do not embrace all of the relevant aspects of public acceptance of nuclear energy. Public attitudes can be motivated by different goals, including the overall evaluation of costs and benefits, moral dispositions, and subjective feelings related to the nuclear technology (Visschers et al., 2011); they are dependent on socioeconomic status, education and knowledge of energy matters (Bazile, 2012; Pampel, 2011). For example, a survey of more than 3,000 US residents (Greenberg and Truelove, 2001) found that the pro-nuclear group was disproportionately composed of affluent, educated white males, while the pro-coal group included more relatively poor, less educated African-American and Latino females. Apart from the perception of the technology, acceptance is significantly affected by the way that the technology is implemented (Venables et al., 2012), and how the costs and benefits of power plants are distributed: i.e. the factors of procedural fairness, distributional fairness and trust in the available information and the intentions of policymakers and companies (Visschers et al., 2011; Visschers and Siegrist, 2012).

2.2 Socioeconomic impacts of nuclear power plants on host localities

The NPPs have a range of socioeconomic implications for their host localities: some direct through local employment in the development; others more indirect, resulting from the filtering of income and expenditures through and into the local community (see, e.g. McGuire, 1983; Bezdek and Wendling, 2006). It is necessary to distinguish between the effects associated with the construction stage and

those with the operational stage. Most authors highlighted the significance of those longitudinal effects of plants on their host regions, while the local economic impact of the construction phase has been considered minor due to a dispersed commuting pattern by construction workers (Peelle, 1976). Moreover, the construction stage is prone to various negative effects for local communities, such as traffic growth, disturbance of the local accommodation markets caused by an influx of in-migrants, and increase in levels of crime and other behavioural problems (Glasson, 2005).

The effects on employment and tax revenues have been mentioned among the most relevant long-term benefits of nuclear power plants (Isard et al., 1976; Johnson and Bennett, 1979; McGuire, 1983). The second-order consequences of the direct economic impact may include changes in community land use policies, an increase in the salience of growth issues, and alteration of both inter- and intra-community relationships (Peelle, 1976). On the other hand, negative effects of the power plants on the attractiveness of the locality and residential property values, a potential outflow of population and a decline of local tourism and second-home development, are the most frequently discussed.

Many prejudices, myths and unfounded fears have spread around the siting of either nuclear power plants or nuclear waste storage sites. In this context, Metz (1994) stressed that there are several paradoxes or contradictions between the responses expressed in surveys and recorded economic and demographic behaviours evidenced in the marketplace. Policymakers then need to evaluate whether the request for a change in siting policy is based on subjective fear of a potential negative economic effect, or on proven negative effects.

While studies of the negative externalities of coal-fired power plants (e.g. Davis, 2011) found that neighbourhoods of power plants experienced significant decreases in property values and rents, no similar correlation has so far been detected for nuclear power plants either in the US or Europe (Gamble and Downing, 1982; Clark et al., 1997; Horská et al., 1996). A recent study from Japan (Yamane et al., 2011) reported that the neighbourhoods are negatively evaluated by their residents (reporting that their economic welfare is worsened by living near the plants) in the case of some NPPs, whereas there are no evaluations or even positive ones at other different locations. Meta-analysis detected that these differences are affected by contextual and social factors, such as how long the plant has been in operation, past accidents, population density, changes in employment and industrial structure, financial conditions and changes in social infrastructures in the areas. In summary, this study showed that the construction and operation of hazardous energy facilities do not necessarily lower the local residents' welfare, and that a potential decline can be mitigated if the host community receives enough of the benefits that it had expected in return for accepting the plants.

2.3 Public perceptions of impacts: the effect of distance(s)

Perceptions of and attitudes to nuclear power plants have been shown to be not static, but dynamic and spatially-shaped phenomena. Common themes of research on energy facility siting have been to investigate the effects of the so-called 'NIMBY syndrome' and the 'proximity hypothesis', which assumed that those living nearer to energy facilities are likely to have more negative attitudes in comparison to those living further away (see, e.g. Boholm and Löfsted, 2004; Van

der Horst, 2007). Dear (1992: 291) suggested that "the closer residents are to an unwanted facility, the more likely they are to oppose it". Many studies (e.g. Maderthaler et al., 1978; Eiser et al., 1995; Greenberg, 2009a, 2009b; Frantál, 2005) reported the opposite - that people living close to existing power plants perceive them more positively and are likely to accept them more, than people living farther away. The proximity hypothesis, however, has not been definitively falsified, and it is even supported by some recent research on the local acceptance of renewable energy projects (Jones and Eiser, 2010; Swofford and Slattery, 2010).

Warren et al. (2005) reported a strong positive effect of distance on the dislike for proposed wind power plants, and a much weaker negative effect of distance on the dislike of existing wind power plants. It is evident that the time-space dynamics of local opposition are complex phenomena and that the role of geographical proximity differs largely with respect to the type of technology and the stage of development, as well as to specific local contexts. In addition, 'distance' itself must be qualified. In this sense, Devine-Wright (2005) in the context of perception and acceptance of wind power plants, indicates that 'social distance' (the effect of social influence and social networks on the formation of opinions) can be a more important factor than geographical proximity. In social science generally, social distance has been used to measure the degree of closeness or remoteness people feel toward other groups. Extensively used today in studies of ethnic, class, gender, status and many other kinds of social relations, social distance is most often measured following the Bogardus 'Social Distance Scale', or some modification of it (Ethington, 1997). In the context of this study, we use the term 'social distance' to indicate the (socioeconomic) relationship of people to the NPP: i.e. a measure based on the degree of familiarity and interactions with the NPP, and their ability to participate in the economic benefits generated by the power plant. We expect that people working in plant itself will be, in this sense, socially closest to it - no matter how physically close or far from it they live.

The attitudes of residents of local communities to NPPs usually develop from very critical during the planning and construction phase to more tolerant or even positive after a certain time of operation. The acceptance of existing NPPs, which is constructed through the processes of familiarisation and normalisation of risks as a part of everyday life, co-exists here with a more complex set of contradictions (risk, threat and anxiety as a part of everyday life) (Parkhill et al., 2010). The experience of having lived near a NPP affects not only public perceptions of the various potential costs and (especially economic) benefits, but also the importance people attach to the various consequences (Van der Pligt et al., 1986).

In contrast to the familiarisation of risks and adaptation to a new local identity, attitudes towards a specific project or technology can deteriorate due to some external factors (e.g. the effect of nuclear accidents such as those in Chernobyl and Fukushima - see, e.g. Eiser et al., 1989; Lindell and Perry, 1990; Siegrist and Visschers, 2013; Siegrist et al., 2014), or because the expectations of local communities concerning the scale of costs and benefits have not been met. It has been suggested that, in the case of rebuilding and re-powering older NPPs, the local residents' own personal experiences, perceived benefits and outcome fairness are some key determinants of acceptance of the decision, while procedural fairness and trust have only a limited impact (e.g. Visschers and Siegrist, 2012).

In this sense, greater attention should be paid to research on the ex-post perceptions of the outcomes of existing power plants and the 'asymmetries of impact' (Walker et al., 2014). The primary objective of this study is to assess the effect of geographical distance on the intensity of socioeconomic impacts of nuclear power plants on surrounding communities. In this sense, we intend to support or falsify the proximity and NIMBY theories in the context of nuclear energy development. The methodological contribution of this paper to current knowledge is represented by our two approaches: (i) we apply an integrative research approach which confronts subjective and objective dimensions of the issue (assessing socioeconomic impacts as perceived by residents of local communities, as well as that evidenced by official statistical data); and (ii) in addition to assessing the influence of geographic distance on public perceptions, we identify and evaluate the socio-demographic factors that determine the 'social distance' of people from the nuclear power plant.

3. Research methodology

3.1 Area under study

The Dukovany NPP is located near the municipality of Dukovany, situated on the border of the Vysočina and the South Moravian regions. The power plant consists of four pressurised-water reactors, each of which has a heat capacity

of 1,375 MW and an electric capacity of 510 MW. The first reactor unit was put into operation in 1985 and the last one in 1987. The average annual production of electrical energy approaches a value of more than 13 TWh, which represents about 20% of the total consumption of electricity in the Czech Republic. The NPP is owned and operated by the ČEZ Group: the largest utility as well as the largest public company in Central and Eastern Europe.

For the purposes of this research, we divided neighbouring municipalities into three categories, set up on the basis of zones within a radius of 5, 10 and 20 km from the power plant (see Fig. 1). These zones delimit the area that is affected by the activities of the NPP (including plans for a possible nuclear accident), and also includes municipalities with direct financial support from the ČEZ company. The zones are officially established in the 'External Emergency Plan' (EEP), which is the basic document addressing measures to protect the population, the environment and properties in the event of a nuclear accident. The 'Zone of Emergency Planning' (ZEP) includes some 138 municipalities with a total population of nearly 100,000 (see Tab. 1).

This delimitation of zones has also been used by the ČEZ company for the purpose of allocation of financial support to surrounding communities. Financial support (in the form of financial donations, support for development projects or various sponsorship activities) has been directed primarily to

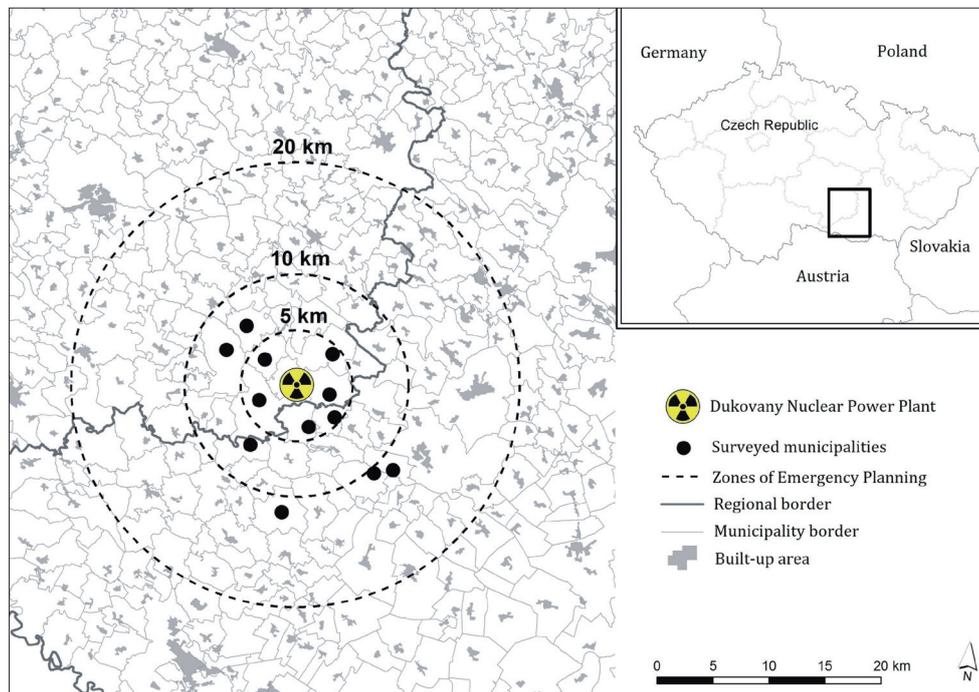


Fig. 1: Area under study

Zone	Number of municipalities	Population	Economically active population (EAP)	Commuters to work to Dukovany municipality	
				Number	% of EAP
Zone I	6	4,199	1,644	117	7.1
Zone II	29	8,972	3,395	149	4.4
Zone III	103	83,145	32,333	314	1.0
Total	138	96,316	37,372	580	1.6

Tab. 1: Basic characteristics of the area under study

Source: Population Census 2011 (CZSO, 2011); authors' calculations

municipalities within the ZEP, although there are exceptions such as support for the cities of Třebíč and Brno, which are important for the life of the inhabitants of the ZEP (providing health and social services, education, etc.).

Municipalities located in the inner emergency zone have obtained, relatively, the highest levels of financial support through donations from specific contracts. The so-called “Agreement on good neighbourhood” between the ČEZ and the six closest municipalities includes clauses on mutual information about activities and plans of the company and communities, mutual assistance in solving some problems, the pursuit of long-term regional development, and improvement of living conditions and civic amenities (according to Šilhán, 2011, p. 19). Based on this agreement, ČEZ provided municipalities with annual financial donations. The municipalities reciprocated in providing ČEZ advertising, sought to educate residents about the power plant’s safety and environmental impacts, and they undertook to provide no support for protest actions against the company (ibid.).

Moreover, Dukovany and Rouchovany municipalities benefit from the fact that the NPP is located in their cadastral areas. As such, their incomes are significantly increased by property taxes, which account for more than 10 million CZK (appr. 370,000 EUR) annually. Rouchovany also benefits from the fact that the short-term storage of spent nuclear fuel is located in its cadastral area (the annual contribution is about 3 million CZK (appr. 110,000 EUR)). It can then be hypothesised that the most visible positive economic impact of the NPP on local development, as well as the most positive perception of the power plant, should be in such communities located within the inner emergency zone, and particularly in the municipalities of Dukovany and Rouchovany.

3.2 Methods and data

During December 2013 and January 2014, we carried out a standardised questionnaire survey of residents in local communities living in the vicinity of the power plant, to explore how they perceive the impacts of the power plant on

their personal quality of life and the development of their communities. Given these data, we were able to evaluate the extent to which these perceptions were spatially and socially differentiated. The questionnaires were completed via on-site interviews (in peoples’ homes or on the street) by trained interviewers. Potential respondents were selected by quota sampling procedures, with respect to their basic demographic characteristics in order to represent the population of the region. The sample involved a total of 582 respondents, including 294 people living in the six municipalities in Zone I, 196 people living in the three selected municipalities in Zone II, and 92 people living in the three selected municipalities in Zone III. The basic characteristics of respondents are summarised in Tab. 2: the sample approximates the target population quite well.

Some distortion of the results, particularly as concerns the spatial differentiation of perception of impacts in municipalities in the third zone and the estimation of “zero effect distance” (a hypothetical distance where positive effects on the personal quality of life are no longer perceived), may be present as a consequence of the small sample of municipalities, as well as the location of all surveyed municipalities at a maximal distance of 14 km from the power plant. Nevertheless, this study was not aimed primarily at the estimation of absolute numbers but rather at exploring specific relative numbers and relationships, particularly differences between the municipalities in the first zone (with the highest direct economic profits) and other zones, and differences with respect to the socio-demographic characteristics of residents.

Following the survey of perceived impacts, we assessed the regional impacts of the NPP by analysing long-term official statistical data indicative of selected socioeconomic characteristics of the municipalities in the vicinity of power plant and in the wider region. In this paper, we focus specifically on the two key indicators that are most often mentioned in connection with the positive effects of nuclear power plants – job opportunities and the unemployment rate. These indicators represent important measures of economic advancement in the region and municipalities. For

Indicator	Category	Share [%]
		in Sample (in Target Population)*
Gender	Male	49 (50)
	Female	51 (50)
Age (years)	less than 20	10 (20)
	20-29	14 (13)
	30-39	18 (15)
	40-49	15 (14)
	50-59	18 (13)
	60-69	15 (13)
	70 and more	10 (12)
Education	Basic	16 (19)
	Secondary without GCE	36 (37)
	Secondary with GCE	36 (31)
	Tertiary	12 (10)
Work in plant	Yes	16 (n/a)
	No	84 (n/a)

Tab. 2: Basic characteristics of the survey sample (NOTE: * Share (%) in the population of Vysočina Region (virtually equivalent to South Moravia Region). Sources: authors’ survey and Population Census 2011

our analyses, we used data from the last three Population Censuses (Czech Statistical Office, 2011) and data on registered unemployment in the years 2000–2011 provided by the Ministry of Labour and Social Affairs (MPSV, 2012).

4. Results

4.1 General perception of the nuclear power plant

For purposes of comparison (Fig. 2), we used a single question concerning general perceptions of the Dukovany NPP (“What are your feelings when you see the cooling towers of the nuclear power plant?”), with the same terms employed in a previous study of the perceptions of the Temelín NPP (Těšitel et al., 2005, 2008). Dukovany – an older power plant in comparison with Temelín – is perceived and assessed by the majority of our respondents cognitively (as a ‘reasonable solution’ and a ‘technological achievement’), rather than emotionally (as a ‘necessary evil’, an object of ‘discomposure’ or ‘immediate danger’). Although this literal question was not applied in the earlier surveys in Dukovany (Horská et al., 1996, Vaishar, 1999), it can be inferred that the perception of Dukovany has improved with the length of residents’ cohabitation with the power plant, and that the fear of immediate danger was more common during the construction and in the first years of operation.

The levels of ‘discomposure’ or ‘fear of immediate danger’ increase with zonal distance from the power plant from the more recent Dukovany study (see Tab. 3). The more positive perception of the power plant by people living closer to it

is probably influenced by the effect of habituation, everyday direct contact with the power plant and the familiarisation of risks (risk has become a part of our everyday reality), and also by the more significant economic impacts on communities in close proximity to the power plant. The level of fear of danger is also significantly affected by knowledge and personal experience, i.e. more highly educated people and people who work in the power plant are less likely to feel threatened by such risks.

4.2 Perception of impacts on people’s quality of life

The results from our survey concerning perceptions of the impacts of the NPP on particular ‘spheres’ of the quality of life, as defined by indicators of subjective well-being (Massam, 2002, cit. in Těšitel et al., 2008), are presented in Table 4. We used a similar list of items (i.e. individual ‘spheres’ of the quality of life) as that used in the previous research by Těšitel and colleagues (2005, 2008), for a possible comparison of our results with those from the Temelín NPP. From Table 4, it can be seen that only a negligible minority of respondents perceive negative impacts of the Dukovany NPP on their personal well-being. Most residents perceive positive impacts (particularly with respect to the development and image of the communities in which they live, access to public services, and their working activities), or no effects on their personal lives (particularly as regards their life values, relationships, and mental and physical health). These results are clearly more positive compared to the case of the Temelín NPP, where the average assessment

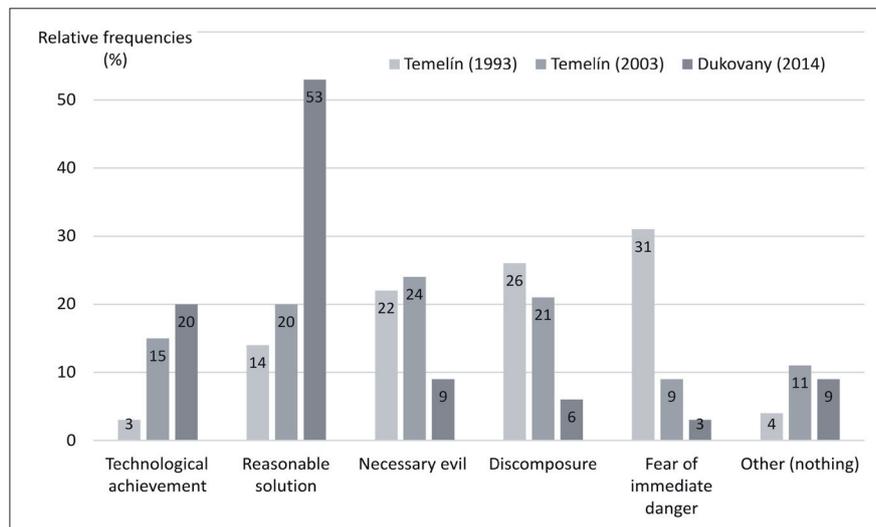


Fig. 2: Perceptions of nuclear power plants in Temelín (1993 and 2003) and Dukovany (2014)
Sources: Těšitel et al. (2005) and authors’ survey

Indicator	Category	Share of respondents (%) who feel the ‘fear of danger’ or ‘discomposure’
Zone	Zone I	6.1
	Zone II	6.6
	Zone III	20.7
Work in power plant	Yes	0.0
	No	10.2
Education	Basic	12.0
	Secondary	8.0
	Tertiary	3.2

Tab. 3: Spatial and social differentiation of risk perceptions. Source: authors’ survey

Aspect of personal life	Perceived impact [%]			Mean	Variance
	Positive	Neither	Negative		
Community in which I live	56	41	3	0.54	0.30
Access to services	39	60	1	0.38	0.26
Working activities	31	66	3	0.29	0.26
Leisure activities	15	84	1	0.14	0.14
Life values	10	88	2	0.07	0.12
Relationships	10	84	6	0.05	0.16
Mental health	6	90	4	0.02	0.10
Physical health	6	90	5	0.01	0.10

Tab. 4: Perceived impact of the Dukovany nuclear power plant on 'spheres' of the quality of life. Note: The impact was assessed on a three-point scale: positive impact (+ 1), no impact (0), and negative impact (− 1). Individual aspects are ordered according to descending mean values. Source: authors' survey

of most spheres (except the access to services and everyday activities) were in a 'negative territory' (ranging from − 0.1 to − 0.4 in case of mental health).

We can assume that, as in the case of the general perceptions of the power plant (see Fig. 2), even in the case of their impact on the quality of life, the perceptions of Dukovany residents are more positive than perceptions of Temelín – presumably because of a longer co-existence of people with the power plant, inducing subsided fears, as well as the positive economic impacts on local development. We found significant differences between zones and municipalities within zones, which are related to the perception of impacts on the communities in which respondents live ($F = 40.86$; $p < 0.001$), access to services ($F = 14.56$; $p < 0.001$), and working activities ($F = 18.84$; $p < 0.001$). The highest percentage of people who perceive positive impacts in these matters is in the municipalities of Dukovany and Rouchovany (see Tab. 5). The spatial demarcation of emergency zones is also reflected in the proportion of people who work for the power plant – the largest share of workers was reported in the Dukovany municipality (every fourth respondent from this municipality worked in the NPP).

4.3 The effect of spatial and social distance on perceived impacts

For purposes of a more detailed analysis, we calculated the overall "index of impact" of the power plant, as a sum of the evaluation scores for all eight aspects of the quality of life. The sum of the eight items resulted in a satisfactory measure of reliability (Cronbach's alpha = 0.68); hence, they were summed to create the overall index. The value of this index can hypothetically range from − 8 to + 8. For two thirds (67%) of respondents the value of this index is positive, for 27% the value is zero, and for only 7% is the

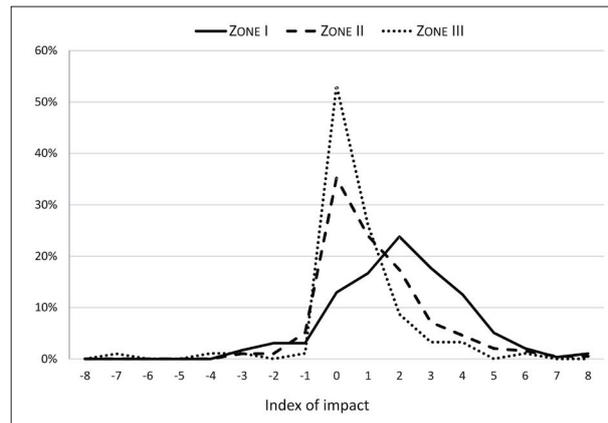


Fig. 3. Distribution of values of the 'index of impact' by emergency zones. Source: authors' survey

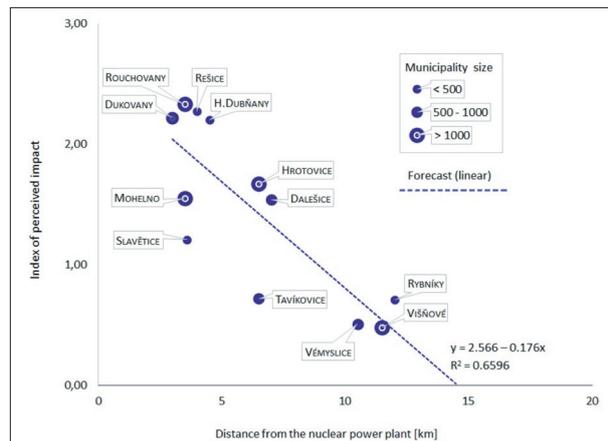


Fig. 4: The relationship between distance of municipality from the power plant and perceived impact Source: authors' survey

Spheres of the quality of life	Share (%) of perception of positive impact				
	Zone I	Zone II	Zone III	Dukovany	Rouchovany
Community in which I live	75	41	29	88	80
Access to services	50	31	24	60	48
Working activities	41	27	11	40	44
Share (%) of people working in NPP	20	15	3	27	16

Tab. 5: Spatial differences in perceived positive impacts Note: Spheres with the largest variance in perceived impact are included. Source: authors' survey

value negative. The distribution of values of the index according to emergency zones is presented in Figure 3. We found that the mean value of the impact varies significantly depending on the emergency zone. While the average index value for municipalities in the first zone is over 2, it is only 1.15 in the second zone and 0.57 in the third zone. The mean value of the index for the whole sample is 1.45.

In addition to the variation by zone, the mean values of the index for specific municipalities (i.e. mean values of resident responses) strongly correlate with the specified geographical distance from the power plant (see Fig. 4).

Based on this linear regression analysis, a hypothetical boundary where the index of impact approaches zero is at a distance of about 15 km from the power plant. We note that such a spatially-determined distance from the power plant is not the only, and perhaps not even the main determinant, influencing perceptions of its impact. In this sample, nonetheless, the factor of spatial distance explains 66% of variations in the index of impact. We have also tested whether there is a relationship between the index of impact for municipalities and their size (population), the rate of unemployment, and the sum of donations gained over the period 2008–2011 from the ČEZ company (using data provided by Šilhán, 2011). No correlation was found for the first two variables, but a significant correlation ($r = 0.30$; $p < 0.001$) was found in the case of donations. These results are obviously affected by the small sample of municipalities, and they must then be interpreted with caution.

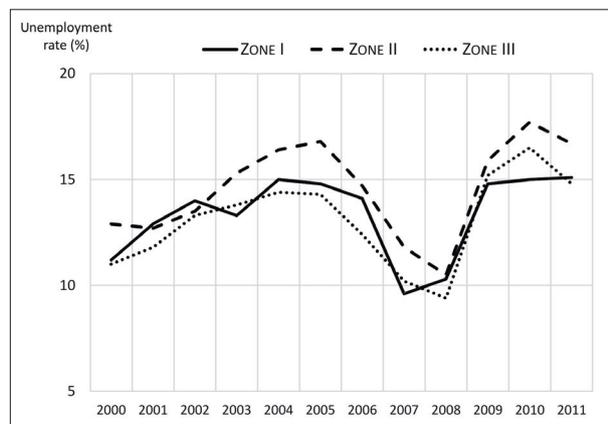


Fig. 5: Development of the unemployment rate within the three emergency zones

Source: MPSV (2012), authors' calculations

Devine-Wright (2005) has emphasized that the 'social distance' and the 'location of interest' are usually more important factors affecting public perceptions and attitudes to energy facilities than mere physical proximity. Indeed, we found that in addition to the spatial differences in the perception of positive impacts, there were significant differences according to age, education and occupation (see Tab. 6). Highly educated, young (up to 30 years) and middle-aged (30–49 years) economically active people, were more likely to report perceived positive impacts on their personal well-being. Working for the power plant also proved to be a very significant factor affecting perception of positive impacts. The value of the impact index reported by males (1.62) is higher than the value reported by females (1.36), but this difference is not statistically significant.

4.4 Regional economic impacts of the nuclear power plant

Large parts of the broader region encompassing the Dukovany NPP (particularly the districts located in the western part of the study area, such as Znojmo and Třebíč) have been among those regions most affected by unemployment in the Czech Republic since the 1990s. Moreover, the wider region has to cope with many other economic and social problems which are characteristic of peripheral areas in the Czech Republic.

With respect to the role of the Dukovany NPP as an important regional employer, we can identify three relatively compact areas with differing rates and long-term development of unemployment. The first area covers the eastern part of the region, i.e. the regional capital of Brno and its hinterland, which is characterized by very low rates of unemployment. Although most of the area surrounding the Dukovany NPP is located in the so-called 'inner periphery' (Musil and Müller, 2008), it has a significantly lower average unemployment rate. In addition, the average unemployment rate of the wider commuting region of the NPP is slightly lower than the national average. We can argue that this area represents a specific region in the settlement system of the Czech Republic, given the effects of the NPP. In a regional context, the Dukovany NPP can be considered as an important centre comparable to secondary centres of the region (such as the cities of Znojmo, Třebíč, Velké Meziříčí or Jemnice). Further, the municipalities located beyond the regional reach of Brno city and the Dukovany NPP show some of the highest unemployment rates, not only within this region but also in the Czech Republic as a whole (cf. Ouředníček and Nemeškal, 2015).

Independent variables		Index of impact* (Mean)	F	Sig.
Work in/for power plant	Yes	3.07	87.096	0.0001
	No	1.20		
Education	Basic	1.51	7.800	0.0001
	Secondary without GCE	1.20		
	Secondary with GCE	1.47		
	Tertiary	2.50		
Age (years)	less than 30	1.52	2.349	0.0300
	30–49	1.85		
	50–59	1.14		
	60 and more	1.28		

Tab. 6: Social differentiation of perceptions of positive impacts (* Index of impact is a sum of evaluation scores for all eight aspects (values can range from - 8 to + 8); ** Result of the ANOVA, F-values and probability levels)

Source: authors' survey

Jobs in the power plant, the activities connected to its operation, the level of salaries and the employment structure both in the power plant itself and in companies in its supply chain operating in the region, have had a significant effect on the economic level of the wider region. An important role is played by the presence of people with higher economic and social capital and higher purchasing power. The construction of the NPP (in 1974–1987) significantly contributed to the increase of job opportunities in the study area (see Tab. 7). According to Svoboda and Hána (2015), the robust increase in job opportunities in the energy development sector was connected with a significant population increase in municipalities which became new homes for immigrant workers. This is particularly evident in the city of Třebíč, where new housing estates were constructed specifically to house the NPP employees.

Evaluation of the development of unemployment in the period 2000–2011 shows that when there is a nationwide trend of increasing unemployment, the growth of the unemployment rate in the inner periphery is higher than in other parts of the region. Comparison of the development of unemployment rates according to emergency planning zones (see Fig. 5) showed that long-term unemployment is highest within the municipalities of the second zone, which forms a kind of inner periphery within the NPP commuting region. The positive impact of the NPP on employment is also evident from the number of commuters to the Dukovany municipality (see Tab. 1). The number of commuters to Dukovany decreases significantly with distance from the power plant. The average rate of unemployment in municipalities of the third zone proved to be even lower than in the first zone, due to the effect of the suburban growth of Brno and several larger cities that impinge on the third emergency zone. The observed differences in the average unemployment rate for emergency zones, however, proved to be statistically insignificant (except for the years 2005 and 2006).

5. Discussion and conclusions

The results of this study indicate that the Dukovany nuclear power plant has had important positive impacts on its surrounding communities and the broader region, both as perceived by local residents and as evidenced by statistical data. These impacts are, however, significantly spatially and socially differentiated. In other words, the level of positive impacts is influenced by both the geographical distance from the power plant and the ‘social distance’, which is linked to the occupation and socioeconomic status of individuals. In addition, we can also infer a positive effect of

‘time distance’ (or the years of co-existence with the power plant) on perceptions. Somewhat ‘circumstantial’ evidence for this argument is seen in that the Dukovany NPP has been perceived both generally (as an object in the landscape) and specifically (in terms of impacts on partial aspects of the quality of life), more positively than the second and more recent Czech NPP in Temelín (cf. Těšitel et al., 2005, 2008).

Generally, local residents are more likely to perceive and report positive impacts of the Dukovany NPP at the community level than at the personal level. The power plant has positively affected the image and development of its neighbouring communities, the regional labour market and public access to services, while minor or negligible impact was perceived with respect to residents’ physical and mental health, their life values and relationships. Perceptions of positive impacts are correlated significantly with proximity to the power plant, and positive effects are also more likely to be reported by highly educated, young and middle-aged, economically active respondents whose work is connected to the power plant. In this sense, we can also infer the effects of the “social distance” of people from the power plant.

Our research results are in accordance with an earlier study on perceptions of the Dukovany power plant carried out in the early 1990s (Horská et al., 1996). People living in municipalities situated in the vicinity of the power plant tend to have positive attitudes as they see the economic benefits for their communities, while people from remote communities are more preoccupied with potential security risks and negative consequences, such as visual disruption of the landscape or the decline of property prices. Warren et al. (2005: 866) defined this reverse proximity effect as an “inverse NIMBY syndrome”, whereby those with power plants in their backyard area tend to be more supportive of the technology. This kind of acceptance of energy facilities for economic benefits is sometimes also called “Yes In My Backyard” (YIMBY).

The positive impacts on partial aspects of the quality of life are significantly more likely to be perceived by residents living in municipalities of the first emergency zone (up to 5 km from the power plant). In more remote municipalities, the positive effects of the NPP are less pronounced, and respondents tended to report neither positive nor negative impacts. The hypothetical distance where positive effects on the quality of life are no longer perceived was estimated by linear regression at about 15 km. Our results, however, could be strongly affected by the small sample of municipalities located in the second and the third emergency zones, and they must accordingly be interpreted with caution.

Zone	Number of jobs per economically active population			Employment in the energy sector (2011)	
	1991	2001	2011	Number	Share (%)
Zone I	0.60	1.92	1.24	128	7.12
Zone II	0.51	0.55	0.67	134	4.23
Zone III	0.53	0.49	0.56	574	0.02
Wider commuting region	0.58	0.50	0.56	368	2.46
Czech Republic	0.97	0.91	0.90	32,390	1.02

Tab. 7: Number of jobs per economically active population and employment in the energy sector according to emergency planning zones. Note: The wider commuting region includes the three zones of emergency planning plus 32 other municipalities belonging to the region on the basis of intensive commuting to work

Source: Population Censuses 1991, 2001, 2011 (CZSO, 2011).

Similar to our current results, Horská et al. (1996) found that inhabitants of municipalities mentioning positive impacts of the power plant considered the effects on the regional labour market, on the development of the civic and technical infrastructure of municipalities and the overall quality-of-life standard, as the most important aspects. While distance is still significant, our results (compared to Horská et al.) differ as concerns the overall perception of risks: almost 60% of respondents felt threatened by the power plant ten years after its commissioning at that time (mid-1990s), but nearly twenty years later such feelings have rapidly decreased. The positive effects of time, knowledge and proximity, on public attitudes towards nuclear power plants have also been reported from other countries, such as the UK, USA or France (Eiser et al., 1995; Greenberg, 2009b; Venables et al., 2009).

The concept of “familiarisation of risks” (Parkhill et al., 2010) can be used to support the survey results. The effect of familiarisation is expressed by feelings of risks and unrest that decrease with declining distance from the power plant. As Parkhill et al. (2010) pointed out, such familiarity was engendered through ‘growing up’ with the power plant (it was something that had always been there and had been part of peoples’ everyday lives), and through perception of the power plant as a symbol of home. In addition, familiarity was also reinforced through social networks (the experience of working at the power plant; a worker as a family member or friend). In our study this is reflected in the fact that if a respondent works in the power plant, the perception of it is almost solely positive (this relationship could be termed a strong link of ‘social proximity’). This is also closely connected to a higher degree of technical education and knowledge about issues concerning nuclear energy development or any other practices in related industries.

Nevertheless, Venables et al. (2009) stressed that local communities’ dependency on the nuclear industry in providing jobs, economic benefits and sponsorship activities, is not the only reason why some people express positive attitudes towards nuclear power plants. According to Bisconti Research (2013), a majority of people associate nuclear energy primarily with reliable electricity, efficiency, clean air, energy security, job creation and affordable electricity. The contribution of nuclear power to increasing national energy security and its role as a kind of ‘clean energy’ in mitigating global climate change, was included among the top-rated pro-arguments of nuclear power plants (in general) by a majority of respondents, and this is also seen in the case of this study of Dukovany. The fact that nuclear power plants create job opportunities and retain employment in host regions, is considered their key contribution.

Furthermore, the dominant economic role of NPPs, which may substantively bring significant benefits to local communities, such as jobs, property tax revenues, sponsorship for local activities or a range of other economic multipliers, have, however, often led to something Wynne et al. (2007) call a ‘dependency syndrome’ for much of the surrounding population. This is probably also the case of the Dukovany NPP, as evidenced by the intense endeavours of local communities in the region to support the renovation of the power plant or even completion of other blocks of the facility. In this context, the extent to which any specific NPP has generated economic benefits for its host region throughout its operational stage and how far these benefits will be reversed on its closure, has to be seriously considered by experts and policy-makers (Lewis, 1986; Tomaney et al., 1999).

The region in which the Dukovany power plant is located can be designated as an area with a predominantly rural peripheral character, which has to cope with many socioeconomic problems, such as a high unemployment rate and few job opportunities (Feřtřová, 2011). Despite these problems, the municipality of Dukovany still maintains the status of an important centre of commuting for work, which distinctly exceeds the importance of municipalities of a similar population size. The Dukovany nuclear power plant is an important employer, which mitigates potential problems of the region by providing job opportunities for a significant proportion of the local population (both directly in the power plant and in its supply chain, across a wider region). In the case of the closure of the power plant and the related reduction of job opportunities, it would be reasonable to expect a significant rise in unemployment and a considerable deepening of the socioeconomic problems of this region.

Acknowledgements

The research presented in this paper was carried out within the sustainability of the project “Energy landscapes: innovation, development and internationalization of research (No. ESF OP CZ.1.07/2.3.00/20.0025), the long-term institutional support from the Institute of Geonics (RVO: 68145535), and the project TD020354 “Scenarios of future development of the Dukovany nuclear power station’s microregion using a Territorial Impact Assessment approach”, supported by the OMEGA Programme of the Technology Agency of the Czech Republic. The authors express their sincere gratitude to these supporting agencies.

References:

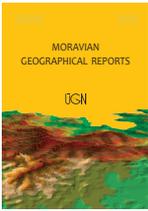
- BAROCH, P. (2010): Obec Temelín nevzkrvává. I když ČEZ vydělává miliardy [online]. [cit. 10.10.2015] Available at: <http://zpravy.aktualne.cz/domaci/obec-temelin-nevzkrvava-i-kdyz-cez-vydela-miliardy/r~i:article:663436/>
- BAZILE, F. (2012): Social impacts and public perception of nuclear power. In: Alonso, A. [ed.]: Infrastructure and Methodologies for the Justification of Nuclear Power Programmes. A Volume in Woodhead Publishing Series in Energy, 549–566.
- BEZDEK, R. H., WENDLING, R. M. (2006): The impacts of nuclear facilities on property values and other factors in the surrounding communities. *International Journal of Nuclear Governance, Economy and Ecology*, 1(1): 122–144.
- BISCONTI RESEARCH (2013): Favorability Toward Nuclear Energy Stronger Among Plant Neighbors Than General Public [online]. [cit. 10.10.2015] Available at: <http://www.nei.org/CorporateSite/media/filefolder/Backgrounders/Reports-Studies/MEMO-Plant-Neighbors-070113.pdf>
- BOHOLM, A., LÖFSTED, R. [eds.] (2004): Facility sitting: Risk, Power and Identity in Land Use Planning. London: Earthscan.
- BRODY, C. J. (1984): Differences by sex in support for nuclear power. *Social Forces*, 63(1): 209–228.
- CLARK, D. E., MICHELBRINK, L., ALLISON, T., METZ, W. C. (1997): Nuclear power plants and residential housing prices. *Growth and Change*, 28(4): 496–519.
- COOPER, M. (2010): Policy challenges of nuclear reactor construction: Cost escalation and crowding out alternatives [online]. [cit. 10.10.2015] Available at: http://www.ises.org/il/assets/files/News/20100909_cooperStudy.pdf

- CVVM (Public Opinion Research Centre) (2015): Veřejnost o energetice – květen 2015 [online]. [cit. 10.10.2015] Available at: http://cvvm.soc.cas.cz/media/com_form2content/documents/c1/a7392/f3/oe150609.pdf
- CZSO (Czech Statistical Office) (2013): Cenzus 2011 [online]. [cit. 10.10.2015] Available at: <https://www.czso.cz/csu/sldb>
- DAKE, K. (1992): Myths of nature: culture and social construction of risk. *Journal of Social Issues*, 48(4): 21–37.
- DAVIS, L. W. (2011): The effect of power plants on local housing values and rents. *Review of Economics and Statistics*, 93(4): 1391–1402.
- DEAR, M. (1992): Understanding and overcoming the NIMBY syndrome. *Journal of the American Planning Association*, 58: 288–300.
- DEVINE-WRIGHT, P. (2005): Beyond NIMBYism: Towards an Integrated Framework for understanding Public Perceptions of Wind Energy. *Wind Energy*, 8(2): 125–139.
- EISER, J. R., SPEARS, R., WEBLEY, P. (1989): Nuclear Attitudes Before and After Chernobyl: Change and Judgment. *Journal of Applied Social Psychology*, 19(8): 689–700.
- EISER, J. R., VANDER PLIGT, J., SPEARS, R. (1995): *Nuclear Neighbourhoods*. Exeter: Exeter University Press.
- ENERGOREGION 2020 (2016): Sdružení obcí region JE Dukovany [online]. [cit. 10.02.2016] Available at: <http://portal.energoregion.cz/o-nas-a-kontakt/>
- ETHINGTON, P. J. (1997). The intellectual construction of "Social Distance": Toward a recovery of Georg Simmel's social geometry. *Cybergeo: European Journal of Geography*, 30 [online]. [cit. 10.02.2016] Available at: <http://www.cybergeo.presse.fr/essoc/texte/socdis.htm>
- EUROSTAT (2015): Renewable energy statistics [online]. [cit. 10.10.2015] Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics
- FEŘTROVÁ, M. (2011): Nezaměstnanost a sociální dávky. In: Ouředníček, M., Temelová, J., Pospíšilová, L. [eds.]: *Atlas sociálně prostorové diferenciacie České republiky* (pp. 37–38). Praha: Nakladatelství Karolinum.
- FISCHHOFF, B., SLOVIC, P., LICHTENSTEIN, S., READ, S., COMBS, B. (1978): How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy Sciences*, 9: 127–152.
- FISCHHOFF, B., SLOVIC, P., LICHTENSTEIN, S. (1983): "The Public" Vs. "The Experts": Perceived Vs. Actual Disagreements About Risks of Nuclear Power. In: Covello, V.T. et al. [eds.]: *The analysis of actual versus perceived risks* (pp. 235–249). New York, Springer US.
- FLYNN, J., SLOVIC, P., MERTZ, C. K. (1994): Gender, Race, and perception of environmental health risks. *Risk Analysis*, 14(6): 1101–1108.
- FRANTÁL, B. (2015): Have local government and public expectations of wind energy project benefits been met? Implications for repowering schemes. *Journal of Environmental Policy & Planning*, 17(2): 217–236.
- GAMBLE, H. B., DOWNING, R. H. (1982): Effects of nuclear power plants on residential property values. *Journal of Regional Science*, 22(4): 457–478.
- GLASSON, J. (2005): Better monitoring for better impact management: the local socio-economic impacts of constructing Sizewell B nuclear power station. *Impact Assessment and Project Appraisal*, 23(3): 215–226.
- GOODFELLOW, M. J., WILLIAMS, H. R., AZAPAGIC, A. (2011): Nuclear renaissance, public perception and design criteria: An exploratory review. *Energy Policy*, 39(10): 6199–6210.
- GREENBERG, M. (2009a): How much do people who live near major nuclear facilities worry about those facilities? Analysis of national and site-specific data. *Environmental Planning and Management*, 52(7): 919–937.
- GREENBERG, M. (2009B): NIMBY, CLAMP, and the Location of New Nuclear-Related Facilities: U.S. National and 11 Site-Specific Surveys. *Risk Analysis*, 29(9): 1242–1254.
- GREENBERG, M., TRUELOVE, H. B. (2011): Energy choices and risk beliefs: is it just global warming and fear of a nuclear power plant accident?. *Risk Analysis*, 31(5): 819–831.
- HORSKÁ, H., MIKULÍK, O., VAISHAR, A., ZAPLETALOVÁ, J. (1996): Perception of the Dukovany nuclear power plant (Czech Republic) by local population. *Moravian Geographical Reports*, 4(2): 19–34.
- ISARD, W., REINER, T., VAN ZELE, R., STRATHAM, J. (1976): *Regional economic impacts of nuclear power plants*. Philadelphia: Pennsylvania University, Department of Regional Science.
- JAHN, D., KOROLCZUK, S. (2012): German exceptionalism: the end of nuclear energy in Germany. *Environmental Politics*, 21(1): 159–164.
- JOHNSON, M. H., BENNETT, J. T. (1979). An input-output model of regional environmental and economic impacts of nuclear power plants. *Land Economics*, 236–252.
- JONES, C. R., EISER, J. R. (2010): Understanding 'local' opposition to wind development in the UK: How big is a backyard? *Energy Policy*, 38(6): 106–3117.
- LEWIS, P. M. (1986): The economic impact of the operation and closure of a nuclear power station. *Regional Studies*, 20(5): 425–432.
- LINDELL, M. K., PERRY, R. W. (1990): Effects of the Chernobyl accident on public perceptions of nuclear plant accident risks. *Risk Analysis*, 10(3): 393–399.
- MASSAM, B. H. (2002): *Quality of Life: Public Planning and Private Living*. *Progress in Planning* 58: 141–227.
- MADERTHANER, R., GUTTMANN, G., SWATON, E., OTWAY, H. J. (1978): Effect of distance upon risk perception. *Journal of Applied Psychology*, 63(3): 380–382.
- MCGUIRE, A. (1983): The regional income and employment impacts of nuclear power stations. *Scottish Journal of Political Economy*, 30(3): 264–274.
- METZ, W. C. (1994): Potential negative impacts of nuclear activities on local economies: rethinking the issue. *Risk Analysis*, 14(5): 763–770.
- MPSV (Ministry of Labour and Social Affairs) (2012): Časové řady: Průměrná míra nezaměstnanosti od roku 1997 [online]. [cit. 10.10.2015] Available at: http://portal.mpsv.cz/sz/stat/nz/casove_rady
- MUSIL, J., MÜLLER, J. (2008): Vnitřní periferie v České republice jako mechanismus sociální exkluze. *Sociologický časopis/Czech Sociological Review*, 44(2): 321–348.
- OUŘEDNÍČEK, M., NEMEŠKAL, J. (2015): Vývoj nezaměstnanosti v obcích v širokém okolí Jaderné elektrárny Dukovany 1991–2011. Specializovaná mapa. In: Špačková, P. [ed.]: *Vývoj stavu sociálních a ekonomických podmínek v širokém okolí Jaderné*

- elektrárny Dukovany [online]. [cit. 10.10.2015] Available at: <http://www.atlasobyvatelstva.cz/cs/dukovany>
- PAMPEL, F. C. (2011): Support for nuclear energy in the context of climate change: Evidence from the European Union. *Organization & Environment*, 24(3): 249–268.
- PARKHILL, K. A., PIDGEON, N. F., HENWOOD, K. L., SIMMONS, P., VENABLES, D. (2010): From the familiar to the extraordinary: local residents' perceptions of risk when living with nuclear power in the UK. *Transactions of the Institute of British Geographers*, 35(1): 39–58.
- PEELLE, E. (1976): Socioeconomic effects of operating reactors on two host communities: a case study of Pilgrim and Millstone. Tennessee: Oak Ridge National Laboratory.
- PIDGEON, N., HENWOOD, K., SIMMONS, P. (2009): Living near nuclear power plants. *People & Science*, 3: 14–15.
- PRATI, G., ZANI, B. (2013): The effect of the Fukushima nuclear accident on risk perception, antinuclear behavioral intentions, attitude, trust, environmental beliefs, and values. *Environment and Behavior*, 45(6): 782–798.
- SIEGRIST, M., VISSCHERS, V. H. (2013): Acceptance of nuclear power: the Fukushima effect. *Energy Policy*, 59: 112–119.
- SIEGRIST, M., SÜTTERLIN, B., KELLER, C. (2014): Why have some people changed their attitudes toward nuclear power after the accident in Fukushima? *Energy Policy*, 69: 356–363.
- ŠILHÁN, Z. (2011): Jaderná elektrárna Dukovany a její vliv na okolní obce. Diploma Thesis. Brno: Masaryk University.
- SLOVIC, P., LICHTENSTEIN, S., BISCHHOFF, B. (1979): Images of disaster: perception and acceptance of risks from nuclear power. *Electric Perspectives*, 3: 8–20.
- SLOVIC, P. (1987): Perception of risk. *Science*, 236(4799): 280–285.
- STARR, C. (1969): Social benefit versus technological risk. *Readings in Risk*, 183–194.
- SVOBODA, P., HÁNA, D., NEMEŠKAL, J. (2015): Pracovní příležitosti v obcích v širokém okolí Jaderné elektrárny Dukovany 1991–2011. Specializovaná mapa. In: Špačková, P. [ed.]: *Vývoj stavu sociálních a ekonomických podmínek v širokém okolí Jaderné elektrárny Dukovany* [online]. [cit. 10.10.2015] Available at: <http://www.atlasobyvatelstva.cz/cs/dukovany>.
- SWOFFORD, J., SLATTERY, M. (2010): Public attitudes of wind energy in Texas: Local communities in close proximity to wind farms and their effect on decision-making. *Energy Policy*, 38(5): 2508–2519.
- TĚŠITEL, J., KUŠOVÁ, D., BARTOŠ, M. (2005): Temelín power plant as an unusual landscape feature. *Ekológia*, 24(Suppl. 1): 139–149.
- TĚŠITEL, J., KUŠOVÁ, D., BARTOŠ, M. (2008): Temelín v kontextu obytné krajiny. *Životné prostredie*, 42(2): 85–88.
- TOMANEY, J., PIKE, A., CORNFORD, J. (1999): Plant closure and the local economy: the case of Swan Hunter on Tyneside. *Regional Studies*, 33(5): 401–411.
- VAISAR, A. (1999): Vývoj názorové hladiny obyvatelstva a prognóza sociálního rozvoje v oblasti vlivu energetické soustavy Dukovany – Dalešice. In: Hanus, V. [ed.]: *O vlivu provozu jaderných elektráren na životní prostředí* (pp. 19–30). Praha, Česká nukleární společnost a Česká vědeckotechnická společnost.
- VAN DER HORST, D. (2007): NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy sitting controversies. *Energy Policy*, 35(5): 2705–2714.
- VAN DER PLIGT, J. (1985): Public attitudes to nuclear energy: salience and anxiety. *Journal of Environmental Psychology*, 5(1): 87–97.
- VAN DER PLIGT, J., EISER, J. R., SPEARS, R. (1986): Attitudes toward Nuclear Energy Familiarity and Salience. *Environment and Behavior*, 18(1): 75–93.
- VENABLES, D., PIDGEON, N. F., SIMMONS, P., HENWOOD, K. L., PARKHILL, K. A. (2009): Living with Nuclear Power: A Q-Method Study of Local Community Perceptions. *Risk Analysis*, 29(8): 1089–1104.
- VENABLES, D., PIDGEON, N. F., PARKHILL, K. A., HENWOOD, K. L., SIMMONS, P. (2012): Living with nuclear power: Sense of place, proximity, and risk perceptions in local host communities. *Journal of Environmental Psychology*, 32(4): 371–383.
- VISSCHERS, V. H., KELLER, C., SIEGRIST, M. (2011): Climate change benefits and energy supply benefits as determinants of acceptance of nuclear power stations: investigating an explanatory model. *Energy Policy*, 39(6): 3621–3629.
- VISSCHERS, V. H., SIEGRIST, M. (2012): Fair play in energy policy decisions: Procedural fairness, outcome fairness and acceptance of the decision to rebuild nuclear power plants. *Energy Policy*, 46: 292–300.
- WALKER, C., BAXTER, J., OUELLETTE, D. (2014): Beyond rhetoric to understanding determinants of wind turbine support and conflict in two Ontario, Canada communities. *Environment and Planning A*, 46(3): 730–745.
- WARREN, C. R., LUMSDEN, C., O'DOWD, S., BIRNIE, R. V. (2005): Green on green: public perceptions of wind power in Scotland and Ireland. *Journal of Environmental Planning and Management*, 48(6): 853–875.
- WNA (World Nuclear Association) (2015): Nuclear Power in the World Today [online]. [cit. 10.10.2015] Available at: <http://www.world-nuclear.org/info/Current-and-Future-Generation/Nuclear-Power-in-the-World-Today/>
- WYNNE, B., WATERTON, C., GROVE-WHITE, R. (1992/2007): *Public Perceptions and the Nuclear Industry in West Cumbria*. Lancaster: Lancaster University, Centre for the Study of Environmental Change.
- YAMANE, F., OHGAKI, H., ASANO, K. (2011): Social Factors Affecting Economic Welfare of the Residents around Nuclear Power Plants in Japan. *Energy Procedia*, 9: 619–629.

Please cite this article as:

FRANTÁL, B., MALÝ, J., OUŘEDNÍČEK, M., NEMEŠKAL, J. (2016): Distance matters. Assessing socioeconomic impacts of the Dukovany nuclear power plant in the Czech Republic: Local perceptions and statistical evidence. *Moravian Geographical Reports*, 24(1): 2–13. Doi: 10.1515/mgr-2016-0001.



European territorial cohesion policies: Parallels to socialist central planning?

Jiří MALÝ^{a*}, Ondřej MULÍČEK^a

Abstract

Contemporary EU territorial cohesion policy presents some striking reminders of features of socialist central planning. The objective of socio-spatial solidarity aimed at balanced spatial development is a core principle of both spatial planning doctrines. Reviewing key planning documents, this article compares territorial cohesion discourses in terms of their normative and analytical natures in order to critically evaluate the uniqueness and novelty of the current modern concept. In spite of ideological contradictions, a commonly-shared realisation of the importance of urban agglomerations as specific integrated spatial units and the need to improve living conditions in disadvantaged areas, are crucial characteristics for both spatial planning policies. Moreover, analytical spatial planning procedures are based on similar methods and lead to nearly identical results concerning the spatial pattern for one specific case settlement system (the South Moravian Region, Czech Republic). In this respect, the currently-emphasised territorial cohesion discourse is familiar to that in former socialist areas in Central and Eastern Europe. Based on these findings, spatial planning authorities should learn from the past in reflecting on the limitations and advantages of spatial planning in the socialist era.

Keywords: territorial cohesion, socialist central planning, settlement systems, European Union, Czech Republic

Article history: Received 6 October 2015; Accepted 28 January 2016; Published: 31 March 2016

1. Introduction

‘Territorial cohesion’ has become a conceptual buzzword often quoted in European regional and spatial planning policies. It is a frequent subject of theoretical discussions concerning balanced socio-economic development, as well as a goal of planning and decision-making practices. The broad thematic scope and an underdeveloped analytical apparatus, however, make this concept rather elusive in terms of its operationalisation and evaluation. It seems there is no single definition of territorial cohesion; instead, it is used as an umbrella term covering several purpose-built conceptual frameworks and approaches.

The term ‘territorial cohesion’ appeared in official EU documents for the first time in 1997 in the Amsterdam Treaty, with regard to the importance of services of general economic interest (SGEI). Here, the declared access to SGEI is understood as the cornerstone of territorial cohesion, but without any detailed specifications (Sauter, 2008). Later, the concept has become part of the regular reports on economic, social and territorial cohesion. The Third Cohesion Report defines territorial cohesion in a rather normative manner as a state of balanced development, reducing existing disparities and territorial imbalances (EC, 2004). A likely more meaningful statement, however,

is that “people should not be disadvantaged by wherever they happen to live or work in the Union” (EC, 2004, p. 27). Corresponding with this formulation, Martin and Ross (in Davoudi, 2005) suggest that the territorial cohesion concept “spatialises” some variety of so-called biographical risks, such as unemployment, disability, poverty, etc. In other words, an individual’s life chances reflect not only his or her position within the system of social interdependencies but, at the same time, their position within the structure of territorial interdependencies. As Molle (2007, p. 84) points out, territorial cohesion is “a situation whereby people and firms are not unduly handicapped by spatial differences in access to basic services, basic infrastructure and knowledge”. The concept of territorial cohesion enunciated here echoes significantly the ideas of spatial justice understood as the “fair and equitable distribution in space of socially valued resources and opportunities to use them” (Soja, 2009, p. 2).

Employing a critical spatial perspective, research attention is drawn not only to the qualities of particular places and territories, but, more implicitly, to their organisation in physical, socio-economic and political space. As places of work and living do not exist as isolated geographic entities, place-based qualities and opportunities stem from the complex networks of territorial interdependencies mentioned

^a Department of Geography, Faculty of Science, Masaryk University, Brno, Czech Republic (*corresponding author J.Malý, e-mail: j.maly@mail.muni.cz)

above. Each particular urban system involves a specific arrangement of territorial interdependencies reflecting, among many other factors, political strategies articulated in the form of planning doctrines and policies. Spatial planning can be therefore regarded as an important ‘platform’ translating essentially political concepts of territorial cohesion into the worlds of everyday urban activities. Planning interventions usually follow normatively-defined narratives of a territorially coherent society, applying tools related to the spatial (re)distribution of valued resources.

The general aim of this paper is to look more closely at the conceptualisation of territorial cohesion in two distinct periods of modern history. The contemporary operationalisation of the territorial cohesion concept implemented in EU countries will be compared with the central planning doctrines endorsed by socialist regimes. Such an historical excursion could shed light on the currently proclaimed territorial cohesion concept. Special attention will be paid to the political discourse framing the territorial cohesion concept in both of the periods, and particular spatial policies which shape the functional geographies of interdependent places and territories will be examined. The paper indicates that territorial cohesion is an evolving concept deeply rooted in its spatial and political contexts. The comparison then focuses on a Czech case study (the South Moravian Region), as the changing socio-economic and political conditions, as well as the development of relevant planning tools, will be critically explored with the aim of disclosing the scale of conceptual shifts and their imprints on planning practice.

2. The conceptualisation and operationalisation of territorial cohesion

2.1 Territorial cohesion in current EU planning doctrine

Achieving territorial cohesion is currently one of the main objectives of EU regional policy. The territorial dimension was officially attached to the goals of economic and social cohesion by the Lisbon Treaty (EC, 2007b). Thus, today, regional policy represents economic, social and territorial cohesion policy (Cohesion Policy). As a shared competence between EU and its member states, territorial cohesion aims at a coordination of policies with spatial impact to ensure integrated territorial development (Faludi, 2013). From this normative and theoretical perspective, the Territorial Agenda of the EU 2020 defines territorial cohesion as “a set of principles for harmonious, balanced, efficient, sustainable territorial development. It enables equal opportunities for citizens and enterprises, wherever they are located, to make the most of their territorial potentials” (EU Ministers responsible for Spatial Development, 2011, p. 2). Based on this quotation it can be assumed that territorial cohesion is characterised (besides its political nature) by a strong spatial planning dimension that includes an aspect of social and spatial solidarity.

This general and ambiguous definition, however, results in a number of different interpretations and reflections about the sense and relevance of the territorial cohesion concept (see, e.g. Davoudi, 2005; Doucet, 2006; Evers, 2008; Schön, 2005; Servillo, 2010). The most noticeable confusion associated with the concept is a simultaneous promotion of the principle of solidarity and also the competitiveness of

European regions and Europe as a whole. In this regard, Waterhout (2007) identifies the storyline “Competitive Europe”, stressing the need for a competitive European territory, which stands in contrast to the traditionally understood meaning of territorial cohesion emerging in the storyline “Europe in Balance”¹. Given the purpose of this paper, the meaning of territorial cohesion emphasizing balanced development will be used.

With regard to decision-making processes, the objective is to make “both sectoral policies which have a spatial impact and regional policy more coherent” (EC, 2004, p. 27). Additionally, more effective coordination of EU policies, member states’ authorities, private actors, planners and regional or local authorities is required. The system of multi-level governance should be able to manage functioning of various territories and enhance territorial cohesion (Finka and Kluvánková, 2015). Respecting the principle of subsidiarity and the so-called bottom-up approach, vertical and horizontal coordination between decision-making bodies at different levels and sector-related policies is supposed to secure consistency and synergy within the process of achieving territorial cohesion (EU Ministers responsible for Spatial Development, 2011).

Reaching territorial cohesion should be based on an adaptation of development opportunities to the specific characteristics of a particular region. Thus, the diversity of regions is not ignored and is even regarded as a development potential (EC, 2008). Despite the awareness of the unique position and inner structure of each territory (notwithstanding its delimitation), common territorial priorities for the development of the EU have been established by the Territorial Agenda of the EU 2020. From a planning perspective, territorial priorities reflect challenges for territorial development that cover a wide range of fields of interest (from demographic and social challenges to environmental risks and climate change). Consequently, the list of territorial priorities is very complex as well. “Balanced spatial development” is seen as a key element of territorial cohesion and is predominantly associated with the structure of urban systems.

The promotion of “polycentric development” is therefore crucial in terms of avoiding the economic, social and spatial polarisation of human activities (however, supporters of a competitive European territory scenario see polycentric development as a bridging concept of cohesion and competitiveness), although such an assumption lacks empirical verification (Malý, 2016; Veneri and Burgalassi, 2012). On the one hand, the potential of metropolitan areas to generate economic and social prosperity is recognised, and the attractiveness of the largest agglomerations for living, working and investment seems to be unquestionable. On the other hand, territorial cohesion discourse accentuates the complicated position of spatially excluded territories and suggests that “rural, peripheral and sparsely populated territories may need to enhance their accessibility, foster entrepreneurship and build strong local capacities” (EU Ministers responsible for Spatial Development, 2011, p. 7). Realising the importance of “territorial cooperation”, territorial priorities include improvement of “spatial connections” (i.e. transport networks, communication technologies and infrastructure, cross-border relations, etc.) and strengthening “local

¹ In addition to “Europe in Balance” and “Competitive Europe” storylines, Waterhout (2007) also recognises the narratives of “Coherent European Policy” and “Green and Clean Europe”.

economies". Achieving territorial cohesion should also respect ecological and natural values. In this regard, "protection of ecological systems" is also territorial priority.

Territorial priorities defined by the Territorial Agenda of the EU 2020 should not be viewed as isolated goals. By linking them to strategy Europe 2020, Böhme et al. (2011) identify five territorial keys that can be understood as crucial issues promoted by the territorial cohesion concept: accessibility, SGEI, territorial capacities/endowments/assets, city networking, and functional regions. Based on territorial priorities it can be argued that urban systems and their functioning play a key role in spatial development. Due to the extent of the EU in terms of land area, territorial cohesion is characterized by strong scale-dependency. In the context of urban systems, the role of cities/towns is partially determined by the geographical level at which they act as centres. Nevertheless, according to the concept of polycentricity, centrality stems from nodal positions within the urban network and connections to other localities, irrespective of scale level. Access to centres is thus an essential factor when trying to improve living conditions in disadvantaged areas and to achieve more territorial cohesion (e.g. efficient public transport connecting rural municipalities to local towns, highway networks ensuring relations between regional capitals, or accessibility of the largest metropolitan regions by air transport). Besides transportation accessibility to centres (provision of SGEI and jobs), focus is put on easy access to communication services (broadband, mobile telecommunication) and energy networks.

The principles of territorial cohesion are not groundbreaking. The promotion of balanced spatial development in order to reduce territorial disparities and more evenly distribute economic activities is deeply rooted in European policies. Interest in regional planning at the European level had begun to emerge during the second half of the 1960s. The formation of regional policy and the beginnings of any actual applied principles of cohesion policy, however, can be dated to the 1970s. The establishment of a common regional policy partly related to the implementation of the Common Market, which was unable to balance the differences between regions, and partly to reducing economic disparities before the planned single currency project (George, 1996). With growing inter-regional inequalities due to the expanding membership base of the EU (mainly the post-socialist countries of Central and Eastern Europe), European spatial development has been seen as increasingly important. In the late 1990s, the principles of territorial cohesion began to form during the process of preparing the European Spatial Development Perspective. The promoted model, however, did not represent an innovative strategy in the context of spatial planning. Rather it was inspired by "l'aménagement du territoire", a French tradition of spatial planning (Faludi, 2004). 'L'aménagement du territoire' was developed as a strategic spatial framework designed for eventual intervention by the public administration and was based primarily on a regional economic approach to spatial development (Faludi, 2009). Economic changes in France in the 1960s (partially caused by the loss of the French colonial markets and the lowering of trade barriers within the European Economic Community), the increasing economic domination of Paris (at the expense of most other French regions) and consequently growing differences between the major cities and especially rural regions, were the main factors in adopting l'aménagement du territoire (Burnham, 1999). France, at that time a centrally-

governed state, started to apply the policy of balanced spatial development with regard to geographical and social conditions in particular regions.

The concept of territorial cohesion (as well as l'aménagement du territoire) emphasizes the development of disadvantaged areas or territories lagging behind. By supporting equal access to SGEI and jobs, the territorial cohesion policy applies the European social model to spatial planning strategies. Access to SGEI and jobs should be ensured for all citizens irrespective of where they live. Location of residence, economic and social activities and relations between them, are in themselves preconditions for a certain level of territorial cohesion. Thus, the spatiality of everyday human lives is closely linked to general welfare and social status. Promoting territorial cohesion adds a spatial justice dimension to European spatial policy (Davoudi, 2005). It seems that thinking about space has been evolving from economic and technical perceptions of space as a container to a recognition of spatial and social causality, something that Soja (1980) called the socio-spatial dialectic. From the perspective of critical geographies, however, the current political and economic organisation of European space is one of the factors of spatial injustice. In contrast to territorial cohesion discourse, the epistemological concept of spatial justice in itself represents one of the critiques of capitalist economies. But in fact, no matter how truly socially motivated the promotion of territorial cohesion is, the aspect of social solidarity has become an integral part of EU spatial policy.

2.2 Territorial cohesion in socialist planning doctrines up to the 1990s

Socialism can be regarded as a general term for a specific socio-economic and political structure that orders many aspects of societal functioning. Single-party political systems, strong ideological anchoring, state ownership of the means of production (land included), rejection of market principles and a wide preference for collective interests – these are some of the distinctive characteristics of socialist regimes (Musil, 2001; Nedovic-Budic, 2001), when compared with capitalist societies in the period after WW II. In spite of such unifying symptoms of socialist order, however, there were numerous types of socialist societies, a variety of socialist frameworks stemming from specific historical legacies of the pre-socialist periods and from different adaptations of ideological premises to local milieu (Hamilton, 1976). As Musil (2001) points out, the socialist transformation was implemented in countries differing in terms of economic and urban structures, political institutions and cultural models.

The seemingly homogenous space of socialist countries has thus to be grouped into several categories, enabling a proper description of applied planning strategies. Firstly, we can recognize the category of Central East European socialist countries, including East Germany and the former Czechoslovakia, i.e. regions with relatively high levels of pre-socialist industrialisation and urbanisation, as well as Poland and Hungary, representing countries with a heritage of deeper regional disparities. The second distinct group covers the agrarian or semi-agrarian socialist states of south-eastern Europe, including Romania, Bulgaria and the former Yugoslavia. The Soviet Union and the non-European, predominantly developing socialist countries, can be further distinguished as a third or even a fourth category within the outlined classification (Dingsdale, 1999;

Musil, 2001; Sokol, 2001). The research interest here will focus mainly on the category of Central Eastern Europe, but still respecting the strong influence of political and planning paradigms emerging from the Soviet space during the post-war period.

The political systems under the socialist regimes were tightly coupled with the economic and social ones. The interconnectedness was visible in particular in socialist industrialisation which played the important ideological role of a flagship project, introducing not only economic but, at the same time, also social modernisation (Mareš, 1988). It was precisely this strong ideological dimension that made socialist industrialisation so different from other types of industrialisation processes (Szczepański and Furdyna, 1977). Socialist industrialisation was controlled through a strongly hierarchical central command planning system. The national economic strategy defined the basic framework for developing more specific policies for various sectors, and long- and middle-term economic priorities were set up on these decision-making levels to reflect the needs of the national economy as a whole (Hoffmann, 1994; Nedovic-Budic, 2001). The regional policies were generally given a lower priority, at least in the first two decades of socialist industrialisation, which was understood as a comprehensive universal tool diminishing existing regional disparities. Regional plans were formulated as rather auxiliary documents channelling the geographical distribution of nationally-defined planning targets (Enyedi, 1990). The top-level regional documents took the form of urbanisation strategies, which detailed physical arrangements at the nation-wide scale. Their effective design and scope followed to some extent historical legacies and national settlement specificities in their respective countries, as well as the modifications of political regimes since 1940s.

We can recognize several distinct phases of socialist industrialisation, having different impacts in terms of territorial interdependencies and regional disparities (Szczepański and Furdyna, 1977). During the period immediately after WW II and further into 1950s, the major effort was to restore national economies (Malík, 1976). The onset of industrialisation followed the Soviet heavy-industrialisation model, which was not accompanied by specific urbanisation strategies (Enyedi, 1996; Musil, 2001). The discourse of territorial cohesion was embedded primarily at the national scale, echoing the proclaimed equity between industrialisation and socio-economic modernisation. There was an ideologically-supported aim to develop new socialist industry outside of the traditional capitalist industrial cores, and accordingly some investments were allocated to less developed, more agrarian regions. Nonetheless, the bulk of industrial production remained stabilised in the pre-socialist locations in order not to weaken overall national economic output, manifesting the contradiction between the de-concentrating appeal of ideological visions and the agglomerating nature of economically-driven politics (Musil, 2002).

In the case of Czechoslovakia, substantial political attention was paid to diminish the long-standing economic gap between the Czech lands and the Slovak territories, as well as between the northern and southern parts of the Czech lands. The displacement of the original German populations resulted in the need to repopulate peripheral regions of the country (Illner and Andrlé, 1994). These issues were viewed as ad hoc planning assignments and not set into any wider planning concept. Musil (2001) summarises the planning

discourse at the time as driven only by economic strategies, applying centralised distributive tools in rather extensive ways while ignoring regional feedbacks.

From the early 1960s the discrepancies between industrialisation strategies and regional policies became the subject of deeper planning interest, as they caused problems both in terms of economic development and in terms of social cohesion. The territorial distribution of new industrial premises, for example, often did not correspond to the potential of local/regional labour markets (Mareš, 1988), resulting in a lack of the required labour force, long-distance commuting to work and emerging demographic imbalances in some industrial centres. Especially in the case of Czechoslovakia and Hungary, the spatial concentration of industry outpaced the tempo of the concentration of population, and this developed indirect urbanisation strongly and complicated the rational distribution of (non-industrial) resources (Musil and Link, 1976). Planning attention thus turned towards urbanisation strategies, promising to set up an optimal equilibrium between economic effectiveness and social goals.

The assignment for such goals can be cited from the Czechoslovak period analytical document: “The basic task of our settlement regulation is to work out how to distribute effectively housing and amenities development in the context of a too scattered settlement structure and how to, at the same time, reach the optimal settlement standards for all inhabitants within the national territory. The only solution is to establish a network of economic, social and cultural centres within the settlement system which will be well accessible on a daily basis, providing economic conditions for the concentration of population. We have to locate new housing and amenities development in these centres.” (Palla et al., 1962, p. 22). The first generation of these urbanisation concepts was developed in Czechoslovakia and Hungary during late 1960s and 1970s, theoretically based on Christaller’s Central Place Theory (Ryšavý et al., 1992). They transferred the cohesion discourse from the national to a regional level, and at the same time they refused the political concept of cities as spatial containers for industrial production. Instead, urbanism was put back into the game through taking broader non-productive and service urban functions into account (Enyedi, 1996; Szelenyi, 1996; Wu, 2003). This approach of “decentralised concentration” (Malík et al., 1968) established the basic territorial framework for the centrally-planned allocation of investments.

The delimited network of centres was normative and, to certain extent, utopian in nature. But by the middle of the 1970s, spontaneous processes had started to change the normatively-given spatial pattern of centres in a significant way (Musil, 2001). Many centres were developing more slowly than intended. In contrast, the hinterlands of some regional centres rapidly strengthened their positions within the national settlement systems. The criticisms of the central-place settlement system came from economic standpoints, together with more realistic analyses of urban processes, and set the stage for the birth of conceptually new urbanisation strategies. These concepts took into account the existence of spontaneous urbanisation processes, as well as the economic and demographic importance of emerging city regions and metropolitan areas (Musil, 2002). City regions (urban agglomerations) represented qualitatively new spatial units within the planning doctrines of those times. They were complex territories integrated through economic, social and transportation linkages, requiring qualitatively new

definitions of cohesive territorial arrangements. Accepting the ‘universal’ nature of urbanisation processes, the socialist planning doctrines were weakened in their normative stance. The detailed physical planning approach was slightly re-oriented towards the employment of more integrated spatial planning tools. The delimitation of “preferred urbanisation axes” and “integrated urbanised areas” (Sulkiewicz et al., 1981) contextualised the cohesion concept in a more relational way.

2.3 Comparative scheme

Territorial cohesion discourses are primarily contextualized by political and economic systems and by their instances in certain periods of time. While EU spatial development strategies have evolved in democratic societies characterised by a free market environment and the rapid qualitative increase of communication technologies and overall individual mobility, the previous socialist planning approach was based on a totally different political regime, characterised by strong central governance and a limited role for local authorities in spatial planning processes. With respect to the territorial cohesion concept, however, the normative principles of contemporary European spatial planning policy and those of socialist planning doctrines exhibit similar features concerning the aims and priorities of cohesive spatial development. Although there were different underlying ‘*raison d’être*’ for the spatialisation of socio-economic political narratives, the idea of balanced spatial development represents the common aspect of both planning approaches: the excessive concentration of (economic) activities should be counterweighed by the development of lagging areas that are disadvantaged in terms of access to resources. The principle of socio-spatial solidarity is thus embedded in both planning doctrines as a way towards a more just or effectively a more balanced spatial arrangement.

From a spatial planning perspective, the political goal of balanced spatial development is achieved via specific interventions into the functioning of a settlement system, attempting to counterbalance the uneven distribution of resources. The planning action is thus oriented mainly toward the support of the settlements centres outside of the economically most advanced areas. Generally, small and medium-sized towns are frequent objects of planning interventions in order to create a stable network of centres which would ensure the efficient use of their strengths, through coordinated cooperation (EC, 2008). According to EU spatial policy, cooperation between regional and local centres by the sharing of functions and provisioning of services contributes to less territorial concentration and more balanced development (EC, 2007a). Similarly, socialist central planning emphasised the role of centres in which basic public amenities are concentrated and where residents of particular hinterlands can satisfy their claims and rights to education, health care, social care, etc. (Musil, 2001). These centres should be spatially distributed as evenly as possible. In spite of distinctive urban system theories which serve as a framework for settings of spatial planning strategies and the delimitation of centres (see the empirical part of this work, below), a focus on daily-based access to services and jobs characterises both planning traditions.

There is a strong de-concentration bias underlying the normative discourse of contemporary European spatial planning, as well as in the ideologically-framed socialist doctrines. Planned de-concentration, however,

often conflicts with the more spontaneous concentrative nature of many social and economic processes. Although de-concentration of economic activities is one of the main aims of current EU territorial cohesion policy, the impact of metropolitan regions in terms of global competitiveness and their role in economic development is considered as crucial (EU Ministers responsible for Spatial Development, 2011). Highly-urbanised areas enjoy agglomeration economies, the advantages of clustering particular activities, easier access to higher education and health or social care facilities, etc. Consequently, “this is reflected in the high level of GDP per head, productivity, employment and research and innovation activity relative to the national average in capital cities and in most other densely populated conurbations” (EC, 2008, p. 5). Under socialist central planning policy, metropolitan and suburban processes were limited due to the equalising and regulatory approach to spatial development (Hampl, 2005). Even such a strongly restrictive planning strategy, however, was not able to hide the specific functioning of the largest urban areas. Reflecting the strength of regional agglomerations, socialist planners realised the imperfection of administrative spatial boundaries and the importance of complex territorial frameworks including broader spatial relations. Thus, the concentration of people and economic activities into growth poles (especially industrial agglomerations) gained its conceptual utilisation, leading to an increasing focus on highly urbanised areas (Musil, 2001). A certain duality in the planning paradigms spanning between concentration and de-concentration benefits, can be thus pointed out as a feature inherent in both doctrines under study.

2.4 Case study methodology

Having compared socialist and contemporary territorial cohesion discourses, we can argue that they share significant common features. The similarities can be found mainly in the spatio-political normative narratives framing the planning goals. What still remains unclear, however, is the extent to which these narratives are (and were) reflected in analytical practices of spatial planning. The current principles of EU spatial policy are translated into national spatial development strategies and planning tools. In the Czech Republic, the empirical focus of this paper, the form of spatial planning documents follows the hierarchy of particular administrative territorial units. The EU territorial cohesion priorities are taken into account in the Spatial Development Policy of the Czech Republic: “... a planning tool that sets up requirements and frameworks for detailed specification of planning tasks” (MMR, 2015a, p. 11). As a national document, the Spatial Development Policy concerns the issues of cohesion at a rather general level, particularly accenting the integrated development of cities and regions (reflecting spontaneous concentrative processes within metropolitan areas), as well as the polycentric organisation of the settlement system (reflecting the normatively-defined goal of balanced spatial development). The general framework set by the Spatial Development Policy is developed into more concrete goals and measures by the Spatial Development Principles. This is the spatial planning document at the regional level and it must respect the Spatial Development Policy in order to ensure the vertically-binding interconnection of spatial planning documents. These documents (together with ad hoc studies of regional settlement structure) provide the information about analytical procedures that are based on the discourse on territorial cohesion.

Correspondingly, socialist documents on spatial development serve as the source for understanding the practical application of socialist central planning principles. The structure of the historical planning documents under study is analogous, in many ways, to that of the contemporary materials. The documents produced by the state Research Institute of Construction and Architecture were examined to interpret knowledge of planning measures at the national scale. The document “Principles and Standards of Physical Planning” (VÚVA, 1979) played the role of an historical counterpart to the contemporary Spatial Development Policy document. Analogically, the Physical Plan of the Brno Settlement Regional Agglomeration (Terplan, 1985) provided information concerning reflections of socialist national-wide policies in this specific regional context.

Reviewing spatial planning documents, comparing analytical approaches and their impact on the spatial arrangements of territories, this empirical study reveals the parallels and dissimilarities of EU and socialist spatial planning. The starting point for the empirical analysis deals with the national-scale level, in an effort to compare patterns of normatively-defined territories, where intensive development is (was) expected to take place. The first step in the analysis is based on the planning policies coping with concentration processes. We argue, that the socialist map of “growth poles” (urban regional agglomerations) is very similar to the contemporary normative delimitation of metropolitan regions. The (dis)similarity of policies intended

to even out spatial imbalances is examined at the regional level in the second stage of this empirical analysis. This stage follows the normatively-planned de-concentration measures. Because the lower hierarchical level was crucial for the application of socialist de-concentration policies, the study region (namely the South Moravian Region – NUTS3) was established as the basic spatial unit for this part of the study. It was selected primarily due to the structure of its settlement system, including a variety of centres in terms of population size and economic importance, and hence it serves as a relevant model when describing urban hierarchies. The planned structures of the urban centres in the 1980s and the situation at present can now be compared.

The South Moravian Region is situated in the south-eastern part of the country and is characterised by high economic potential, especially given by the strong position of its regional capital Brno in the national economy (see Fig. 1). Moreover, its strategic location stems from its proximity to the metropolitan regions of Prague, Vienna and Bratislava. Regarding the spatial relations and functioning of its settlement system, Brno plays a key role as the administrative, economic and cultural centre of the region (Muliček and Toušek, 2004; Kunc et al., 2012). The importance of Brno (380,000 inhabitants) is further increased by the relatively small sizes of other centres (approximately 35,000 inhabitants of the second largest city Znojmo), and its central position with reference to spatial context and routing of transport infrastructure (Kraft et al., 2014).

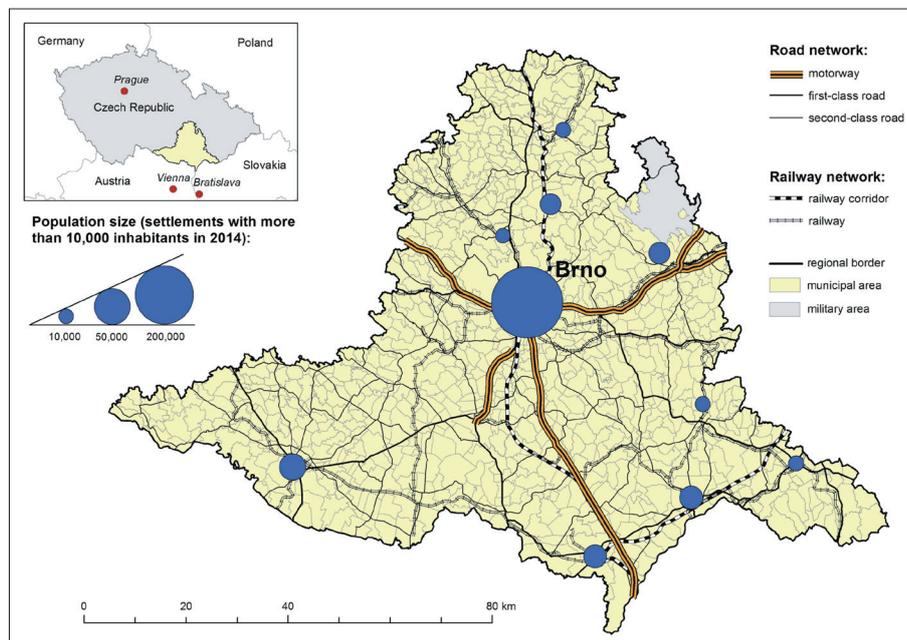


Fig. 1: Geographical location of the South Moravian Region. Source: ČSÚ (2014); authors' elaboration

3. Empirical analysis and findings

3.1 National level – urban regional agglomerations and the metropolitan areas

Socialist urbanisation strategies were characterised by a continuous evolution of the normative approaches to spatial development. The first theoretically-based conceptions were questioned and modified by approaches emphasising spontaneous urban processes and the importance of highly-urbanised areas. With respect to analytical planning practices, the goal of decentralised concentration was initially expressed by the so-called “central settlement system”. The insufficient

ability of the central settlement system to react to natural urban processes gave rise to strategies taking into account relatively spontaneous concentrative metropolitan processes. In order to regulate these urbanisation trends, urban regional agglomerations were delimited at the national planning level. They were conceptualised from the late 1970s as the elementary backbones of the national settlement system. The spatial delimitation of urban regional agglomerations is depicted, together with the metropolitan regions which were delimited as the target areas of integrated territorial investments (with respect to integrated development territorial plans), in 2014 (see Fig. 2).

Despite the long historical gap in development (these two distinct layers of metropolitan regions/agglomerations are almost 40 years distant from each other), there are just minor changes of overall geographic pattern. The number of delimited metropolitan regions is slightly higher in 2014 when compared with the 1976 proposal, as the Northern Bohemia urbanised belt was divided into two polycentric metropolitan regions and the Mladá Boleslav region emerged driven by the presence of a strong economic actor (Škoda Auto). Having accounted for the changes in spatial extent (which are sizable in the case of some metropolitan regions when compared to the socialist proposal), no other major structural variances which would distinguish the geographic logic of both delimitations are observed.

The question then is how much the similarity of spatial patterns stems from the affinity of socialist and contemporary planning discourses. The urban regional agglomerations were delimited during the 1970s as a kind of planning response to the gradual and rather spontaneous emergence of complicated inter-urban relations in the hinterlands of large Czech cities. These territories emerged from the traditional conceptualisation of local daily-urban systems organised through flows-to-work in secondary sectors. The VÚVA period analytical documents (1979) point out the functional division of labour developing between particular towns and municipalities within agglomerations. In particular, the rise of employment in the tertiary sector in metropolitan cores formed a qualitatively new spatial configuration. The analytical and planning discourse thus had to shift from quantitative urbanisation issues towards a more integrative approach able to grasp the functional diversity of urban regional agglomerations.

The socialist integration discourse was different from contemporary concepts of integrative planning, however. It understood agglomerations as urban systems with an internal hierarchy of particular centres and municipalities. Different functions and development strategies were normatively assigned to them in order to reach a desirable development of the agglomeration as a whole. Although there were several proclaimed targets of planning measures (among them environmental, infrastructural and facilities issues), the coordination of economic and housing policies was of the highest priority. As the extent of sprawling suburbanisation was restricted during socialism, the spatial balance between normatively allocated production and housing functions was one of the most important planning goals within urban regional agglomerations.

The political and planning narratives at the base of the delimitation of present-day metropolitan regions differ in terms of scale. In contrast to the situation in the 1970s, there is a strong embeddedness of national planning actions in European political discourse. Re-territorialisation, as well as the re-scaling of regional policies and planning measures, have become emerging issues within this discourse (MMR, 2015b). Bearing in mind the socio-economic significance of European metropolitan regions, it is not surprising that urban/metropolitan dimensions receive the foreground of planning attention. Thirteen metropolitan regions were identified in the Czech Republic in 2014, ordered in two hierarchical levels – the metropolitan areas of Integrated Territorial Investments (ITI), and urban agglomerations of Integrated Plans of Territorial Development (IPRU). As mentioned above, the ‘top-down’ delimitation of socialist

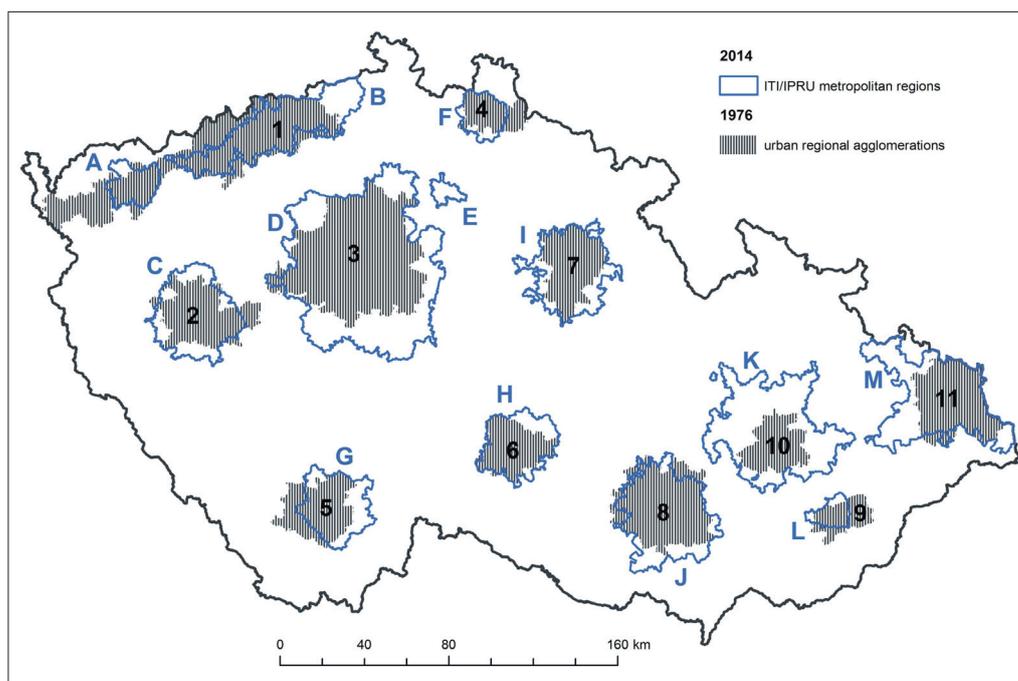


Fig. 2: Comparison of urban regional agglomerations (URA)^a delimited in 1976 and ITI/IPRU metropolitan regions (MR)^b delimited in 2014

Sources: VÚVA (1979), MMR (2015b); authors' elaboration

^a1 – Northern Bohemia URA, 2 – Plzeň URA, 3 – Prague URA, 4 – Liberec URA, 5 – České Budějovice URA, 6 – Jihlava URA, 7 – Hradec Králové/Pardubice URA, 8 – Brno URA, 9 – Gottwaldov (Zlín) URA, 10 – Olomouc URA, 11 – Ostrava URA

^bA – Karlovy Vary MR, B – Ústí nad Labem/Chomutov MR, C – Plzeň MR, D – Prague MR, E – Mladá Boleslav MR, F – Liberec MR, G – České Budějovice MR, H – Jihlava MR, I – Hradec Králové/Pardubice MR, J – Brno MR, K – Olomouc MR, L – Zlín MR, M – Ostrava MR

urban regional agglomerations is similar to the rather ‘bottom-up’ delimitation (there was no binding national methodology), managed at the regional scale.

Disregarding the internal hierarchy, these metropolitan regions coincide with socialist urban regional agglomerations not only in terms of spatial delimitation but also in terms of political grounding. Just as in Czechoslovakian socialist planning discourse, they represent shifting scale, singularities emanating from existing spatial planning categories; they are proposed as the areas where integrated planning tools are to be applied, joining sector-based planning measures and financial schemes under a single strategic framework. The strategic documents giving reasons for the purpose of individual metropolitan regions employ concepts and issues highly comparable with socialist narratives. They respect the extraordinary (economic) position of urban cores, as well as the transforming nature of secondary metropolitan centres. Contemporary metropolitan plans, however, do not attempt to prescribe fixed functions to the metropolitan centres, as the initial ethos of socialist planning was substituted by a more networked and participatory approach. The metropolitan areas were considered in both periods under study as growth poles, where special planning measures had to be employed in order to ensure economic performance and, at the same time, internal coherence.

3.2 Regional level – urban centres

Besides realising natural concentrative tendencies, socialist nation-wide spatial policies applied the approach of “decentralised concentration”, relevant especially at lower hierarchical levels. At the regional level, a strictly normative approach to delimitations of centres (the initial definition of the central settlement system from the 1960s) was relaxed in the 1980s. Although the places of concentration of human and economic resources were still seen as growth poles, their potential to generate economic profit was tightly connected to their specific spatial, economic and social advantages supporting concentration tendencies (Terplan, 1981). As a result, the revised concept of the socialist settlement system was based on the delimitation of a hierarchical settlement system reflecting the main functions of potential centres and the broader spatial context.

In the 1980s, centres were defined by using information about a settlement’s functions and its regional significance (Terplan, 1985). The importance of centres was generally based on two indicators. The primary characteristic concerned the main types of residential, job and service functions. The second and rather additional indicator assessed the regional significance of centres by comparing the size of its respective micro-regions. a criterion of minimum functional size was adopted to determine settlement centres. In some relevant cases, a centre was represented by the organic integrity of more than one municipality. In other words, intensive mutual relations between settlement centres, expressed by mutual work commuting flows, served as a supplementary indicator to determine the final list of 338 centres (from 7,511 municipalities in 1970) at the national level, and 43 centres in the case of the South Moravian Region (in its present delimitation).

Using the two previously-mentioned indicators, the defined centres were divided into four main categories (see Tab. 1). The first category (A) represents basic settlement centres characterised by a low frequency of units and a large inner differentiation of the significance of centres. Besides the capital Prague, which is the only macro-regional centre, this category includes meso-regional centres with distinctive levels of significance. Basic settlement centres are predominantly centres and other larger settlements of the highest-level administrative units – regions – in their former delimitation. Secondary settlement centres (B) are micro-regional centres with relatively great importance for their hinterlands. Supplementary settlement centres (C) are micro-regional centres typified by looser relations between functions of centres and their regional significance and by more variability in a centre’s development potential. Spatial context and other features concerning position within the settlement system are important for planning intentions. Other settlement centres (D) play the role of sub-regional centres with local significance.

With respect to the principles of the current territorial cohesion policy, the basis for regional spatial planning policies in the Czech Republic is represented by the Spatial Development Principles (USB, 2015) and the Territorial Study of Settlement Structure (UAD Studio, 2014). In

Category	Settlement centres	Hierarchical level	Sub-categories	Number (SMR)
A	Basic	Macro-regional	A	0
		Meso-regional	A1 strong	1
			A2 medium	0
			A3 weak	0
B	Secondary	Micro-regional	B1 very strong	0
			B2 strong	1
			B3 medium strong	2
C	Supplementary	Micro-regional	C1 medium	2
			C2 weak	4
			C3 very weak	10
D	Other	Sub-regional	D	23
Sum				43

Tab. 1: Categories of centres based on their function and regional significance (in 1985) and their presence in the South Moravian Region (SMR)

Source: Terplan (1985); authors’ calculations

the case of the South Moravian Region, a municipality with production and service potential is understood as a centre (UAD Studio, 2014). Centrality is thus determined essentially by potential job opportunities, causing work-in-commuting flows, and by the potential of service functions affecting in-commuting flows in terms of different types of services (retail, cultural facilities, social care, health care, administrative functions, etc.). Moreover, the importance of residential functions is also considered. Nevertheless, a purely quantitative approach including evaluation of the occurrence and prevalence of specific types of services or functions is not applied. Besides quantitative indicators (static and dynamic), settlement context and the embeddedness of a specific centre in broader functional relationships are taken into account.

Focusing on the delimitation made in 2014, the final number of centres in the South Moravian region is 54 (from 647 municipalities). The regional capital Brno is identified as a supra-regional centre (the only one in the region). Then, there are regional centres, sub-regional centres, micro-regional centres, and local centres (see Tab. 2). The hierarchical categorisation is complemented by the positional typology of each centre, however. In this context, a centre could be the core of Brno metropolitan region (BMR), situated within BMR (strict and looser delimitation), part of another agglomeration, networked with other centres, autonomous, or a periphery centre.

In general, methodological approaches to the delimitation of centres in both time periods show similar features. Primarily, both analyses are based on quantitative methodology concerning jobs and the services and residential functions of municipalities. Although this could result from the limited availability of municipal data, the focus on jobs and service functions is a traditional way to identify settlement centres. Secondly, the position and significance of centres within the settlement system is based on horizontal linkages and the potential integrity of particular territories. But, in fact, emphasising the importance of relational aspects with regard to the identification of centres is a typical concern of current analytical approaches. Thirdly, although the comparison of results could be problematic due to different scales and

methods employed in both analyses, the distribution pattern of centres varies to a smaller extent and the main centres preserve their importance (see Fig. 3). The categories of centres determined in 1985 have been assigned to the nine categories created in 2014. A regional analysis from 2014, however, defines a large number of categories and thus the comparison should not be overestimated. It serves especially as a graphical visualisation and summary of the principal outcomes of the empirical investigation.

4. Discussion and conclusions

This paper examined territorial cohesion discourses characteristic for spatial planning doctrines in two historically distinctive periods of time. Comparing the current territorial cohesion concept pervading EU Cohesion policy and the spatial planning strategies at lower geographical (administrative) levels with socialist planning doctrine in the Czech Republic, the work reveals remarkable similarities not only in the spatio-political normative narratives but also in analytical practices of spatial planning mechanisms. In spite of ideological contradictions between both spatial planning doctrines emphasising social solidarity within spatial contexts, there is a shared principle of spatial development strategies. Uneven development is thus understood as a consequence in part of spatial inequalities resulting from various levels of territorial potential. Such a common ground is essential for the subsequent interpretation of particular narratives and analytical procedures.

The EU territorial cohesion concept could be understood as a political goal and also as a tool designed to ensure 'spatial' solidarity across the EU territory. Despite several attempts to clarify the concept (e.g. Faludi, 2004; Servillo, 2010), its multidimensional character does not allow a simple definition. The abstract meaning of the concept becomes clearer when territorial cohesion is reflected in spatial planning strategies and the structure of urban systems is questioned. In that case, supporting small and medium-sized towns as local centres, as well as metropolitan regions as growth poles of the EU and national economies, is a typical practical application of the territorial cohesion concept. Natural concentration processes increase the importance of the largest agglomerations while

Category	Settlement centres (hierarchical level)	Sub-categories	Number (SMR)	Positional typology*	Category (1985 delimitation)
1	Supra-regional	–	1	a	A1
2	Regional	I.	1	f	B2
3		II.	6	f	B3
4	Sub-regional	I.	6	b, c, f	C1
5		II.	6	c, e, f	C2
6	Micro-regional	I.	9	a, c, d, e, f	C3
7		II.	8	c, d, f, g	D
8	Local	I.	12	b, c, d, f, g	D
9		II.	5	b, c, d, f	D
Sum			54		

Tab. 2: Categories of centres based on production and service potential (in 2014) and their presence in the South Moravian Region (SMR). Source: UAD Studio (2014); authors' calculations

Note: *a = the core of the Brno Metropolitan Region (BMR); b = within BMR (strict delimitation); c = within BMR (looser delimitation); d = part of other agglomeration; e = networked with other centres; f = autonomous; g = periphery centre

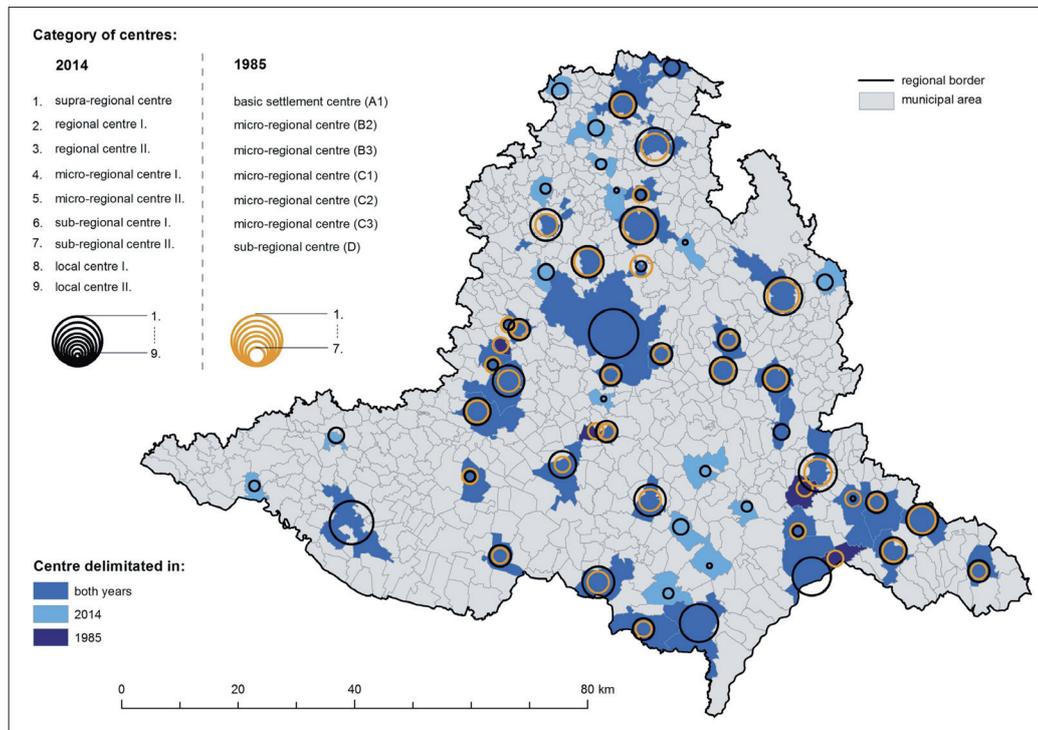


Fig. 3: Delimitation of settlement centres in the South Moravian Region by UAD Studio in 2014 and Terplan in 1985
 Sources: UAD Studio (2014), Terplan (1985); authors' elaboration

peripheral localities experience dramatic losses of population and economic power. a territorial cohesion policy aims at overcoming territorial disparities by finding solutions to the adverse situations of disadvantaged regions (EC, 2008). Similarly, the goal of socialist central planning was to eliminate economic and social disparities between cities and rural areas (Malík, 1976). The issue of spontaneous concentration (or de-concentration) processes was purposely mitigated (and ignored) in the initial phase of the socialist period in Czechoslovakia. To a certain extent, however, the 'failure' of the central settlement system approach enabled the formation of a more complex and integrated approach to spatial development. The realisation of the economic significance and specific functioning of urban regional agglomerations was a first step to modify the previous strict normative planning strategy into a more contextualised approach, respecting the distinctive qualitative nature of specific spatial units. Thus, both territorial cohesion discourses are characterized by a relatively substantial concentration/de-concentration duality.

Reviewing the analytical procedures and outcomes of both spatial planning doctrines we can argue that spatial pattern of agglomerations/metropolitan areas in the Czech Republic has not changed in a significant way. Nevertheless, the socialist approach was based on a slightly different understanding of urban agglomerations: although an agglomeration consisted of several spatial units, linkages between them were planned as vertical policies with the focus on coordination of economic development and housing. On the other hand, the current delimitation of ITI metropolitan regions respects increasing de-concentration processes, the functional specialisation of secondary centres emerging in mutual horizontal linkages between the spatial units, and the growing importance of the core city or entire metropolitan region for more distant municipalities (i.e. the larger area of ITI metropolitan regions as a consequence). Regardless of distinct internal processes, metropolitan areas are seen as specific spaces (territories

in EU rhetoric) with great impacts on national (European) development, especially in terms of economic prosperity, and as units exceeding traditional administrative boundaries and requiring integrated planning tools.

Information about the analytical elaboration of the normatively-defined goal of supporting small and medium-sized towns is provided by the delimitation of centres at the regional level. The socialist delimitation worked with the absolute importance of centres (defined by jobs, service and residential functions), and the broader context including relations with surrounding municipalities played only a supporting role. Greater emphasis is put on the capability of centres to create their own catchment areas in the current delimitation. Due to the enormous stability of settlement systems, however, and despite transformation processes in the Czech Republic in the 1990s, the outcomes of both delimitations show a considerable degree of accordance. With regard to the type of centres in terms of their functions and desired (planned) development, any contradictory distinction between socialist and current spatial planning is mainly based on related economic systems and modes of production.

In the case of centres located in peripheral and rural areas, socialist planners accentuated agricultural functions with a strictly defined hierarchy depending on specific localisation related to agricultural land and potential consumption. The development of other centres was closely linked with industrialisation and agricultural mass production (Malík, 1976). Today, the centrality of peripheral centres is related to a broader spectrum of functions and activities and is more dependent on the position of the centre within the urban network.

In terms of spatial planning policies, the territorial cohesion concept does not represent a completely new spatial planning strategy, at least in the former socialist countries and especially in the Czech Republic. In spite

of different ideological backgrounds, planned balanced spatial development is typical for both territorial cohesion discourses. As a common objective, spontaneous concentration processes should be counterbalanced by the growing prosperity of peripheral and rural regions. While socialist policies aimed at ensuring prosperity by direct investments in the production functions in central settlements, current EU regional policy intends to enhance the adverse situations of peripheral areas by strengthening local entrepreneurship, especially through the investments in the form of subsidies from the EU structural funds. The centralist top-down approach of socialist spatial planning has been replaced by a more decentralised system, characterised by a certain level of autonomous decisions concerning the spatial development of particular territories and a more limited power of the state apparatus. In contrast with the socialist regime, contemporary spatial planning policy is applied within a distinctive socio-economic context: a free market environment; intensive mobility; international trade; and globalisation influences. In this matter, the EU goal of territorial cohesion seems to play the role of a socially-motivated 'rescuer' of areas not profiting from the capitalist economic system. As natural concentration processes continue, however, with the increasing importance of the largest agglomerations and metropolitan regions projected in the support of growth poles (ITI), one can seriously doubt improved cohesion for the most disadvantaged areas. This leads us to essential questions concerning the functioning mechanisms of a capitalist economy tightly connected to the concentration of wealth, production or even ideas into a relatively small number of key development centres.

Learning from the mistakes of socialist spatial planning associated mainly with the partial ignoring of regional and local specificities, current European spatial planning policies should be aware of the problems related to the strict following of normative concepts and grand narratives. Urbanisation processes emerge in a rather natural (or at least politico-economic) way, and thus spatial planning practices should be based on complex and integrated planning concepts and instruments. Instead of a non-effective application of a normatively-defined spatial redistribution of centres, contemporary territorial cohesion discourse places an emphasis on the advantages resulting from spatial diversity and the particularities of unique localities. Nevertheless, EU territorial cohesion policies build on grand narratives, including access to SGEI, polycentricity, or territorial capital with the purpose of continuous economic prosperity. Territorial cohesion practice should not be limited only to a growth and competitiveness rhetoric, but rather the regional diversities stemming from the varieties of European territories should be brought to the forefront of interest. In the context of the negative historical experiences of the former socialist European countries with central planning mechanisms, skepticism towards top-down spatial planning equalising policies is a legitimate concern. As a multi-scalar and multidimensional concept, territorial cohesion attempts to grasp all of the issues linked with regional development – without a real awareness of the complicated realisation of this task with respect to the site-specific character of spatial inequalities. In this regard, understanding territorial cohesion as a place-based approach, even though it disregards to some extent the complexity of local development and requires different scenarios and practices in different spaces, seems to be a crucial interjection in order to move forward the effectiveness and comprehension of the territorial cohesion concept.

Acknowledgements

This work was supported by the specific research project MUNI/A/1315/2015 "Integrovaný výzkum environmentálních změn v krajinné sféře Země" ("Integrated research on environmental changes in the Earth's landscape") and by the Czech Science Foundation (grant number GA13-31351S "Transformations in Czech urban and regional system: from hierarchical organization to polycentric settlement").

References:

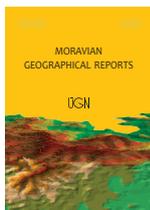
- BÖHME, K., DOUCET, P., KOMORNICKI, T., ZAUCHA, J., ŚWIĄTEK, D. (2011): How to strengthen the territorial dimension of Europe 2020 and the EU Cohesion Policy. Warsaw.
- BURNHAM, J. (1999): Contrasts and contradictions in French regional policy: from de Gaulle to Chirac, from the Treaty of Rome to the Treaty of Amsterdam, from central direction to local cooperation. In: Allison, M., Heathcote, O. [eds.]: Forty Years of the Fifth French Republic: Actions, Dialogues and Discourses (pp. 77–94). Bern, Peter Lang.
- ČSÚ (2014): Regional Office Brno [online]. Czech Statistical Office website [cit. 17.07.2015] Available at: <<https://www.czso.cz/csu/xb>>
- DAVOUDI, S. (2005): Understanding Territorial Cohesion. Planning, Practice & Research, 20(4): 433–441.
- DINGSDALE, A. (1999): New Geographies of Post-Socialist Europe. The Geographical Journal, 165(2): 145–153.
- DOUCET, P. (2006): Territorial Cohesion of Tomorrow: A Path to Cooperation or Competition? European Planning Studies, 14(10): 1473–1485.
- EC (2004): Third report on economic and social cohesion. Luxembourg, Publications Office of the European Union.
- EC (2007a): Fourth report on economic and social cohesion. Luxembourg, Publications Office of the European Union.
- EC (2007b): Treaty of Lisbon: amending the Treaty on European Union and the Treaty establishing the European Community [online]. Official Journal of the European Union, C 306/1 [cit. 15.07.2015] Available at: <<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12007L/TXT&from=EN>>
- EC (2008): Green Paper on Territorial Cohesion: Turning territorial diversity into strength [online]. COM(2008) 616 final [cit. 16.07.2015] Available at: <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0616:FIN:EN:PDF>>
- ENYEDI, G. (1990): New Basis for Regional and Urban Policies in East-Central Europe. Pecs: Centre for Regional Studies of Hungarian Academy of Sciences Discussion Paper No. 9.
- ENYEDI, G. (1996): Urbanization under socialism. In: Andrusz, G., Harloe, M., Szelenyi, I. [eds.]: Cities after socialism. Urban and regional change and conflict in post-socialist societies (pp. 100–118). Oxford, Wiley-Blackwell.
- EU Ministers responsible for Spatial Development (2011): Territorial Agenda of the European Union 2020 [online]. Agreed on 19 May 2011, Gödöllő [cit. 17.07.2015] Available at: <<http://www.eu2011.hu/files/bveu/documents/TA2020.pdf>>

- EVERS, D. (2008): Reflections on Territorial Cohesion and European Spatial Planning. *Tijdschrift voor Economische en Sociale Geografie*, 99(3): 303–315.
- FALUDI, A. (2004): Territorial Cohesion: Old (French) Wine in New Bottles? *Urban Studies*, 41(7): 1349–1365.
- FALUDI, A. (2009): Territorial Cohesion under the Looking Glass [online]. Synthesis paper about the history of the concept and policy background to territorial cohesion [cit. 17.07.2015] Available at: <http://ec.europa.eu/regional_policy/archive/consultation/terco/pdf/lookingglass.pdf>
- FALUDI, A. (2013): Territorial cohesion, territorialism, territoriality, and soft planning: a critical review. *Environment and Planning A*, 45: 1302–1317.
- FINKA, M., KLUVÁNKOVÁ, T. (2015): Managing complexity of urban systems: A polycentric approach. *Land Use Policy*, 42: 602–608.
- GEORGE, S. (1996): *Politics and Policy in the European Union*. Oxford, Oxford University Press.
- HAMILTON, I. (1976): Spatial structure in east European cities. In: French, R.A., Hamilton, I. [eds.]: *The socialist city* (pp. 195–262). Chichester, John Wiley & Sons.
- HAMPL, M. (2005): Geografická organizace společnosti v České republice: Transformační procesy a jejich obecný kontext. Praha, Univerzita Karlova.
- HOFFMAN, L. (1994): After the fall: crisis and renewal in urban planning in the Czech Republic. *International Journal of Urban and Regional Research*, 18(4): 691–702.
- ILLNER, M., ANDRLE, A. (1994): The Regional Aspect of Post-Communist Transformation in the Czech Republic. *Czech Sociological Review*, 2(1): 107–127.
- KRAFT, S., HALÁS, M., VANČURA, M. (2014): The delimitation of urban hinterlands based on transport flows: A case study of regional capitals in the Czech Republic. *Moravian Geographical Reports*, 22(1): 24–32.
- KUNC, J., TONEV, P., FRANTÁL, B., SZCZYRBA, Z. (2012): Retail gravity models, shopping habits and shopping centres: The case of the Brno agglomeration (a contribution to the study of daily urban systems), *Sociologický časopis (Czech Sociological Review)*, 48(5): 879–910.
- MALÍK, Z., ČADA, R., LUKAŠÍK, M., MUSIL, J., ULIČNÝ, F., ZBOŘIL, M. (1968): *Kritéria racionálního rozvoje osídlení*. Brno, Výzkumný ústav výstavby a architektury.
- MALÍK, Z. (1976): *Urbanizace a rozvoj systému osídlení*. Praha, Výzkumný ústav výstavby a architektury.
- MALÝ, J. (2016): Impact of Polycentric Urban Systems on Intra-regional Disparities: A Micro-regional Approach, *European Planning Studies*, 24(1): 116–138.
- MAREŠ, J. (1988): Industrializace Československa – její klady a zápory. *Sborník Československé geografické společnosti*, 93(3): 183–198.
- MMR (2015a): *Politika územního rozvoje České republiky, ve znění Aktualizace č. 1*. Brno, Institute for Spatial Development.
- MMR (2015b): *Vymezení ITI/IPRU metropolitních regionů v ČR*. Internal document. Praha.
- MOLLE, W. (2007): *European Cohesion Policy*. Oxon, Routledge.
- MULÍČEK, O., TOUŠEK, V. (2004): Changes of Brno Industry and their Urban Consequences. *Bulletin of Geography*, 3: 61–70.
- MUSIL, J. (2001): Vývoj a plánování měst ve střední Evropě v období komunistických režimů – pohled historické sociologie. *Sociologický časopis*, 37(3): 275–296.
- MUSIL, J. (2002): Urbanizace českých zemí a socialismus. In: Horská, P., Maur, E., Musil, J. [eds.]: *Zrod velkoměsta: Urbanizace českých zemí a Evropa* (pp. 237–331). Praha-Litomyšl, Paseka.
- MUSIL, J., LINK, J. (1976): Urbanizace v socialistických zemích ve světle mezinárodních srovnání. In: Musil, J. [eds.]: *Otázky urbanizace. Sborník výzkumných prací kabinetu sociologie* (pp. 9–30). Praha, Výzkumný ústav výstavby a architektury.
- NEDOVIC-BUDIC, Z. (2001): Adjustment of planning practice to the new eastern and central European context. *Journal of the American Planning Association*, 67(1): 38–52.
- PALLA, V., MÁČEL, O., MALÍK, Z., LUKAŠÍK, M., ULIČNÝ, F., ČADA, R. (1962): *Základní otázky osídlení v ČSSR*. Brno, Výzkumný ústav výstavby a architektury.
- RYŠAVÝ, Z., DVOŘÁK, B., ŠIPLER, V. (1992): *Posouzení dřívějších koncepcí územního rozvoje České republiky*. Praha, Výzkumný ústav výstavby a architektury.
- SAUTER, W. (2008): Services of General Economic Interest and Universal Service in EU Law [online]. TILEC Discussion Paper No. 2008-017. *European Law Review* [cit. 13.07.2015] Available at: <<http://www.nza.nl/104107/230942/Research-paper-'Services-of-General-Economic-Interest'-2008-05.pdf>>
- SCHÖN, P. (2005): Territorial Cohesion in Europe? *Planning Theory & Practice*, 6(3): 389–400.
- SERVILLO, L. (2010): Territorial Cohesion Discourses: Hegemonic Strategic Concepts in European Spatial Planning. *Planning Theory & Practice*, 11(3): 397–416.
- SOJA, E. (1980): The socio-spatial dialectic. *Annals of the Association of American Geographers*, 70(2): 207–225.
- SOJA, E. (2009): The city and spatial justice [online]. *Justice Spatiale/Spatial Justice* 1 [cit. 13.07.2015] Available at: <http://www.jssj.org/wp-content/uploads/2012/12/JSSJ1-1en4.pdf>
- SOKOL, M. (2001): Central and Eastern Europe a Decade After the Fall of State-socialism: Regional Dimensions of Transition Processes. *Regional Studies*, 35(7): 645–655.
- SULKIEWICZ, M., ANDRLE, A., ŠTĚPÁNEK, M. (1981): *Koncepce urbanizace a vývoje osídlení krajů ČSR: Koncepce sídelního systému*. Praha, Terplan.
- SZCZEPAŃSKI, J., FURDYNA, A. (1977): Early Stages of Socialist Industrialization and Changes in Social Class Structure. *International Journal of Sociology*, 7(3/4): 11–36.
- SZELENYI, I. (1996): Cities under socialism – and after. In: Andrusz, G., Harloe, M., Szelenyi, I. [eds.]: *Cities after socialism. Urban and regional change and conflict in post-socialist societies* (pp. 286–336). Oxford, Wiley-Blackwell.
- TERPLAN (1981): *Koncepce sídelního skeletu: Výchozí podklady*. Praha.

- TERPLAN (1985): Brněnská sídelní regionální aglomerace. Územní plán VÚC. Praha.
- UAD STUDIO (2014): Územní studie sídelní struktury Jihomoravského kraje. Brno.
- USB (2015): Zásady územního rozvoje Jihomoravského kraje. In preparation. Brno.
- VENERI, P., BURGALASSI, D. (2012): Questioning polycentric development and its effects: Issues of definition and measurement for the Italian NUTS 2 Regions. *European Planning Studies*, 20(6): 1017–1037.
- VÚVA (1979): Zásady a pravidla územního plánování. Výzkumný ústav výstavby a architektury, Urbanistické pracoviště Brno.
- WATERHOUT, B. (2007): Territorial Cohesion: The Underlying Discourses. In: Faludi, A. [ed.]: *Territorial Cohesion and the European Model of Society* (pp. 37–59). Cambridge (MA), Lincoln Institute of Land Policy.
- WU, F. (2003): Transitional Cities. *Commentary. Environment and Planning A*, 35: 1331–1338.

Please cite this article as:

MALÝ, J., MULÍČEK, O. (2016): European territorial cohesion policies: Parallels to socialist central planning? *Moravian Geographical Reports*, 24(1): 14–26. Doi: 10.1515/mgr-2016-0002.



Are there differences in the attractiveness of shopping centres? Experiences from the Czech and Slovak Republics

Josef KUNC^{a*}, František KRIŽAN^b, Kristína BILKOVÁ^b, Peter BARLÍK^b, Jaroslav MARYÁŠ^a

Abstract

The measurement and evaluation of the attractiveness of shopping centres in the Czech and the Slovak Republics is examined in this paper, countries which had experienced seventy years of development within a single state. The methodological basis for measuring the attractiveness of 130 shopping centres is an evaluation of the factors that can be described as objective (exogenous and endogenous) and subjective (in vivo and in vitro approach). An aggregate indicator of the overall attractiveness of each shopping centre was computed as a combination of the sub-variables. Based on previous international studies, the factors (variables influencing attractiveness) that are typical for shopping malls anywhere in the world, as well as for the original specific information for the Czech-Slovak retail environment, enable a generalization of the results at least to the East Central European level, and to carry out a comparison with any other market environment.

Keywords: shopping centres, attractiveness, similarities and differences, Czech Republic, Slovak Republic

Article history: Received 4 May 2015; Accepted 29 January 2016; Published 31 March 2016

1. Introduction

The phenomenon of shopping centres¹ is probably the most significant manifestation of current retail business in both the Czech and the Slovak Republic. We mean not only the frequently hard-to-overlook physical appearance, but especially the social and cultural phenomena of shopping centres, which has modified long-established patterns of (not only) shopping behaviours and shopping customs of the majority of the population (Grosmanová et al., 2015; Križan, 2009; Križan et al., 2014; Kita and Grosmanová, 2014; Kunc et al., 2013; Spilková, 2012a, 2012b; Timothy, 2005).

The main role of retailing, the sales of goods and services to final consumers, has been transforming into its contemporary format for several decades. Continually accelerating globalisation and internationalisation trends are reflected in hurried and hectic ways of life and lack of time (Giddens, 2002). The new dimensions of large-area chain stores and shopping centres have not only pushed the formerly traditional forms of retail shopping out of the attention of

shoppers (Szczyrba, 2005), but shopping centres have replaced to a large extent traditional public spaces with everything that belongs in them (Cooper, 2007; Jackson et al., 2011; van Leeuwen, Rietveld, 2011; Voyce, 2006). Many commercial and non-commercial functions (e.g. catering, post offices, banks, medical offices, etc.) have gradually “moved over” from individual municipal districts to the shopping centres. As indicated by Spilková and Hočeľ (2009) and Pospěch (2010), shopping centres became one of the key bearers of changes in the consumer societies of post-socialist countries.

If we follow the relationship between shopping and place of purchase, we find that it does not always have to serve the economic reasons of the rational consumer. This disproves the previously-accepted opinions that a consumer prefers minimal mobility for shopping and behaves entirely economically, as indicated in the earlier previous research by Rushton (1969) and Potter (1979). Later work showed that the consumers choose their place of purchases according to other factors, e.g. choice of goods, good service, services,

^a Department of Regional Economics and Administration, Faculty of Economics and Administration, Masaryk University, Brno, Czech Republic (*corresponding author: Josef Kunc, e-mail: kunc@econ.muni.cz)

^b Department of Regional Geography, Protection and Planning of the Landscape, Faculty of Natural Sciences, Comenius University in Bratislava, Bratislava, Slovak Republic

¹ To find uniform criteria for the classification of shopping centres remains difficult; we will use the methodological approach of the European classification of ICSC (2005), i.e., with respect to Cushman & Wakefield (2011), with a gross leasable area of 5,000 m². In the Czech Republic, this database represents 83 shopping centres and in the Slovak Republic, 47.

size, cleanliness, atmosphere, shops, and the level of the attractiveness of a shopping place. Experience shows that people often do not respect the logic of economic thinking and they do not follow strictly economic aspects. As reported by Walmsley and Lewis (1984), if a large modern business centre, offering high-quality services, a wide range of goods, good prices, etc. was built in a certain town, not all people around would do their shopping in it. On the contrary, it would be possible to observe shoppers from relatively long-distance locations. It turns out that shopping is influenced by many factors varying in time and space, and that it is a relatively complicated social phenomenon.

Thus, consumer behaviours cannot be simplified and summarized in some general model. They are continually shaped by the influences of specific changes in the retail sector and in retail networks. Golledge and Stimson (1997) and Spilková (2003) describe the formation of the process of shopping behaviour in economies of transformation as a transition between the phases of the organisation of society and the economy, i.e. the transition from socialism through a transitional phase to the market economies. Shopping behaviour is not just a repeating unchanging activity, but it is going through processes of forming. A consumer goes through the process of space searching, before collecting the necessary information about retail opportunities, so that s/he can subsequently exclude those that are unfavourable unattractive ones.

Modern malls became “worlds in themselves” (Crawford, 1992), comprised of shopping services as well as social and cultural activities (Kunc et al., 2012a, 2012c), and people like to “gravitate” (Wolf, 2003) towards these “magnets”. The objective of this paper is to measure the attractiveness of the shopping centres in the Czech Republic and Slovakia, with an emphasis on exogenous (localization) and endogenous (operation and assortment) factors, and a summary (subjective) measure of centre attractiveness for potential visitors. The methodological approach is based on numerous examples of similar empirical studies dealing with the different ways of measuring the attractiveness of shopping centres. On the other hand, the specifics of the Czech-Slovak retail environment introduce an original element to the study of attractiveness. The data and information on the two case study countries are not bounded determinants, but they are shifting the results to implications and generalisation. Moreover, the variables used (factors determining attractiveness) are so typical of studies of most shopping centres in the world that they cannot be completely avoided in similar analyses. Thus the results of the study can be used for broader comparisons beyond the limits of East Central Europe.

In the first place, this contribution is trying to answer the following questions:

- Q1: *Is the attractiveness of shopping centres similar in the Czech and Slovak Republics? Is this the case in terms of the character of the countries and consumer behaviours resulting from the cultural and historical contexts of East Central Europe?*
- Q2: *In general, is the attractiveness of the shopping centres linked to the size of the city, its institutional position (state capitals versus regional centres), and location “inside” the city?; and*
- Q3: *What is the impact of endogenous and exogenous factors, as well as the subjective factors, on the aggregate aspect of attractiveness?*

This paper is divided into four sections. After the theoretical introduction, the phenomenon of shopping centres in the Czech and Slovak Republics is discussed. The methods and data used in the analysis are then discussed, followed by the results in terms of the existing literature. After the conclusions, some major limitations of the empirical study and ideas for future research are discussed.

2. The attractiveness of shopping centres

Shopping centres or retail outlets generally compete with each other for customers. They are trying to attract clients with a range of shops and services, entertainment and various events, as well as new channels of sales and place marketing (Teller and Elms, 2012; Warnaby et al., 2005). As claimed by Finn and Louviere (1996, p. 241), most research that has collected image ratings data for shopping centres has studied a limited number of centres and analysed the dimensionality of the image data across consumers. But, from a management perspective, it is not clear why shopping centre managers would be concerned about the dimensionality of image (in this case attractiveness) when the analysis is conducted using a sample of consumers. From a manager's perspective, it may be more important to identify centre characteristics that determine the image of the shopping centres in their market. Teller et al. (2015) see the managers as key to unlocking potential and consequently building up a competitive advantage for the network and its nodes. More specifically, a manager's willingness and ability to collaborate and thereby cross boundaries to other stores (shopping centres) is the important factor.

All of these as well as other characteristics of retail create its attractiveness. Therefore, the issue of the attractiveness of shopping centres has gained the attention of the academic community as well as practice in recent years, as evidenced by the number of expert studies (e.g. Arentz and Timmermans 2001; Awang et al., 2013; Burns and Warren, 1995; Dębek, 2015; Guy, 1998; Lusch and Serpkenci, 1990; Teller and Alexander, 2014; Teller and Reutterer, 2008; Teller and Elms, 2010).

The attractiveness of shopping centres is influenced by many characteristics, which can be divided into four groups (Teller and Reutterer, 2008): i) site-related factors; ii) tenant-related factors; iii) environment-related factors; and, iv) the buying situation-related factors. These groups of factors include a wide variety of more specific factors (Dębek, 2015; Micu, 2013; Teller, 2008; Teller and Elms, 2010, 2012, and others).

The factors of “accessibility” and “parking” are important in the group of site-related factors. In general, we can say that the attractiveness of a shopping centre decreases with distance (accessibility) to the centre (Dennis et al., 2002a). Retail agglomerations are attractive for consumers because they reduce the cost and time of travel, as the closer they are, the fewer trips are required (Ghosh, 1986). Research has shown that larger shopping centres offering free car parking are often perceived as more attractive than traditional town centres (Timmermans, 1996; Teller and Reutterer, 2008). Moreover, the availability of public transportation near to shopping centres may influence the choice of place of purchase (Ibrahim and McGoldrick, 2003). The parking possibilities also influence the comfort of purchase (Alzubaidi et al., 1997). A study by Marjanen (1995) points out that parking facilities, a large shopping area and the availability of more diversified goods influence shopping. On

the other hand, the significance of the factor of parking has been discussed, as some studies question the impact of this factor on retail turnover (cf. Mingardo and Meerkerk, 2012; van der Waerden, 1998).

The second tenant-related group involves two groups of factors (Teller and Reutterer, 2008). The first group of factors represents “mix of retail-tenants” and the second “mix of non-retail tenants”, such as gastronomy and entertainment facilities (bars, restaurants or cinemas) (Garg and Steyn, 2014; Wakefield and Baker, 1998). Tenant mix (retail and non-retail) affects the success of the mall, because a proper tenant mix can attract more patrons and thus increase the sales of retailers (Abrate et al., 1985). On the other hand, it should be noted that an appropriately selected tenant mix can cause some synergistic effects (Mejia and Epple, 1999). It can also be due to the fact that “anchor stores” attract the highest or a higher share of customers in comparison with other smaller retail tenants (Levy and Weitz, 2006). As claimed by Bean et al. (1988), the concept of an ideal tenant mix has not yet been formulated, which provides reasons for further research in this area (Garg and Steyn, 2014; Plăiaş and Abrudan, 2013). Generally, this group of factors is considered to be that with the highest relative importance (Teller, 2008).

The environment-related factors in the third group include factors such as “orientation” and “ambience” (Teller and Reutterer, 2008), but mainly “atmosphere” (Wakefield and Baker, 1998). Atmosphere is the first and sometimes the most important factor affecting the attractiveness of a shopping centre (cf. Turley and Milliman, 2000). As Teller et al. (2010) noted, the retail tenant mix and the atmosphere are the most important influencing factors. More specifically, the effects of retail tenant mix are strongest where there is a direct influence on the three endogenous factors. Atmosphere has a direct effect on satisfaction and retention proneness, with patronage intention being only indirectly affected. On the other hand, it should be noted that analysis of the attractiveness in terms of atmosphere is not clearly given, since the research concepts are diverse (Debek, 2015).

The last group of factors is represented by the buying situation-related factors. This is a subjective factor evaluated from an individual’s point of view and includes two factors (Teller and Reutterer, 2008): the perceived ‘distance’ between the starting point of a specific trip and the destination of choice; and the perceived importance of a shopping trip, measured in terms of an individual’s ‘involvement’.

The attractiveness of a shopping centre can be measured by various methods, normally thought of as two approaches. The first of them utilizes primarily quantitative methods based on interaction models (Reilly, 1931, Huff, 1963). In the field of retail marketing, studies evaluating the attractiveness of retail locations have been classified by Teller (2008) in the following research streams:

1. approaches based on spatial interaction theory;
2. models of retail attraction based on random utility theory; and,
3. multiplicative competitive interaction models.

Such models refer to the establishment of “objective” criteria for attractiveness in terms of retail consumer perceptions. The second group is represented by methods evaluating the attractiveness to consumers primarily by applying more qualitative methodologies such as interviews and questionnaires, in particular in-home interviews or

telephone surveys (Teller and Reutterer, 2008). While the first group of methods has a dominantly spatial character in an effort to determine the boundaries of the impact of retail units, the second group has a socio-economic nature in order to tackle place marketing.

3. Methods and data

Evaluation of the attractiveness of shopping centres is based on the preferences of consumers as the main factor determining attractiveness in many studies (McGoldrick and Thompson, 1992; Oppewal et al., 2006; Teller, 2008). Retail attraction research can be categorized as two approaches (Teller and Reutterer, 2008). The first of them, “*in vitro*”, uses interviews or telephone surveys, which requires strong imaginary skills (particularly with regard to unfamiliar retail sites) and/or the high shopping involvement of respondents. The second approach can be called by analogy “*in vivo*”, as it requires the analyst to confront respondents with more realistic shopping tasks or even real shopping situations. The evaluation of the preferences of a representative sample of respondents can be considered particularly demanding in order to analyse the 130 shopping centres in the two countries (Tab. 1). Therefore, we used a special case of the “*in vitro*” approach in this contribution.

In general, the attractiveness of shopping centres can be evaluated by the following variables: availability, number of parking places, size of leasable area, structure of retail stores, business hours, atmosphere/visual characteristics of the shopping centre, pricing, social events, etc. (Donovan and Rossiter, 1982; Nevin and Houston, 1980; Teller, 2008; Teller and Reutterer, 2008; Sit et al., 2003; Uschev et al., 2015; Wakefield and Baker, 1998). In this study, the attractiveness of the shopping centres was evaluated on the basis of the factors divided into three groups: A) exogenous; B) endogenous; and, C) complex factors (Tab. 2).

The factors under evaluation are articulated in various units of measure, which makes it impossible to compare them. Therefore we have standardised the quantified measures using Z-scores. Using this method, we have eliminated the dependence of the data on the units of measurement and on the location and variance parameters. These standardised data were subsequently individually assessed for each shopping centre according to the following formula:

$$AM_i = \left(\sum A_{i1} + A_{i2} + A_{i3} \right) + \left(\sum B_{i1} + B_{i2} + B_{i3} \right) + \frac{\sum C_{i1}}{n_i}$$

where,

AM_i is the measure of (aggregate) attractiveness for shopping centre i ; A_{in} is an exogenous factor n for shopping centre i , ($n = 1, 2, 3$); B_{in} is an endogenous factor n for shopping centre i , ($n = 1, 2, 3$); C_{iI} is a complex factor for shopping centre I , and n_i is the number of evaluated factors for shopping centre i .

Similarly to the quantification of the complex factor C, the empirical estimation of 10 experts, both from the business and academic environments, was used to establish the aggregate measure of attractiveness AM (“*in vitro*” approach). The expert group was provided with data for all factors under assessment (A, B and C) and, according to the variable values, they independently and anonymously defined limits for five categories of shopping centre attractiveness: (1) very high; (2) moderately high; (3) average; (4) limited; and, (5)

Czech Republic					
No.	Name	City	No.	Name	City
1	Centrum Černý Most	Praha	46	OC Laso Ostrava	Ostrava
2	Avion Shopping Park	Brno	47	OC Šestka	Praha
3	Spektrum	Průhonice Čestlice	48	Obchodní centrum DBK	Praha
4	NC Borská Pole	Plzeň	49	OC Novodvorská Plaza	Praha
5	Avion Shopping Park	Praha	50	OZC Zlaté jablko	Zlín
6	Nákupní centrum Průhonice	Říčany u Prahy	51	NC Géčko České Budějovice	České Budějovice
7	Olympia Brno	Brno	52	OC Dragoun	Cheb
8	OC Grand Pardubice	Pardubice	53	NC Géčko Liberec	Liberec
9	OC Letňany	Praha	54	Bondy centrum	Mladá Boleslav
10	GECO Ústí Všebořice	Ústí nad Labem	55	Plzeň Plaza	Plzeň
11	OC Futurum	Hradec Králové	56	OC Galerie Dvořák	Plzeň
12	OC Futurum	Ostrava	57	Palladium	Praha
13	Cíl Praha	Praha	58	Campus Square	Brno
14	Park Hostivař	Praha	59	City Park Jihlava	Jihlava
15	Centro Zlín Malenovice	Zlín	60	NC Oaza Kladno	Kladno
16	OC Futurum	Brno	61	OC Futurum Kolín	Kolín
17	Velký Špalíček Brno	Brno	62	Nisa Center	Liberec
18	Čtyři Dvory	České Budějovice	63	Central Most	Most
19	Olympia Mladá Boleslav	Mladá Boleslav	64	Afi Palace Pardubice	Pardubice
20	Avion Shopping Park	Ostrava	65	Galerie Fénix	Praha
21	OC Nový Smíchov	Praha	66	Arkády Pankrác Praha	Praha
22	EuroCenter Hradec Králové	Hradec Králové	67	OC Atrium	Hradec Králové
23	OC Haná Olomouc	Olomouc	68	OC Rýnovka	Jablonec nad Nisou
24	OC Plzeň	Plzeň	69	Galerie Liberec Plaza	Liberec
25	Metropole Zličín	Praha	70	Forum Liberec + My Tesco	Liberec
26	OC Europark	Praha	71	Forum Ústí nad Labem	Ústí nad Labem
27	Olympia Teplice	Teplice	72	Chomutovka	Chomutov
28	OC Fontána	Karlovy Vary	73	Galerie Harfa	Praha
29	OC Karviná	Karviná	74	OC Galerie Moritz	Praha
30	Palác Flóra	Praha	75	Breda & Weinstein	Opava
31	NC Královo Pole	Brno	76	OC Forum Nová Karolina	Ostrava
32	IGY Centrum	České Budějovice	77	Galerie Šantovka	Olomouc
33	Olympia Olomouc	Olomouc	78	Centrum Krakov	Praha
34	OC Silesia	Opava	79	Fontána Teplice	Teplice
35	Olympia Plzeň	Plzeň	80	Centrum Pivovar Děčín	Děčín
36	Galerie Vaňkovka	Brno	81	OC Lužiny	Praha
37	OC Cukrovar	Hodonín	82	Florentinum	Praha
38	OC Varyáda	Karlovy Vary	83	Galerie Teplice	Teplice
39	Olomouc City	Olomouc			
40	OC Galerie	Ostrava			
41	Galerie Butovice	Praha			
42	Centrum Chodov	Praha			
43	NC Eden	Praha			
44	Centrum Zlín Čepkov	Zlín			
45	Mercury Centrum	České Budějovice			

Tab. 1: List of shopping centres (ranked according to the date of opening)

Source: Retail Book (2010, 2014); author's survey based on the websites of the particular shopping centres

Slovak Republic					
No.	Name	City	No.	Name	City
1	Polus City Center	Bratislava	26	Galéria Dunajská Streda	Dunajská Streda
2	Danubia	Bratislava	27	Jasna Shopping City	Liptovský Mikuláš
3	Aupark	Bratislava	28	Zemplín	Michalovce
4	Cassovia Košice	Košice	29	Galéria Nitra	Nitra
5	Dubeň Žilina	Žilina	30	ZOC MAX Prešov	Prešov
6	Avion Shopping Park	Bratislava	31	Apollo Business Center II	Bratislava
7	Optima Košice	Košice	32	Galéria Košice	Košice
8	Saratov Bratislava	Bratislava	33	Galéria Mlyny	Nitra
9	Shopping Palace Zlaté Piesky	Bratislava	34	Madaras	Spišská Nová Ves
10	ZOC MAX Trnava	Trnava	35	Laugaricio Trenčín	Trenčín
11	Apollo Business Center I	Bratislava	36	Galleria Eurovea	Bratislava
12	OC Mólo	Pezinok	37	Galéria Cubicon	Bratislava
13	ZOC MAX Poprad	Poprad	38	Aupark Piešťany	Piešťany
14	ZOC MAX Trenčín	Trenčín	39	OC Korzo Prievidza	Prievidza
15	Europa Banská Bystrica	Banská Bystrica	40	Aupark Žilina	Žilina
16	Tulip Center	Martin	41	Mirage Žilina	Žilina
17	Centro Nitra	Nitra	42	Aupark Košice	Košice
18	ZOC MAX Nitra	Nitra	43	Centrál Bratislava	Bratislava
19	Galéria Trnava	Trnava	44	Trnava Park	Trnava
20	OC Hron	Bratislava	45	Europa Zvolen	Zvolen
21	ZOC MAX Dunajská Streda	Dunajská Streda	46	TMT Trnava	Trnava
22	Aquario Nové Zámky	Nové Zámky	47	Bory Mall	Bratislava
23	ZOC MAX Skalica	Skalica			
24	ZOC MAX Žilina	Žilina			
25	Galéria Bratislava-Lamač	Bratislava			

Tab. 1 continued

A) Exogenous factors	B) Endogenous factors	C) Complex factors
A1 Locality/Accessibility	B1 Size of leasable area	C1 Subjective categorization
A2 Parking	B2 Number/Structure of businesses	
A3 Potential customers	B3 Entertainment and leisure	

Tab. 2: Factors determining the attractiveness of shopping centres

Source: authors' design

insufficient. Final limits for the selected shopping centre categories were calculated by means of weighted averages of the proposed limits for the individual categories.

Other attributes of attractiveness, in the context of the size of the city's population, as well as the influence of factors on aggregate attractiveness, were evaluated on the basis of descriptive statistics. The results of these analyses were processed in graphics (CorelDRAW) and cartography (ArcMap) programs.

The data can be divided into four groups. The first group includes data from internal databases of the authors of this article, i.e. continuously collected data related to the retail field development and transformation within the particular country. The second group of data include internal databases of the individual shopping centres, focused on their internal structures and their retailing facilities. The third group

includes internal databases of the INCOMA and GfK survey agencies for recent years (2015). The last data group is based on field research. These data form the basis for our empirical approach to resolving these issues.

4. Results

The aggregate attractiveness of the shopping centres (AM) was analysed by the combination of the exogenous (A1–A3), endogenous (B1–B3) and complex factors (C1). In the following graphs (Fig. 1), indicators for individual Czech and Slovak shopping centres are presented.

Location and accessibility (A1) are the essential exogenous factors determining the attractiveness of a shopping centre. In this article, location is understood within the wider context of shopping centre accessibility, and was quantified from the centre of the city road network to the location of the shopping

centre, considering that cars are the most frequent means of transportation for shopping. The average accessibility of a shopping centre is 9.4 minutes in the Czech Republic and 6.4 minutes in Slovakia (Tab. 3). The value of the A1 factor exceeds the average (65.1%) in the Czech Republic for most shopping centres. This factor reaches below-average values for the shopping centres in Slovakia (48.9%). This selected indicator for shopping centre accessibility obtains higher values in smaller towns than in large cities (Fig. 1), as the centres are more accessible. On the contrary, shopping centres are frequently located at peripheries in more populous cities, resulting in higher travel costs.

The numbers of parking spaces are based on the shopping centre data. The average number of parking spaces per a shopping centre is 1,002 in the Czech Republic and 866 in Slovakia. For this indicator, the attractiveness of shopping centres reaches higher values in more populous cities than in less populous ones with regard to the numbers of potential consumers. It should be noted that shopping centres without available parking spaces were built both in the Czech Republic and in Slovakia (e.g. Galerie Moritz in Olomouc or SC Mirage in Žilina). These shopping centres are located in historical city centres.

A shopping centre's success depends on potential consumers (Huff, 1963), who are influenced by the shopping centre's attractiveness. Potential consumer quantification is based on the catchment area specification (Dennis et al., 2002) within a distance of 30 km using the Network Analyst tool from the ArcGIS environment. Empirically, we estimate that about 85% of consumers are included in these zones. The average number of potential consumers (A3) of Czech shopping centres is 720,943 and the difference between the minimum and the maximum is about tenfold. The average Slovak shopping centre has 356,780 potential consumers.

The endogenous factors represent the second group for this evaluation. The 'size of the leasable area' (B1) is one of the basic indicators of shopping centre classification (Lambert, 2006), and also of shopping centre attractiveness (cf. Coleman, 2012). The average Gross Leasable Area (GLA)

of a Czech shopping centre (26,799 m²) is almost 5,000 m² larger than that in Slovakia (21,946 m²). While the smallest centres in both countries are comparable, the difference between the largest shopping centre in the Czech Republic (OC Letňany in Prague, 125,000 m²) and the one in Slovakia (Avion Shopping Park in Bratislava, 84,000 m²) is over 50,000 m². The GLA is linked to the number of businesses (stores) and also to the location of significant magnets in the shopping centres. The smaller shopping centres that are characteristic of smaller towns, still significantly lag behind in their aggregate attractiveness.

The structure and the number of businesses (B2) are conditioned by the location of the magnet within the shopping centre. Brown (1993) calls this "magnet" as such stores that initially attract customers (according to Prendergast et al., 1998). The attractiveness of the magnet within a shopping centre draws not only higher consumer attention but also higher retail business concerns. The number of retail facilities indicates that the larger and frequently also more suitable mix of shops determine consumers' decision-making (Wakefield and Baker, 1998). The shopping centres are mutually comparable in the number of retail facilities in both countries. More numerous businesses are characteristic for Slovak shopping centres with GLAs smaller than those in the Czech Republic. Conversely, Czech shopping centres feature smaller numbers of business facilities within larger GLAs.

In the case of the indicator of entertainment and leisure (B3), the authors selected only the existence of a multiplex cinema with more than two theatres and with a common cinema format or IMAX large-scale cinema system with 3-D technology. Other potential attractors of entertainment and leisure time spending (gaming facilities, fitness centres, bowling, children's areas, climbing walls, etc.) hardly exert such a "mass" attractiveness for the visitors as the multiplex cinemas, not only in the Czech Republic but also in Slovakia (Ooi and Sim, 2007).

The complex factor (C1) was the last evaluated factor, based on a subjective categorization, representing the empirical approach of specialists from the fields of geography and economics. They established the subjective measure of

		N	Minimum	Maximum	Mean	Std. Deviation	t-values; df = 128; probability levels
A1	SC in CR	83	2	27	9.40	6.57	t = 2.89; p < 0.005
	SC in SR	47	1	16	6.40	3.65	
A2	SC in CR	83	0	4,027	1,002	814.22	t = 0.98; ns
	SC in SR	47	0	3,200	866	649.03	
A3	SC in CR	83	115,542	1,575,650	720,943	545,402.85	t = 4.46; p < 0.0001
	SC in SR	47	89,373	686,451	356,780	161,395.09	
B1	SC in CR	83	5,700	125,000	26,799	22,635.82	t = 1.42; ns
	SC in SR	47	5,200	84,000	21,489	16,184.51	
B2	SC in CR	83	15	250	81	50.48	t = 0.86; ns
	SC in SR	47	24	268	89	50.61	
B3	SC in CR	83	0	42	4.30	7.42	t = 0.24; ns
	SC in SR	47	0	21	4.00	5.68	
C1	SC in CR	83	1.0	5.0	3.27	1.03	t = 2.16; p = 0.033
	SC in SR	47	1.8	5.0	3.65	0.83	

Tab. 3: Descriptive statistics of attractiveness factors of shopping centres in the Czech and Slovak Republics
Legend: SC – shopping centre. Probability levels (ns = non-significant). Source: authors' survey

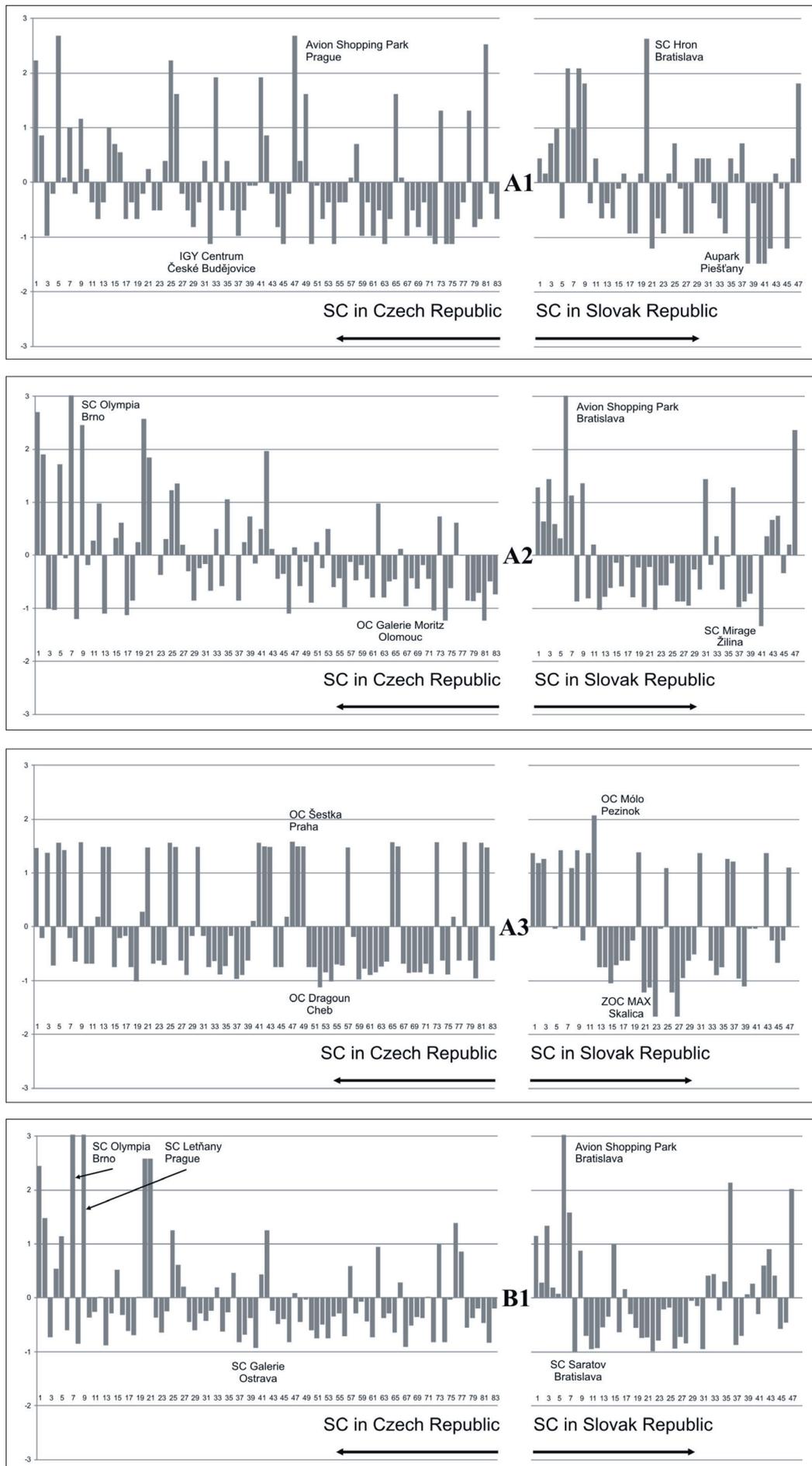


Fig. 1: The attractiveness indicators expressed by endogenous, exogenous and subjective factors (standardised values)

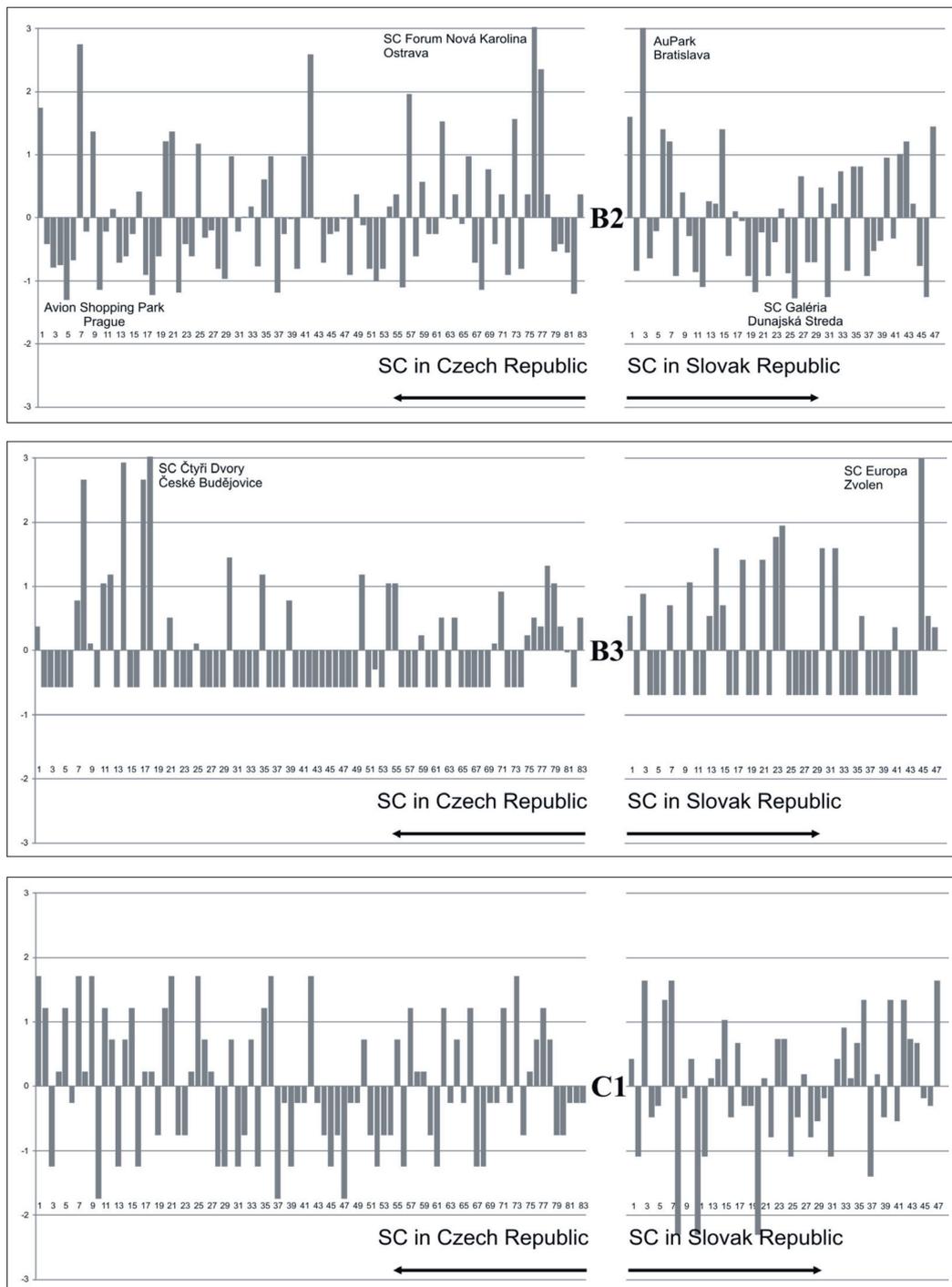


Fig. 1 continued

attractiveness (on a scale from 1 to 5, where 1 = the most attractive and 5 = the least attractive) for all of the assessed shopping centres. The Slovak shopping centres are considered less attractive due to a lower average attractiveness level (3.1 from the 5-degree scale). The specialists from the Czech Republic assessed the average level of shopping centre attractiveness at 2.7. The different values could be influenced by the different numbers of the evaluated shopping centres and by their distribution in space, and by different concentrations in the capital cities of both countries.

The aggregate attractiveness (AM) is based on data from all the assessed factors (A1, A2, A3, B1, B2, B3 and C1) as judged by specialists, who determined five intervals for the individual categories of shopping centre attractiveness (Fig. 2).

From these data, we determined five categories of shopping centres according to their attractiveness (Tab. 4). The shopping centres with limited attractiveness are the most numerous group and they represent approximately one-third of all shopping centres in the Czech Republic. A higher number of this category's centres are located in the north-west of the country (Fig. 3). This could be due to their concentration in a strongly urbanised, but structurally (industrially) affected territory with high unemployment rates and lower purchasing power of the local population, resulting in fewer shopping trips and a lower attractiveness of the shopping centres. The category ranked second in the Czech Republic includes shopping centres with very high attractiveness levels. These are mostly shopping centres

		N	I. category	II. category	III. category	IV. category	V. category
AM	SC in CR	83	26.5	13.3	20.5	33.7	6.0
	SC in SR	47	17.0	14.9	36.2	21.3	10.6

Tab. 4: Categories of shopping centres in the Czech Republic (CR) and the Slovak Republic (SR) (Share of shopping centres in %). Source: authors' surveys

Legend: I. = very high attractiveness; II. = moderately high attractiveness; III. = average attractiveness; IV. = limited attractiveness; V. = insufficient attractiveness

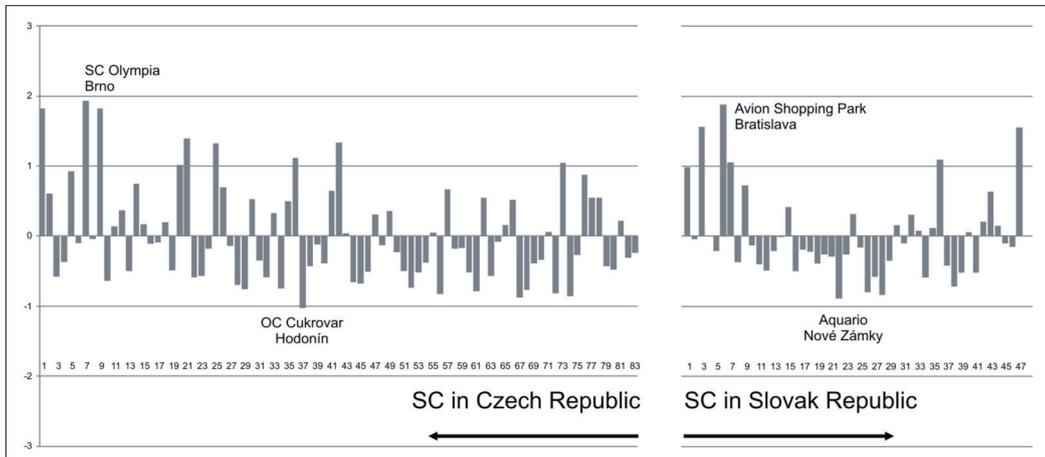


Fig. 2: Aggregate attractiveness (standardised values)
Source: authors' surveys

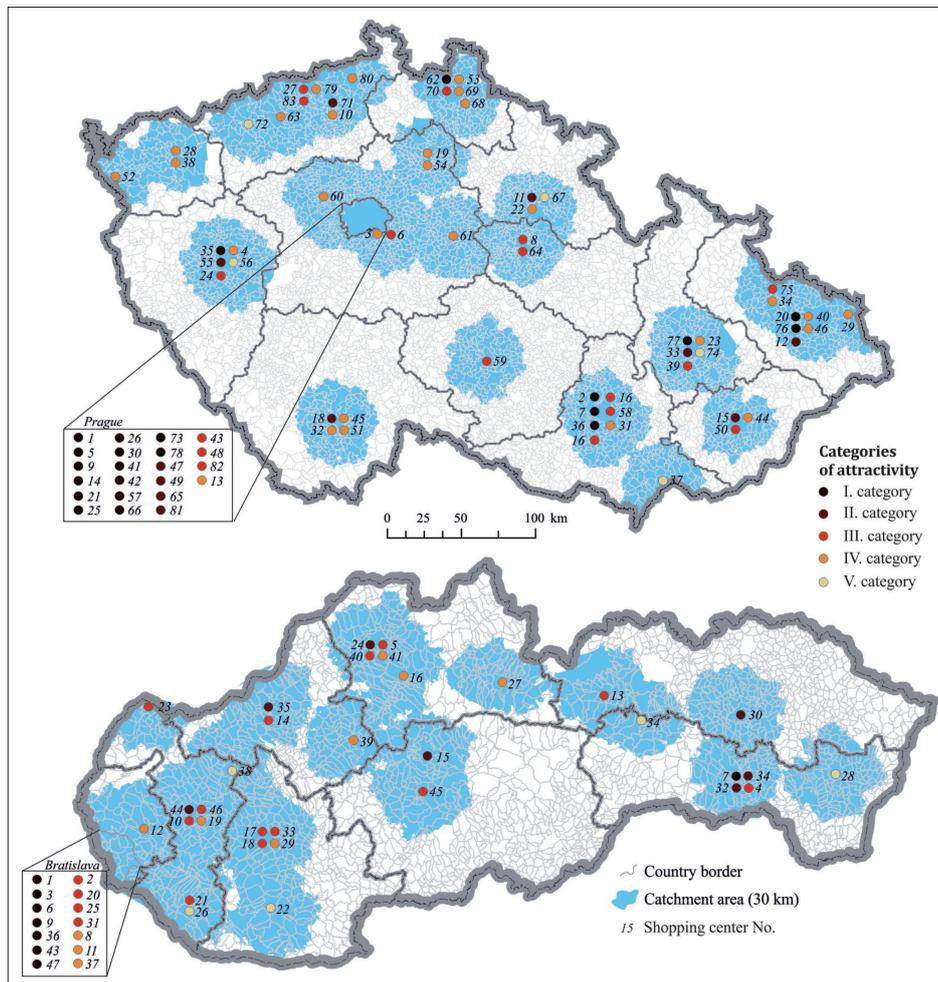


Fig. 3: Classification of shopping centres according to their attractiveness in the Czech and Slovak Republics
Source: authors' surveys

located in the capitals. For example, over one-half of all shopping centres in Prague fall into this category. One-fifth of Czech shopping centres are centres with average attractiveness and they exhibit a relatively uniform distribution in space. The smallest number of shopping centres was included in the group designated (according to the factors analysed) as insufficient-attractiveness centres. These are either shopping centres located in towns with small numbers of inhabitants (former district towns, such as Hodonín, Chomutov and others), or shopping centres complementing retail facilities in towns with multiple shopping centres (such as the regional towns of Olomouc and Plzeň).

The shopping centres with ‘average attractiveness’ comprise the most numerous group in the Slovak Republic (36.2%). These shopping centres are located in both large and smaller towns (by population). It is possibly related to the structure of the regional population distribution and regional economic development within the context of regional disparities in Slovakia. Over one-fifth of all shopping centres in the country are shopping centres with limited attractiveness, located mainly in western and northern Slovakia – areas with lower purchasing power of the local populations, daily trips to more populous towns and shopping there, over-the-border shopping and the general economic situation. In comparison, very high attractiveness is typical only for the Slovak metropolises, Bratislava and Košice (Fig. 3).

To analyse the aggregate attractiveness of the shopping centres, we evaluated its association with the size of the city's population² (Fig. 4). On the one hand, it is possible to observe the concentration of the most attractive shopping centres in the most populous cities. Conversely, the least attractive centres are typical for the less densely populated cities in the Czech and Slovak Republics as well. It may also be noted that in populous cities, there are also less attractive shopping centres.

For illustration, we consider only the two largest cities, which are natural development poles and economic drivers of the Czech Republic (the capital city of Prague and Brno) and Slovakia (the capital Bratislava and Kosice). The shopping centres with less extent of attractiveness can be divided into three groups (Tab. 5). In the first case, one registers the shopping centres which are located mainly in the peripheral parts of cities, mostly built on greenfields and difficult to access by public transport. The second type represents centres that are part of different multifunctional spaces, especially in combination with residential and administrative functions, with modern and luxurious office space with shared entrance areas and a distant and unapproachable effect on the number of potential customers, weakening “more massive” interest in this type of centre. A third type of shopping centre is the one with specialised shops and selected brands targetted to a specific clientele, which includes not only more expensive brands of fashion, footwear and fashion accessories, but also gastronomic facilities,

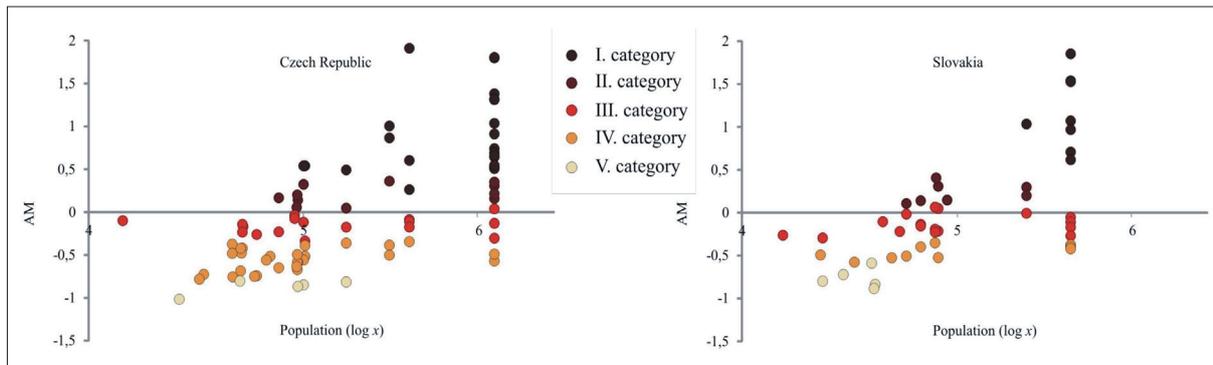


Fig. 4: Dependence of attractiveness of shopping centres on the population size of cities
Source: authors' surveys

Czech Republic	Slovakia
<i>I. Type: Peripheral localization</i>	
Spectrum Práhonice Prague (3)	Saratov Bratislava (8)
SC Královo Pole Brno (31)	Cassovia Košice (4)
<i>II. Type: Multifunctional centre</i>	
Florentinum Prague (82)	
Campus Square Brno (58)	Apollo Business Center Bratislava (11,31)
<i>III. Type: Specific clientele</i>	
Florentinum Prague (82)	Cubicon Bratislava (37)

Tab. 5: Typology of shopping centres with lower attractiveness in the Czech and Slovak Republics (Note: Numbers correspond with the list of shopping centres in Figure 1)
Source: authors' surveys

² The outlet centres located in rural municipalities, are certain exceptions. One example of such an outlet centre is in Voderady near the town of Trnava in Slovakia (Civáň et al., 2014)

services and facilities for entertainment and leisure. These centres are generally not attractive enough for the lower and middle classes, influencing attendance the most.

Aggregate attractiveness (AM) is affected by the analysed factors in different ways (Fig. 5). In general, the most significant positive correlation with aggregate attractiveness was estimated for the indicators B1 and B2, and it is a strong correlation in both countries. The significant impact of the size of leasable area (tenant mix) on the attractiveness is confirmed by several studies (Teller, 2008). Second, positive correlations were also observed for the number of parking places (cf. Reutterer and Teller, 2008). Average correlations are typical for the factors A1, A3 and C1. The accessibility of the shopping centres, with respect to the number of potential consumers does not play an important role in our study. On the other hand, it is important to note that the subjective factors also significantly influence the results of the analysis. The multiplex cinemas, as the main representative of additional services (B3) of Czech and Slovak shopping centres, have only weak, but positive impacts on the aggregate attractiveness. One reason for this could be the fact that 3/5 of all shopping centres are missing these facilities in both countries.

5. Conclusions

Although many studies have focused on the topic of shopping centres in Czech and Slovak geography (e.g. Cíváň et al., 2014; Fertařová, 2005, 2006; Klapka et al., 2013; Križan et al., 2014; Kunc et al., 2011, 2012b, 2013; Maryáš et al., 2014; Mitríková, 2008; Trembošová, 2009, 2012; Spilková, 2003, 2010, 2012a, 2012b; Spilková, Hocheľ, 2009; Szczyrba, 2004, 2005), an empirical study of the attractiveness of shopping centres has not been conducted in the Czech or Slovak research literature. We conclude that the evaluation of the attractiveness of the shopping centres, as a dynamic element of Central and Eastern European countries, is quite complex and to some extent a subjective task. In this paper, we referred to earlier published scientific studies measuring the attractiveness of the retail environment (especially shopping centres): for example, using agglomeration attributes (Teller and Elms, 2010); the catchment area (Dolega et al., 2016); central place theory and the retail hierarchy (Dennis et al., 2002b); or, directly according to respondents' consumer preferences (Dennis et al., 1999). Furthermore, we also took into account some of the specific conditions of the Czech-Slovak retail environment and the post-1989 market in the CEE countries. We also used an evaluation of the attractiveness of the shopping centres by a group of experts. The aggregate attractiveness is a combination of objective and subjective factors.

The results of the study answer the research questions. The shopping centres can be generally considered as more attractive in the Czech Republic (Q1). More than one-quarter of the shopping centres can be specified with a high level of attractiveness in the Czech Republic, although this proportion is less than one-fifth in Slovakia. The economic situation and the spatial distribution of the shopping centres play a significant role in both countries. The average leasable area is more than 5,000 m² greater than the Slovak case for shopping centres in the Czech Republic (Kunc et al., 2013). On the other hand, tenant mix is diversified on average in the case of shopping centres in Slovakia. Even though tenant mix is considered the most important factor of attractiveness (Teller, 2008), it was not primarily expressed in aggregate attractiveness.

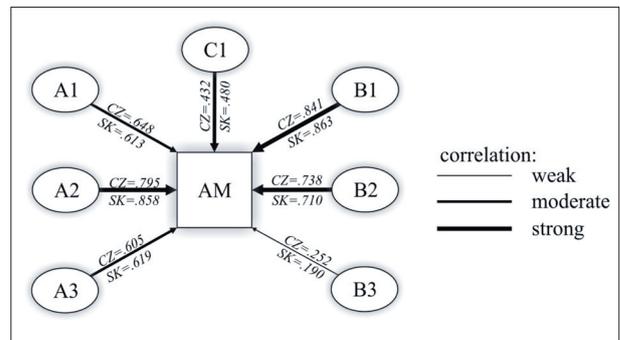


Fig. 5: Correlations of analysed factors and aggregate attractiveness (CZ = Czech Republic, SK = Slovakia)

Source: authors' surveys

In general, the attractiveness of shopping centres in more populous cities is higher than the attractiveness in cities with smaller population (Q2). The attractiveness of shopping centres reached the highest values in the capitals of both countries. On the contrary, the attractiveness of the less populous towns (less than 50,000 inhabitants) does not reach values higher than the average (III. category). On the other hand, attractiveness was measured at the national level. Local attractiveness, measured by consumer preferences, can be achieved and often with different values. Generally, less attractive shopping centres can be divided into three groups based on their location, the (administrative/residential) functions and the targeting of specific clientele.

Aggregate attractiveness is influenced by various factors in different ways (Q3). The analysis of the attractiveness of shopping centres in the Czech Republic and Slovakia confirmed the importance of selected endogenous factors. The most important of these include "GLA" and "tenant mix". On the other hand, exogenous factors such as "parking" and the factor of "accessibility" play important roles. The endogenous factor B3, which represents attractiveness in the context additional services (multiplex cinema), obtained the lowest level of correlation. It turned out that this factor had the lowest impact on the attractiveness of the shopping centres in both countries. Following the selected methodological approach, 'subjective categorization of the shopping centres' has no significant impact on the results of the analysis. It should be noted, however, that we found positive correlations between the assessed factors and aggregate attractiveness in all bivariate associations.

The results of the present comparative study can be generalized to the Central European level. The empirical results can be compared within any standard market environment in the world. Among the generalized implications of the research questions, it is possible to assert the following:

- the theoretical and methodological approach to measure the attractiveness of shopping centres is supported by a number of similar studies from other foreign countries;
- the variables used (factors determining attractiveness) are typical for most shopping centres in the world and they cannot be ignored in similar analyses;
- the theoretical assumptions of the significance of the tenant mix has been empirically supported, i.e. tenant mix is a decisive endogenous factor in the attractiveness of shopping centres. This finding brings additional insights for the practice of marketing planning; and

- the empirical evidence from both countries, as examples of post-socialist countries largely affected by the transformation of the retail environment and by the dynamic development of the construction of shopping centres, is directly applicable to the practice of marketing, in terms of the optimal arrangement of retail space and financial returns.

The authors of this paper are also aware of the limiting factors of this study, which can be characterized in three ways. The first can be matched with the notions of Dolega et al. (2016, p. 81) “*It should be highlighted that although such indicators might influence our choice of a shopping destination, it may not be feasible to measure them on a systematic basis across a national extent*”. The trans-boundary impacts were not taken into account in our analysis. Cross-border shopping and visits to the shopping centres across borders is relatively common in the Shengen space. This phenomenon is also characteristic for the Czech Republic and Slovakia (cf. Civián and Krogman, 2013; Dołzblasz, 2015). A second aspect is based on the method of enumeration of aggregate attractiveness. This is a sample of respondents, experts from various disciplines, who subjectively evaluated the attractiveness of shopping centres. Consumers’ opinions could be quite different. The third limiting factor is based on different perspectives to measure attractiveness, as any single measure of attractiveness is far from comprehensive (Timmermans, 1996). The results of this sub-analysis indicate that the aggregate attractiveness is as defined by the authors. On the other hand, it is possible to encounter various ‘sub’-dimension of attractiveness. For example, the Tellerr and Reutterer (2008) analysis is based on three dimensions (overall attractiveness, situational attractiveness and sustainable attractiveness). This aspect of the work represents a possible direction for future research. Also, measuring the attractiveness of one town with the “*in vivo*” approach is a topic for future studies in post-socialist countries.

Acknowledgements

This contribution was supported by the VEGA project “Specifics of time-space human behaviour under the impact of socio-economic changes” (No. 1/0082/15); by the VEGA project “Social, economic and environmental determinants of regional development and transformation: a regional geographic approach” (No. 1/0540/16; and by an internal grant “Shopping centres and shopping habits of teenagers: Brno case study” of the Faculty of Economics and Administration, Masaryk University (MUNI/A/0943/2015).

References:

- ABBATT, R., FOURIE, J. L., PITT, L. F. (1985): Tenant mix: the key to a successful shopping centre. *Quarterly Review of Marketing*, 15: 19–27.
- ALZUBAIDI, H., VIGNALI, C., DAVIES, B. J., SCHMIDT, R. A. (1997): Town centre versus out-of-town shopping: a consumer perspective. *International Journal of Retail and Distribution Management*, 25(2): 78–89.
- ARENTZE, T. A., TIMMERMANS, H. J. P. (2001): Deriving performance indicators from models of multipurpose shopping behavior. *Journal of Retailing and Consumer Services*, 8(6): 325–334.
- AWANG, Z., AMINUDIN, N., HASHIM, N. N., MUSTAPHA, N. A. (2013): Shopping mall attractiveness: Factors affecting consumer decision towards visitation. *Hospitality and Tourism: Synergizing Creativity and Innovation in Research*, 147.
- BEAN, J. C., NOON, C. E., RYAN, S. M., SALTON, G. J. (1988): Selecting tenants in a shopping mall. *Interfaces*, 18(2): 1–9.
- BROWN, S. (1993): Micro-scale retail location: Cinderella or ugly sister? *International Journal of Retail & Distribution Management*, 21(7): 10–19.
- BURNS, D. J., WARREN, H. B. (1995): Need for uniqueness: shopping mall preference and choice activity. *International Journal of Retail and Distribution Management*, 23(12): 4–12.
- CIVÁŇ, M., KROGMANN, A. (2013): Nákupný turizmus medzi Slovenskom a Rakúskom, *Geografické informácie*, 16(1): 42–50.
- CIVÁŇ, M., SVORAD, A., KROGMAN, A. (2014): Outlet centre as a potential development impulse: a case study of the municipality of Voderady. In: Polak, O. et al. [ed.]. *Conference: 21st International Ph.D. Students Conference* (pp. 340–344). Location: Mendel Univ, Brno (Fac Agron).
- COLEMAN, P. (2012): *Shopping Environments*. London, Routledge.
- COOPER, D. (2007): Being in Public: The Threat and Promise of Stranger Contact. *Law & Social Inquiry*, 32(1): 203–232.
- CRAWFORD, M. (1992): The World in a Shopping Mall. In: M. Sorkin (ed.), *Variations on a theme park. The new American city and the end of public space* (pp. 3–30). New York, Hill and Wang.
- CUSHMAN & WAKEFIELD (2011): *European Shopping Centre Development Report September 2011*. In: Cushman & Wakefield: Knowledge Center [online]. Available at: <<http://www.cushwake.be/cwglobel/jsp/kcReportDetail.jsp?Country=EMEA&Language=EN&catId=700003&pId=c37800004p>>
- DEBEK, M. (2015): What Drives Shopping Mall Attractiveness? *Polish Journal of Applied Psychology*, 13(1): 67–118.
- DENNIS, C., MARSLAND, D., COCKETT, T. (1999): Why do people shop where they do? Recent Advances in Retailing and Services Science. *Proceedings of the 6th International Conference. The European Institute of Retailing and Services Studies*. Eindhoven: The Netherlands.
- DENNIS, C., MARSLAND, D., COCKETT, T. (2002b): Central place practice: shopping centre attractiveness measures, hinterland boundaries and UK retail hierarchy. *Journal of Retailing and Consumer Services*, 9: 185–199.
- DENNIS, C., MURPHY, J., MARSLAND, D., COCKETT, T., PATEL, T. (2002a): Measuring image: shopping centre case studies. *The International Review of Retail, Distribution and Consumer Research*, 12(4): 355–373.
- DOLEGA, L., PAVLIS, M., SINGLETON, A. (2016): Estimating attractiveness, hierarchy and catchment area extents for a national set of retail centre agglomerations. *Journal of Retailing and Consumer Services*, 28: 78–90.
- DOŁZBLASZ, S. (2015): Symmetry or asymmetry? Cross-border openness of service providers in Polish-Czech and Polish-German border towns. *Moravian Geographical Reports*, 23(1): 2–12.

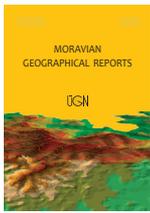
- DONOVAN, R. J., ROSSITER, J. R. (1982): Store atmosphere: an environmental psychology approach. *Journal of retailing*, 58(1): 34–57.
- FERTALOVÁ, J. (2005): Some methodological issues in classification of retail stores (with examples from European countries). *Folia geographica*, 8, 13–19.
- FERTALOVÁ, J. (2006): Evaluation of attendance in selected hypermarkets and shopping stores in the towns of Prešov and Košice. *Acta Universitatis Palackianae Olomucensis Facultas Rerum Naturalium, Geographica*, 39(1): 19–29.
- FINN, A., LOUVIČRE, J. J. (1996): Shopping center image, consideration, and choice: anchor store contribution. *Journal of business research*, 35(3): 241–251.
- GARG, A. K., STEYN, S. (2014): The Ideal Tenant Mix and Shopping Centre Size for the Proposed Thatchfield Convenience Centre. *International Journal of Business and Management*, 10(1): 243–257.
- GHOSH, A. (1986): The value of a mall and other insights from a revised central place model. *Journal of retailing*, 62(1): 79–97.
- GIDDENS, A. (2002): *Runway World. How Globalization is Reshaping Our Lives*. London, Profile Books.
- GOLLEDGE, R. G. J., STIMSON, R. J. (1997): *Spatial Behavior: A Geographic Perspective*. New York, Guilford Press.
- GROSMANOVÁ, M., KITA, P., ŽAMBOCHOVÁ, M. (2015): Segmentation of Consumers in the Context of their Space Behaviour: Case Study of Bratislava. *Prague Economic Papers*, 24(5): 1–15.
- GUY, C. M. (1998): Controlling new retail spaces: The impress of planning policies in Western Europe. *Urban Studies*, 35(5–6): 953–979.
- HUFF, D. L. (1963): A probabilistic analysis of shopping center trade areas. *Land economics*, 39(1): 81–90.
- IBRAHIM, M., MCGOLDRICK, P. (2003): Shopping choices with public transport options: an agenda for the 21st century. Ashgate, Hampshire UK.
- ICSC RESEARCH (2005): *Towards a Pan-European Shopping Centre Standard-A Framework for International Comparison*. New York, International Council of Shopping Centers.
- INCOMA & GFK (2015): *Shopping monitor 2015* [online]. Available at: <<http://incoma.cz/wp-content/uploads/2014/05/Incoma-Shopping-Monitor-2015-obsah.pdf>>
- JACKSON, V., STOEL, L., BRANTLEY, A. (2011): Mall Attributes and Shopping Value: Differences by Gender and Generation Cohort. *Journal of Retailing and Consumer Services*, 18(1): 1–9.
- KITA, P., GROSMANOVÁ, M. (2014): Reflection of Bratislava Retail Network in Selected Aspects of Consumer Behaviour. *Verslas: teorija ir praktika*, 15(3): 279–284.
- KLAPKA, P., ERLEBACH, M., KRÁL, O., LEHNERT, M., MIČKA, T. (2013): The footfall of shopping centres in Olomouc (Czech Republic): an application of the gravity model. *Moravian Geographical Reports*, 21(3): 12–26.
- KRIŽAN, F. (2009). Globalizácia maloobchodu: definícia základných procesov a ich analýza v slovenskej geografii maloobchodu. *Geografický časopis*, 61(1): 49–68.
- KRIŽAN, F., BILKOVÁ, K., KITA, P. (2014): Urban retail market in Bratislava (Slovakia): Consumers perception and classification of shopping centres. *Management & Marketing*, 9(4): 483–500.
- KUNC, J., FRANTÁL, B., SZCZYRBA, Z., TONEV, P., TOUŠEK, V. (2011): Shopping centres and shopping behaviour: selected relations and socio-geographical implications (The Vaňkovka Gallery Brno, Czech Republic example). *Acta Universitatis Palackianae Olomucensis Facultas Rerum Naturalium–Geographica*, 42(1): 5–17.
- KUNC, J., FRANTÁL, B., TONEV, P., SZCZYRBA, Z. (2012a): Spatial Patterns of Daily and Non-daily Commuting for Retail Shopping: Case of the Brno City, Czech Republic. *Moravian Geographical Reports*, 20(4): 39–54.
- KUNC, J., TONEV, P., SZCZYRBA, Z., FRANTÁL, B. (2012b): Shopping centres and selected aspects of shopping behaviour (Brno, the Czech Republic). *Geographia Technica*, 7(2): 39–51.
- KUNC, J., TONEV, P., SZCZYRBA, Z., GREPLOVÁ, Z. (2012c): Perspektivy nákupních center v České republice s důrazem na lokalizaci v urbánním prostředí: příklad města Brna. *Urbanismus a územní rozvoj*, XV(2): 14–20.
- KUNC, J., MARYÁŠ, J., TONEV, P., FRANTÁL, B., SIWEK, T., HALÁS, M., Klapka, P., SZCZYRBA, Z., ZUSKÁČOVÁ, V. (2013): *Časoprostorové modely nákupního chování české populace*. Brno, Masarykova univerzita.
- LAMBERT, J. (2006): One Step Closer to a Pan-European Shopping Center Standard. Illustrating the New Framework With Examples. *Features, Research Review*, 13(2): 35–40.
- LEVY, M., WEITZ, B. A. (2006): *Retailing management*. Boston: McGraw-Hill.
- LUSCH, R. F., SERPKENCI, R. R. (1990): Personal differences, job tension, job outcomes, and store performance: A study of retail store managers. *The Journal of Marketing*, 54(1): 85–101.
- MARJANEN, H. (1995): Longitudinal study on consumer spatial shopping behavior with special reference to out-of-town shopping experiences from Turku, Finland. *Journal of Retailing and Consumer Services*, 2(3): 163–174.
- MARYÁŠ, J., KUNC, J., TONEV, P., SZCZYRBA, Z. (2014): Shopping and Services Related Travel in the Hinterland of Brno: Changes from the Socialist Period to the Present. *Moravian Geographical Reports*, 22(3): 18–28.
- MCGOLDRICK, P. J., THOMPSON, M. G. (1992): The role of image in the attraction of the out-of-town centre. *International Review of Retail, Distribution and Consumer Research*, 2(1): 81–98.
- MEIJA, L. C., EPPLI, M. J. (1999): The effect of merchandise space allocation on retail sales in enclosed shopping centre. *Journal of Shopping Centre Research*, 6: 23–40.
- MICU, C. B. (2013): The concept of shopping centre attractiveness-literature review. *Marketing From Information to Decision*, 6: 145–157.
- MINGARDO, G., Van MEERKERK, J. (2012): Is parking supply related to turnover of shopping areas? The case of the Netherlands. *Journal of Retailing and Consumer Services*, 19(2): 195–201.

- MITRÍKOVÁ, J. (2008): Geografické aspekty transformácie maloobchodu a nákupného správania sa na Slovensku (prípadové štúdie z miest Prešov a Košice). Prešov: Prešovská univerzita v Prešove.
- NEVIN, J. R., HOUSTON, M. J. (1980): Image as a component of attraction to intraurban shopping areas. *Journal of Retailing*, 56(1): 77–93.
- OOI, J. T. L., SIM, L. L. (2007): The magnetism of suburban shopping centers: Do size and Cineplex matter? *Journal of Property Investment and Finance*, 25(2): 111–135.
- OPPEWAL, H., ALEXANDER, A., SULLIVAN, P. (2006): Consumer perceptions of corporate social responsibility in town shopping centres and their influence on shopping evaluations. *Journal of retailing and Consumer services*, 13(4): 261–274.
- PLĂIAȘ, I., ABRUDAN, I. N. (2013): Use of Tenant Mix Strategies to Attract Shopping Centers' Customers. Evidence from Romania. *Marketing From Information to Decision*, 6: 23–35.
- POSPĚCH, P. (2010): Význam a normalita ve veřejném prostoru a v nákupním centru. In Vacková, B., Ferenčuhová, S., Galčanová, L. [eds.]: *Československé město včera a dnes: Každodennost – reprezentace – výzkum*. Červený Kostelec, Brno: Pavel Mervart, Masarykova univerzita: 113–136.
- POTTER, R. B. (1979): Perception of Urban Retailing Facilities: An Analysis of Consumer Information Fields. *Geografiska Annaler, Series B, Human Geography*, 61(1): 19–27.
- PRENDERGAST, G., MARR, N., JARRAT, B. (1998): Retailers' views of shopping centres: a comparison of tenants and non-tenants. *International Journal of Retail & Distribution Management*, 26(4): 162–171.
- REILLY, W. J. (1931): *The Law of Retail Gravitation*, New York.
- RETAIL BOOK (2010, 2014) [online]. Available from: <<http://centers.viphosting.eu/rb2010/>>; <<http://centers.viphosting.eu/rb2014/>>
- RUSHTON, G. (1969): Analysis of Behavior by Revealed Space Preference. *Annals of Association of American Geographers*, 59(2): 391–400.
- SIT, J., MERRILEES, B., BIRCH, D. (2003): Entertainment-seeking shopping centre patrons: the missing segments. *International Journal of Retail and Distribution Management*, 31(2): 80–94.
- SPIPKOVÁ, J. (2003): Nový fenomén: nákupní centrum a utváření nákupního chování spotřebitelů v transformačním období. *Geografie*, 108(4): 277–288.
- SPIPKOVÁ, J. (2010): Retail Development and Impact Assessment in Czech Republic: Which Tools to Use? *European Planning Studies*, 18(9): 1469–1484.
- SPIPKOVÁ, J. (2012a): *Geografie maloobchodu a spotřeby*. Praha, Karolinum.
- SPIPKOVÁ, J. (2012b): The Birth of the Czech Mall Enthusiast: The Transition of Shopping Habbits from Utilitarian to Leisure Shopping. *Geografie*, 117(1): 21–32.
- SPIPKOVÁ, J., HOCHÉL, M. (2009): Toward the Economy of Pedestrian Movement in Czech and Slovak Shopping Malls. *Environment and Behavior*, 41(3): 443–455.
- SZCZYRBA, Z. (2004): Globalized retail structures in the city of Olomouc (selected issues of branch, regional and social organization). *Acta Universitatis Palackianae Olomucensis Facultas Rerum Naturalium, Geographica*, 38: 85–91.
- SZCZYRBA, Z. (2005): Maloobchod v ČR po roce 1989 – vývoj a trendy se zaměřením na geografickou organizaci. Olomouc, Univerzita Palackého.
- TELLER, C. (2008): Shopping streets versus shopping malls—determinants of agglomeration format attractiveness from the consumers' point of view. *The International Review of Retail, Distribution and Consumer Research*, 18(4): 381–403.
- TELLER, C., REUTTERER, T. (2008): The evolving concept of retail attractiveness: what makes retail agglomerations attractive when customers shop at them? *Journal of Retailing and Consumer Services*, 15(3): 127–143.
- TELLER, C., ALEXANDER, A. (2014): Store managers—the seismographs in shopping centres. *European Journal of Marketing*, 48(11/12): 2127–2152.
- TELLER, C., ALEXANDER, A., FLOH, A. (2016): The impact of competition and cooperation on the performance of a retail agglomeration and its stores. *Industrial Marketing Management*, 52: 6–17.
- TELLER, C., ELMS, J. (2010): Managing the attractiveness of evolved and created retail agglomerations formats. *Marketing Intelligence & Planning*, 28(1): 25–45.
- TELLER, C., ELMS, J. R. (2012): Urban place marketing and retail agglomeration customers. *Journal of Marketing Management*, 28(5–6): 546–567.
- TELLER, C., ELMS, J. R., THOMSON, J. A., PADDISON, A. R. (2010): Place marketing and urban retail agglomerations: An examination of shoppers' place attractiveness perceptions. *Place Branding and Public Diplomacy*, 6(2): 124–133.
- TELLER, C., REUTTERER, T. (2008): The evolving concept of retail attractiveness: what makes retail agglomerations attractive when customers shop at them? *Journal of Retailing and Consumer Services*, 15(3): 127–143.
- TELLER, C., SCHNEDLITZ, P. (2012): Drivers of agglomeration effects in retailing: The shopping mall tenant's perspective. *Journal of Marketing Management*, 28(9–10): 1043–1061.
- TIMMERMANS, H. J. P. (1996): A stated choice model of sequential mode and destination choice behaviour for shopping trips. *Environment and Planning A*, 28(1): 173–184.
- TIMOTHY, D. J. (2005): *Shopping Tourism, Retailing, and Leisure*. New York, Channel View Publications.
- TREMOŠOVÁ, M. (2009): Nitra – mesto obchodných centier. *Geografické štúdie*, 13(1): 69–79.
- TREMOŠOVÁ, M. (2012): *Geografické aspekty maloobchodnej siete mesta Nitra*. Nitra: UKF.
- TURLEY, L. W., MILLIMAN, R. E. (2000): Atmospheric effects on shopping behavior: a review of the experimental evidence. *Journal of Business Research*, 49(2): 193–211.
- VAN DER WAERDEN, P., BORGERS, A., TIMMERMANS, H. (1998): The impact of the parking situation in shopping centres on store choice behaviour. *GeoJournal*, 45(4): 309–315.

- VAN LEEUWEN, E. S., RIETVELD, P. (2011): Spatial Consumer Behaviour in Small and Medium-sized Towns. *Regional Studies*, 45(8): 1107–1119.
- VOYCE, M. (2006): Shopping Malls in Australia. The End of Public Space and the Rise of Consumerist Citizenship? *Journal of Sociology*, 42(3): 269–286.
- WAKEFIELD, K. L., BAKER, J. (1998): Excitement at the mall: determinants and effects on shopping response. *Journal of Retailing*, 74(4): 515–539.
- WALMSLEY, D. J., LEWIS, G. J. (1984): *Human Geography: Behavioural Approaches*. London, Longman.
- WARNABY, G., BENNISON, D., DAVIES, B. J. (2005): Retailing and the marketing of urban places: a UK perspective. *The International Review of Retail, Distribution and Consumer Research*, 15(2): 191–215.
- WOLF, K. (2003): Retail and Urban Nature: Creating a Consumer Habitat. *Population and Environmental Psychology Bulletin*, 29(1): 1–6.

Please cite this article as:

KUNC, J., KRIŽAN, F., BILKOVÁ, K., BARLÍK, P., MARYÁŠ, J. (2016): Are there differences in the attractiveness of shopping centres? Experiences from the Czech and Slovak Republics. *Moravian Geographical Reports*, 24(1):27–41. Doi: 10.1515/mgr-2016-0003.



Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland

Robert KRZYSZTOFIK ^{a*}, Maria TKOCZ ^a, Tomasz SPÓRNA ^a, Iwona KANTOR-PIETRAGA ^a

Abstract

The problem of using the concept of post-industrialism to define regions with traditional industries is addressed in this article. It focuses on the diversity of industrial development in the Katowice conurbation (Poland) and the difficulties of situating the region in the widely-used taxonomy by Phelps and Ozawa, which assumes a one-way transition from the late-industrial to post-industrial stage. The authors point to the fact that only some of the towns can be described as post-industrial, since there are also towns in which traditional industries continue to develop relatively well and others at an advanced stage of re-industrialisation. The proposal is made that the Katowice conurbation can be described as a “trans-industrial region” in order to account for the various stages of development in the industrial sector in the towns of the conurbation, and to underline the dynamic nature and temporal variability of the industrialisation factor in the region.

Keywords: *post-industrial region, re-industrialisation, de-industrialisation, the Katowice conurbation, Poland*

Article history: *Submitted 25 March 2015; Accepted 25 January 2016; Published 31 March 2016*

1. Introduction

In Europe, many significant large urban regions have their origins from nineteenth and twentieth century developments of industry and mining. The largest European urban conurbations of this kind are the Ruhr region in Germany, Nord/Pas-de-Calais on the border of France and Belgium, the Ostrava region in the Czech Republic, Donbass in Ukraine, or the Upper Silesian Coal Basin and the Dąbrowa Basin in Poland. In most cases, these are polycentric regions, defined as urban conurbations here. The functioning of such regions, determined by industrial and mining sectors, makes them economically and spatially specific. Another characteristic feature of such regions is that the dynamics of transformations are defined not only with regard to path dependence, but also with the variability and evolution of the process of industrialisation itself.

Both spatial and temporal attributes of conurbations significantly differ from those characteristic of monocentric urban agglomerations whose development was based on mixed functions: service, trade and production, frequently strengthened by administrative functions, in particular, capital cities. London, Paris and Moscow, as well as Prague, Warsaw, and Stockholm, provide good examples of such agglomerations.

Another type of urban region is the polycentric agglomeration, whose development is an effect of their geographical proximity to even larger cities (Parr, 2004; Meijers, 2008). Such systems have a complex functional genesis, and the nature of the development of the towns that form them is determined by production, as well as by services and administrative functions. Randstad Holland or the Saxony triangle in Germany (Kloosterman and Lambregts, 2001; Hudec and Urbančíková, 2008; Franz, 2010) can be mentioned here.

The genesis of urban agglomerations, however, is only the initial phase of their existence. The functional identity of a given agglomeration converges with later stages of development only when the functional component which brought them into existence is relatively permanent. This is particularly visible in the large industrial-mining conurbations.

Functional transformations are also evident today. They follow at least two opposing directions and are conditioned by either centrifugal or centripetal forces (Krugman, 1997; Krzysztofik, 2014). Changes in the functional character of European agglomerations have been visible since at least since the mid-twentieth century. On the one hand, there has been a strengthening of the potential of the monocentric

^a Department of Economic Geography, Silesian University, Sosnowiec, Poland (*corresponding author: R. Krzysztofik, e-mail: robert_krzysztofik@interia.pl)

The use of this categorisation is dictated by the fact that it includes both dynamic and functional aspects of possible explanations. Another advantage is that, to a large extent, it concerns regions forming urban conurbations based on mining and industrial sectors.

The relations between industrialisation, de-industrialisation and re-industrialisation are subject to review initially. It has been assumed that these processes provide key contexts for defining the region as one at the late-industrial and post-industrial stages. Considering the issue of re-industrialisation, broadly understood as a renewed development of industrial functions, however, there appears to be a certain conceptual dissonance. Therefore, the basic aim of this article is to question whether the process of re-industrialisation undermines the validity of describing the region as late-industrial or, perhaps even more so, as post-industrial. Is there another stage of the transformations? If so, what is its nature? Some new proposals are formulated in response to these questions on the specific nature of functional transformations in regions whose genesis was based on industrial and mining functions.

2. Theoretical background

2.1 Mechanisms of development

The research problems discussed here are situated at the interstices between urban and economic geography and the new economic geography. On the one hand, the paper interprets the evolution of an urban conurbation; on the other, it stresses the role of economic factors in its continuity and structure. This seemingly well-known system of dependencies demands, however, further research, as has been recently pointed out by Gwosdz and Sobala-Gwosdz (2012).

The necessity of a more general background against which urban forms and functions should be considered is a first consideration. In this respect, a useful approach is the one assuming the basic role of centripetal and centrifugal forces in shaping the socio-economic and spatial system of regions (Krugman, 1997). Each of the above-mentioned forces, which are also city-forming forces, can predominate in a given area and place. They can also, particularly at present, balance each other. Assuming that the Katowice conurbation discussed in this article has been created by centrifugal city-forming forces (Gwosdz and Sobala-Gwosdz, 2012; Krzysztofik, 2014), their contemporary weakness, and in some places disappearance, constitutes a key framework for explaining the spatial imbalance of the industrial potential of the region. But the weakness and disappearance of the socio-economic attributes defining each of the city-forming forces do not always mean that the gap will be filled by attributes represented by the opposing type of city-forming forces. In practice, frequently the former traditional attribute, for example an obsolete industrial plant, is replaced by a new attribute – a modern industrial plant from another sector of industry. Functionally, they both represent the consequences of the influence of the same city-forming forces, in this case centrifugal ones.

The centrifugal city-forming forces in the Katowice region were visible in the mass exploitation and production of material goods exported beyond the local resources, which led to several important effects:

- the emergence of a network of city-forming points near industrial and mining facilities;
- an intra-urban, strongly specialized economic base, generally independent from supply and demand in the rural or less-urbanized surrounding region (as in central place theory formulations, for example). Bituminous coal or goods produced by the processing industry were exported to any place in Europe or the world, depending on the demands of supra-local markets. A part of coal or steel production was used in situ as an element of a longer cycle of manufacturing, whose products finally were exported outside the region. Relations between the town and other regions (as markets) outside the region dominated those between the town and the surrounding region (with the exception of the above-mentioned endogenous connections in industry); and
- the creation of a system of centrifugal city-forming forces determined by centrifugal systems of the economic bases of the towns in the conurbation.

If the impact and interactions of city-forming forces in a region are determined in every region predominantly by the size and structure of the economic potential (Krugman, 1997), it can be assumed that in heavily industrialized and mining regions this attribute is definitely the determining one. Today, however, the economic development of regions with traditional industries in Central-Eastern Europe tends to be influenced by three processes: (1) the continued functioning of industrial plants constructed in the industrial and late-industrial stages, which is occurring mainly in the mining industry and large industrial plants from other sectors with more than 1000 employees; (2) re-industrialisation based on new industrial plants, frequently based on investments representing sectors that are new to the regions, and they are often situated in special economic areas or functionally derelict areas, including brownfields; and (3) investments in the service sector, particularly large area investments (trade, logistics) and to a lesser extent in R&D sector investments (Gwosdz, 2014; Klasik, 2008; Popjaková et al., 2014).

2.2 The question of post-industrialism with a special focus on Phelps and Ozawa's concept

This listing of business ventures determining the development of formerly strictly mining or mining-industrial regions in Central-Eastern Europe, stresses three of the theoretical issues defined by Phelps and Ozawa (2003).

Firstly, these regions are in the final stages of their late-industrial or post-industrial evolution or relatively somewhere in between these stages. Phelps and Ozawa (2003) correctly phase this evolution, pointing out some classical directions of changes in the functional database already existing in geographical space, which generally can be determined by the phrase: from industry to services. Also, in most cities in the Katowice region examined in this article, the service function dominated the industrial function.

Secondly, an essential feature of the post-industrialism of old industrial districts should be pointed out, which Phelps and Ozawa (2003, p. 593–594) believe to be the borrowed size of towns¹. As shown in further explanation below, this element of the evolution of changes in the post-industrial region is again characteristic for the analysed conurbation.

¹ The meaning of this term, which was proposed by Alonso in the 1970s, has recently been extended to include cities located outside the old industrial and mining districts (Burger et al., 2015).

The third issue related to the Katowice conurbation, as in many other cases, is the fact that post-industrialism, understood as a functional change, is accompanied by two more phenomena: re-industrialisation and urban shrinkage combined with de-industrialisation. The effect of the former is a restriction on the increasing role of services in relation to industrial functions (see Gwosdz, 2014). The effect of the latter is an overall decrease of the region's economic potential, accompanied by de-urbanisation and de-industrialisation (Krzysztofik et al., 2014).

Those regions in Central-Eastern Europe that are traditionally described as post-industrial have been shown to undergo the following changes:

- a. change in functional structure due to the increasing role of services at the cost of the industrial functions (post-industrialism);
- b. some continuation of still significant potential of mining and traditional industry (late-industrialism);
- c. attempts at re-introducing industrial functions, often unrelated to the structure of industry sectors (re-industrialism); and
- d. the disappearance of all exogenous² functions (exogenous services, industry, mining) with a simultaneous exposure of endogenous functions (complete de-industrialisation, de-urbanisation and urban shrinkage).

Taking into account the above-listed changes, one should ask whether the regions should be treated as 'post-industrial' in the literal sense of the word. The dissonance is particularly noted in the interaction between temporally- and spatially-identical post-industrialism (point a), late-industrialism (point b) and re-industrialism (point c), with Sosnowiec providing one of the more interesting examples in the Katowice conurbation (Krzysztofik et al., 2013).

2.3 The question of re-industrialisation

A separate issue in considering re-industrialisation in the context of post-industrialism is the question about the future development paths of large industrial regions. Generally, one can notice that a gradual disappearance of traditional industries is constantly balanced by industrial investments based on new and medium-advanced technologies (Borowik, 2014; Westkämper, 2014). An important role here is performed by the search for a new spatial policy³ for the development of industry, as well as by the placement of the policy of re-industrialisation in the canon of EU economic development.

A slightly different economic-spatial policy with regard to re-industrialisation can be observed in Russia, for example, where, alongside the need to create new industries, particular attention is paid to the strong need for technological and organisational modernisation of traditional industrial centres, in particular of the electrical and machine industries (Schuysky, 2013; Dubenetskii, 2014).

At this point, however, the issue of the re-industrialisation model should be addressed. The essential question in this context is whether the development of new businesses in the Katowice region meets the criteria for one of the four developments of the concept of New Industrial Districts (NID) proposed by Markusen (1996), or does it rather adopt

an individual model of development? Markusen (1996, p. 296) distinguished four forms of industrial districts: The Marshallian NIDs, including the Italian form; "the hub-and-spoke" districts; the satellite industrial platforms; and the state-centred districts. The division was later extended and improved by Pickernell et al. (2007) and Cornell (2013). Referring to this typology, the initial thesis may be that the development of re-industrialisation in the Katowice region is closest to "the hub-and-spoke" model. This model for the Katowice conurbation, however, has its own characteristic features, as discussed below.

3. De-industrialisation and re-industrialisation of the region after 1989

The emergence of a highly urbanised conurbation in the south of Poland was connected with bituminous coal mining and the steel industry (Riley and Tkocz, 1999). By the end of the nineteenth century, the core of the contemporary urban region was formed, and by the middle of the twentieth century town charters were given to all towns in the region. The urbanisation of the region included the spatial development of settlements near or next to the largest coal mines, steelworks, and industrial plants. Since the mid-twentieth century, this network of often loosely connected settlements began to integrate into a system of large (over 100 thousand inhabitants) and medium-size towns. The last stage of integration took place in the 1970s (Gwosdz, 2014; Krzysztofik, 2014).

3.1 De-industrialisation

The first symptoms of an economic crisis in the region's industries were noticed already in the 1980s, but it was only in the 1990s that a number of radical changes took place (Fig. 2). Except for the automotive and power engineering industries, these changes consisted in closing down and restructuring industrial plants. All sectors underwent commercialisation and privatisation. The automotive industry and power engineering did relatively well – all of the larger plants in these sectors were modernized and expanded – but the overwhelming majority of local traditional industries suffered dramatically. Most bituminous coal mines were closed down or merged, and the steel industry was thoroughly restructured: steelworks with 2–4 thousand workers were turned into metallurgical plants with less than 1,000 employees, and some (Gliwice) were closed down. In 1980, there were over 20 thousand people employed in Huta Katowice (Arcelor Mittal) in Dąbrowa Górnicza; after 2010, there were only some 5,000, including those employed in companies working for the steelworks. Light industry disappeared almost completely: out of six big production plants, four were closed down and the other two were thoroughly restructured. Similarly, non-ferrous metals industries, coking, chemical and mineral industries underwent restructuring. A significant number of plants in the metal, machine, and electro-technical sectors went bankrupt, including those constructed in the 1970s.

The de-industrialisation of the region is a continuous process which was particularly intense in the period between 1994 and 2004. At that time, all features of de-industrialisation were visible: the highest number of large

² The terms "exogenous functions" and "endogenous functions" are used in the context of traditional economic base analysis.

³ There should be a public discussion about expected types of industry in Gliwice and Katowice and also a question of future development of some investment areas – whether they should develop towards industry or services?

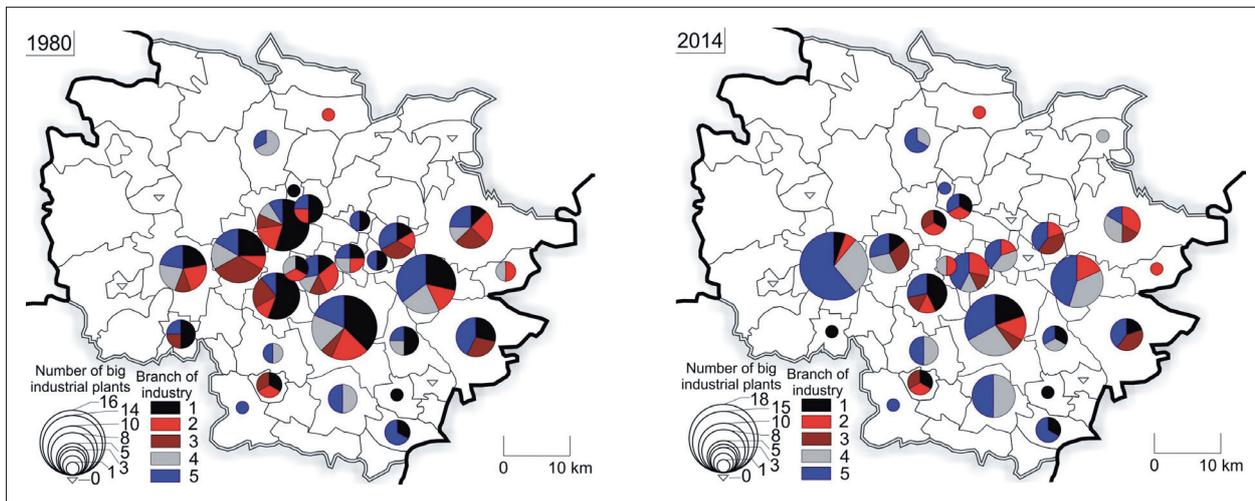


Fig. 2: Number and structure of industrial plants in the Katowice conurbation in 1980 and 2014 (Legend: 1 – coal-mining; 2 – steelworks and non-ferrous sector; 3 – power stations and coke plants; 4 – metal-, machinery- and electro-technical industry plants; 5 – industrial plants representing other branches)

Source: authors

and medium-size companies was closed down; the highest number of employees were fired or sent on holidays; the greatest decline in manufacturing sales; and the largest decreases in profitability were noticed. In this period, the number of jobs in industries was reduced by as much as 400 thousand in the region. According to Tkocz (2003, p. 38), about 280,000 people left the coal mining sector in southern Poland due to the closure of 29 coal mines and job restrictions in other mines. More than one half of this number refers to the Katowice conurbation.

3.2 Re-industrialisation

Since the early 1990s, the restructuring and closure of industries in the Katowice conurbation have been accompanied by the re-industrialisation of the region. Re-industrialisation is the effect of the expansion and modernisation of some existing industrial plants on the one hand, and on the other, of new industrial investments in brownfields and blackfields, as well as in greenfields. The core elements of re-industrialisation have been investments in the automotive industry, with the expanded and modernized plant in Tychy (Fiat Auto Poland) and the brand new plant in Gliwice (Opel production) becoming centres of the development in the sector. Investments in the automotive industry in the Czech Republic and Slovakia have also played an important role (e.g. Volkswagen, Hyundai, Toyota, Kia, Peugeot). Many plants have been created in the Katowice region to cater for the needs of the automotive plants in these three countries and, although they work for various concerns, it should be stressed that most of them cooperate with plants located in Poland (for example, Magneti Marelli).

From this point of view, the essence of the development of the automotive industry in the region of Katowice, but also in the Silesian Province more broadly, is relatively well captured in the concept of New Industrial Districts (NIDs) presented by Markusen (1996). To specify, from the structural point of view, it presents “the hub-and-spoke” model highlighted by Markusen, although not in all industries. From a functional point of view, however, the “satellite platform” model is closer to real connections. Such a differentiation does not exclusively refer to the Katowice conurbation, but it may constitute a more general remark

to the issue of development of some branches of industry (i.e. automotive) in Central and Eastern Europe (Ženka et al., 2015, p. 69).

The “hub-and-spoke” model emphasises the priority of the local system for the needs of a large manufacturing plant, as a network of smaller suppliers is formed. At the same time, the corporate and ownership dependence here it is not always an obstacle, at least in the case of new industry in the Katowice conurbation. It should be emphasised, however, that this model can only be applied to describe the automotive industry in the region. It is rarely representative of the newly-established plants of other industries not directly related to the automotive, such as the electro-technical, machine, mineral, chemical or meat industries. Their location is relatively casual and attractive forces were agglomeration economies and economic, legal and administrative profits resulting from the location in the Katowice Special Economic Zone (the KSEZ), or other privileged local economic zones. Most brand new large industrial plants were built in Gliwice and Tychy (greenfields type investments), Sosnowiec (brownfields), Katowice (brownfields), Dąbrowa Górnicza (brownfields), Siemianowice Śląskie (greenfields and brownfields). This quite specific location of new investments clearly reflects what is contained in the scientific metaphors of Markusen: “sticky places in slippery space” or even the “borrowed size of towns” proposed by Alonso. These issues are expanded in the following section.

The re-industrialisation of the region also consisted of a significant expansion and modernisation of certain industries traditional to the region. A brand new image has been given to the local large coal-fired power stations, in particular the “Łagisza” power station in Będzin and Chorzów, and “Jaworzno II” and “Jaworzno III” in Jaworzno. The coke plant “Przyjaźń”, the largest in the region, has been modernized.

A significant part of the process of re-industrialisation is based on small and medium-sized companies of all sectors in all towns of the conurbation. The nature and investment policy of these companies vary: some of them function in the privileged KSEZ, some have built new plants outside the zone, and others use the buildings, sometimes modernized, of formerly existing companies.

4. Local development paths of industry in the Katowice conurbation

4.1 Introduction

In comparison to large monocentric agglomerations, the conditions for industrial development in polycentric conurbations are relatively good. Here, services naturally limit the role of industry and push it outside the town. The process is facilitated by rent land rates, which are higher in the centre and much lower in the peripheries. In the case of large area investments, this significantly restricts development in the centre of the town, and not infrequently in the town itself. Generally, in such agglomerations industry is less competitive than services, particularly when its peripheral location runs the risk of limited transport accessibility.

Due to polycentricity, in urban conurbations the cross-section level of land rents is shaped like a wave. The value of land rent on the transverse axis increases near city centres and decreases away from them (Fujita, Thisse, 2002, p. 201–209). The differences between the crest of the wave and its base are not, however, as great as in the case of the centre of a monocentric agglomeration and its periphery. The inner-city niches of the location economies that appear in conurbations constitute an important element attracting new industries. Their advantage is also the fact that they are densely populated and have good transport facilities (the factor of job market accessibility).

Due to the dynamics of urbanisation and industrialisation, there are many brownfields and other investment areas available. With respect to re-industrialisation, the fact that they are owned by one or, less frequently, two or three persons is another advantage. Taking into account the often fragmented ownership of greenfields in the suburbs, this is a potential asset.

This seemingly unusual phenomenon derives from the fact that many investors expect a rapid start for their business activities. Hence, they are willing to bear greater financial expenditures on regeneration and decontamination of a brownfield belonging to one legal institution (entity)⁴, rather than wrestle with the purchase of a dozen or dozens of smaller greenfield plots. Due to the fact that some small plot owners are not interested in selling them, and some other plots have an unresolved legal status, as a result, the investment process becomes extended in time, which frequently and often ultimately discourages potential investors⁵.

On the other hand, the re-industrialisation of such regions may be limited by the excessive degradation of post-industrial areas and by too heavy urbanisation (here: residential functions), which may hamper the development of industrial functions. As the example of some cities in the Katowice conurbation demonstrates, however, re-industrialisation can be successful, particularly in areas where the disadvantages of the conurbation were minimized by locating industries within its borders.

De-industrialisation and re-industrialisation in the Katowice region are uneven processes: i.e. many towns are still at the late post-industrial stage while others are at the post-industrial stage (Fig. 3).

To be precise, in 2010, there were only five typically industrial cities, where the number of employees in industry exceeded 55% (Bieruń, Knurów, Łędziny, Łaziska Górne, Miasteczko Śląskie). In two cases – Dąbrowa Górnicza and Jaworzno – industry and services employ a relatively similar number of people (45–55%). In most cities, however, the percentage of employees in industry decreased to below 40%, often even below 30%. For example, in the years 1989–2010, the employment share in industry in Będzin fell from 70% to 25%, in Mysłowice from 80% to 34%, and in Świętochłowice from 70% to 33% (CSO data, 2011).

Apart from this, as already mentioned, a key element in the process of economic transformation is its re-industrialisation, which is most preferably presented based on the models of the “borrowed size of towns” and “sticky places in slippery space”. Both models indicate an unevenness of development of the region conditioned by the local inter-city competition. Determinants of competitive advantages are many, ranging from administrative and academic functions, good transport accessibility, traditions for development of certain industries in a particular city, with a final emphasis on the role of local actors and on the creativity of municipal government and local leaders. The result is the apparent economic success of some cities compared to the failures of others. The “oversized” cities in this respect certainly include Gliwice and Tychy, and among the smaller towns - Siewierz. All three of these centres also meet the criteria of sticky places in the region. The example of Gliwice is discussed later in this section. At this point, the growing role of this city, not only in the Katowice conurbation but also in southern Poland, will be highlighted. These differences are reflected quite well in Fig. 3. Bytom is placed on the opposite side: twenty years ago, it was one of the largest industrial centres in Poland, and today, due to strong de-industrialisation, it is the most problematic city in the country.

A characteristic feature of the spatial differentiation of new investments is the fact of their peripheral locations. In the centre of the region, a clearly visible slippery space developed. The situation is particularly unfavourable in the central-western part. While in the south-eastern part the term “slippery space” (towards new industrial investments) is mitigated by the functioning of traditional industries, in the central-western part it is associated with fairly advanced de-industrialisation.

In order to explain the essence of the changes in the industrial structure of the Katowice conurbation, the cases of three cities: Gliwice, Knurów and Bytom, which represent the most common types of industrial transformations in the region, are presented below.

4.2 The case of a re-industrialised city – Gliwice

Until 1990, the town of Gliwice was based on industries and services. The key sectors were bituminous coal mining (two large mines), the steel industry (two steelworks), and metal, electro-technical, and chemical industries. As a result of economic transformations, one mine and one of the steelworks have been closed down. The steelworks and metal plant have been thoroughly restructured. The plants from

⁴ The most famous example in the Katowice conurbation is “EXPO-SILESIA” – Exhibition and Trade Centre in Sosnowiec, where its location, on a brownfield, required a lot of demolition and was ultimately more favourable than the initially contemplated prestigious location on the outskirts of Cracow (greenfields).

⁵ In many cases, the costs of regeneration, and especially decontamination, are born by local governments and institutions connected with environmental protection (e.g. just closed (2016) WATT factory in Sosnowiec).

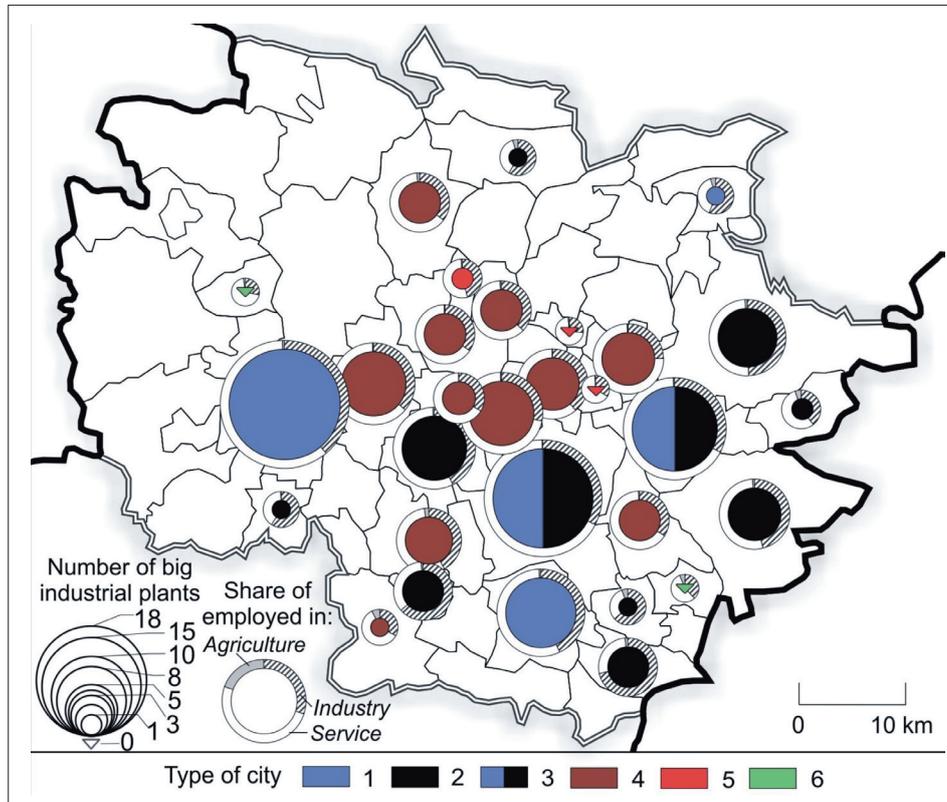


Fig. 3: Types of industrialisation dynamics in towns of the Katowice conurbation (Legend: 1 – towns with almost exclusively new or radically modernised industrial plants. Old industries have been replaced by new ones; 2 – towns whose economic structure is dominated by traditional industries. Lack of new industrial investments; the development of the city is based on traditional industries; 3 – towns in which new industrial plants are developed alongside the existing old industrial plants which have completed the process of restructuring. Old industries are replaced or balanced by new industrial investments; 4 – towns in which most traditional industries plants have been closed down, but in which new industries have not been developed; 5 – towns in which traditional industries plants have been completely closed down and new industries have not been developed; 6 – towns with no industrial function or with a limited industrial function in the past and at present)

Source: authors

other sectors built before 1990 have been almost completely restructured or closed down. The new stage of economic development of the town began with the establishment of the KSEZ investment areas and the flagship investment in Gliwice – an Opel automotive plant (currently General Motors Manufacturing Poland). The automotive plant and favourable local conditions, such as the availability of higher professional education (Silesian Polytechnic University) and a very good transportation network (a highway junction, an important railway hub, an inland port), stimulated the inflow of new investors from the industrial and service sectors. A key role in the industrial sector is held by automotive industry (including Deadong, General Motors, HP, Kirchoff, Nexteer, NGK Ceramics, Plastic Omnium Auto, Tenneco Automotive, and TRW Braking Systems).

Companies located in Gliwice are closely linked to General Motors Manufacturing Poland, as well as other automotive factories in the CEE. The essence of the “oversizing” of Gliwice as a centre of industry was not so much the creation of a special economic zone or a large number of cooperating plants, as the strengthening of a company that would be stimulating the economy and boost the influx of new companies in the automotive industry. Positive feedbacks were reported quickly as Opel accelerated the development

of plants producing components. These, in turn, perpetuated the status of the Opel's Polish factory in the global structure of General Motors. Both the development of the Opel factory and the cooperating companies actuated the expansion of the special economic zone, also for other industries. Gliwice, in the early 2000s, became the most recognisable sticky place in the Katowice conurbation, struggling with restructuring and the liquidation of traditional industries.

Re-industrialisation of Gliwice at the turn of the twenty-first century meant that the city, like no other in the Katowice conurbation, is the antithesis of the post-industrialism concept in the analysed region. Even though in the period 1989–2010, the number of people employed in industry decreased from 64.5 thousand to 38.8 thousand, the share of the industry decreased only from 65% to 42%⁶. This is a relatively small rate of decline in relation to many cities in the region, Poland and CEE. The growing importance of services based largely on logistics is closely connected with the local industry and endogenous services aiming at meeting the needs of residents. The fundamental importance in the economic development of Gliwice, however, was absolutely given to new industries. Taking into account the typology of the evolution of industrial regions proposed by Phelps and Ozawa, the city is difficult to define in the context of

⁶ Taking into account logistics, which is closely related to industry, the rate fell to approximately 50%.

the suggested late-industrial or post-industrial stages. On a regional scale, Gliwice represents the type of city whose evolution is opposed to the one-way evolution visible in Phelps and Ozawa's model.

4.3 The case of a post-industrial city – Bytom

The situation in Bytom is completely different from that in Gliwice. Until the end of the twentieth century, Bytom was one of the largest mining and industrial centres in the region and was dominated by bituminous coal mining, the steel industries and other companies working for mining and heavy industries in the region. The “Bytom” clothing company was a well-known brand.

The depletion of deposits and the economic and structural problems of the Polish mining industry at the turn of the century led to the closure of most of the mines, and the closure and restructuring of steelworks. In 2015, only one large coal mine (about 1.5 thousand employees) and a small one (0.2 thousand employees) were functioning. The larger coal mine will be closed in the future.

At present, Bytom is the best example in Poland of a town affected by de-industrialisation. Except for the restructured steelworks, a power plant and the soon-to-be closed coal mine, there are no large and medium-sized industrial plants. The town has experienced the drastic results of urban shrinkage (rapid depopulation, the highest number of unemployed in the whole region, and the most serious social and spatial problems in the administrative territory of the town). Urban shrinkage and the strong inter-town competition in the Katowice conurbation resulted in a relatively weak development of exogenous, pro-development services. Services are predominantly endogenous. In Kantor-Pietraga's (2014) system of depopulating and shrinking towns, Bytom is described as “a functionally useless town.”

Bytom is a classic example of highly advanced post-industrialism. In contrast to Gliwice, no clear re-industrialism processes have taken place here. The employment in industry is in a steady decline. After the liquidation of mining, the share of industrial employment is going to fluctuate around 20–25% (almost exclusively small and medium-sized companies). From the point of view of the metaphor “sticky places in slippery areas”, Bytom clearly represents the latter type of geographical space. The term “slippery” in reference to Bytom was even strengthened by Gwosdz (2012), with the application of the term of “leaping” through the expected stages of post-industrialism, and, specifically in this case, mitigating the resulting problems by the potential new projects connected with services or production. Undoubtedly, the most serious mistake of the economic policy towards Bytom was the too late (2014–2015) inclusion of selected investment zones into the structure of the KSEZ – the most dynamic actor on the regional economic scene.

4.4 The case of a (still) industrial city – Knurów

The genesis and development of Knurów are linked to bituminous coal mining. The economic base of the town was formed by two mines: “Knurów” and “Szczygłowice,” currently organisationally joined as KWK – “Knurów-Szczygłowice.” In this century, the obsolete coke plant was closed down. Local chemical industries have been thoroughly restructured. Knurów is one of the most interesting examples of a town in the Katowice region where, despite the closure and restructuring of two larger industrial plants (the coke plant and the industrial plants), traditional industries

(coal mining) continue to stabilize economic development. In 2010, 59% of all the employed in Knurów consisted of people employed in industry. Thus, this town is one of the places which make it difficult to use the term “post-industrial” to describe the Katowice region. In the taxonomy proposed by Phelps and Ozawa, the development of the town should be described as situated between the industrial and late-industrial stage.

This city is located in the peripheral zone of Gliwice and it represents a typical example of a slippery space. Even though Knurów is located on a major A1 highway, the strong competition of Gliwice deprives the place of the possibility of re-industrialisation on a broader scale. These restrictions are further aggravated by the negative impact of the local coal industry. Municipalities around Knurów are coping well with attracting new investors. The metaphor of slippery areas may in this case be complemented with “slippery on detour”.

5. Trans-industrialism as a response to post-industrialism dilemmas

A key problem presented in this paper is the definitional dissonance regarding the question whether the term “post-industrial” can be used to describe a region in which there simultaneously appear processes of re-industrialisation (Gliwice) and of the stabilisation of traditional industries (Knurów). From the perspective of the activated mechanisms of de-industrialisation of the so-called traditional industries, the answer is certainly positive. The changes in this regard generally follow a one-way trajectory; after all, even if coal mining continues in Knurów, the coke plant based on coal has been closed down. Assuming that the end of the trajectory is determined by complete de-industrialisation (understood as the closure of former industrial plants), then the question emerges of “When the end will take place?”. We do not know the answer to that. What we do know, however, is that the Katowice region does not fully follow the scenario described by Phelps and Ozawa (2003, p. 586), who set the end of the late-industrial stage at the end of the twentieth century.

Instead, what we observe is a spatial structure characterised by a marked lack of internal balance of development. According to Gwosdz (2012), who analysed the characteristic features of the economic base and employment in the towns of the Katowice conurbation, only six towns – Będzin, Chorzów, Gliwice, Katowice, and Sosnowiec – can be described as post-industrial. The problem is that even in this group, the role of industry and re-industrialisation is quite significant, as demonstrated by the example of Gliwice. Also, as other research shows (Gwosdz, Sobala-Gwosdz, 2012, p. 500), 45% of the employed in the towns of the conurbation work in the sectors of mining industry and industrial production.

The problems with definition become even more important when we attempt to determine precisely the process of industrialisation. Therefore, the question is whether re-industrialisation occurs when:

- new industrial plants appear in general, including plants based on advanced technologies;
- the economic potential of new industrial plants begins to dominate over the still existing (at the time of analysis) plants representing the so-called traditional industries; and
- the economic potential connected with new investments begins to dominate over the lost economic potential

linked to the closed-down industrial plants representing the so-called old industries (i.e. Tkocz, 2001; Martin and Sunley, 2006; Tripl and Otto, 2009).

Finally, a reference should be made to the spatial redistribution of the re-industrialisation phenomenon. The metaphor of Markusen, “sticky places in slippery areas”, that well reflects the reality of the region, significantly breaks apart the previously uniform and consistent mining and industrial region. Dualism in development is deepened with every decade, visibly transforming the hitherto industrial region consisting of dozens of medium-sized and large industrial centres into a network of cities with limited linkages in terms of industry (with the exception of the automotive industry).

As the argument to date suggests, the problems with defining post-industrialism in the Katowice conurbation are caused by our lack of knowledge (at this given moment) about the possibilities of future development of the industry in a given region. Is the development of the process of re-industrialisation at its highest point? Or is it only a stage in its development? A completely new perspective on the process of re-industrialisation has been proposed by Martínát et al. (2014), who use Karviná, a town in the Ostrava region, to argue that re-industrialisation may be based even on traditional industries (the mining industry in Karviná).

The problem of post-industrialism should also be approached from other two sides. The first one is the purely empirical perspective. In this case, a post-industrial region is one where there can be observed a decrease in the number of workers employed in industries and a decline in the proportion of workers employed in industries in relation to those employed in general or in services. This is an irrefutable argument for treating a region as post-industrial, particularly when both tendencies become more significant.

Firstly, a lot of companies classified as service companies work exclusive for industry and in industrial plants. While outsourcing concerns both production facilities and offices, it is included within the service sector in employment statistics. Before the early 1990s, in post-socialist countries these groups of employees were the workers of given industrial plants. For example, in 2001, in the largest steelworks in the Katowice region, ‘Huta Katowice’ in Dąbrowa Górnicza, there were employed approximately 5.2 thousand workers, and over 7 thousand worked in subsidiary companies and businesses producing for the steelworks. Many of the companies were classified as services. At the same time, it should be pointed out that in 1996 in Huta Katowice there were 20.3 thousand employees and there was no division into the two groups of workers. Therefore, the actual decrease in the number of employees due to the restructuring of Huta Katowice shows that part of the workers changed the sector of the economy without changing the work place.

Second, another problem is the question of strongly developed endogenous services (the employed in the region provide services for the inhabitants of the region). These services are not city-forming factors, and therefore form a secondary sector in relation to exogenous services (the employed in the region provide services for those living outside the region) and industry. The quantity and quality of exogenous services are revealed by the low level of employment in exogenous services and industries, as well as by the overall demographic potential. The latter is a crucial issue in the Katowice conurbation (Krzysztofik et al., 2014). Examining closely the structure of employment in the towns

of the Katowice conurbation, we note that the predominance of those employed in services is, to a large extent, an effect of the high proportion of workers employed in endogenous services. It is particularly visible in shrinking towns and in towns defined as post-industrial (Runge et al., 2014).

Taking into account the evolution of the economic base of the Katowice conurbation as discussed above, we cannot offer an adequate and uncontroversial definition of the region’s present economic development. The definitional dissonance is a result of, among other factors, the following issues:

- the diverse stages of the process of de-industrialisation of the so-called old industries;
- the uneven character of the process of re-industrialisation; and
- the partly overestimated real role of services.

The “post-industrial region” is a very ambiguous term, especially as defined by Phelps and Ozawa (2003), who appropriated Hall’s (1997) concept of post-industrial agglomeration. Kuciński (2008) and Gwosdz (2012) have recently questioned this definition; as Kuciński (2008, p. 165) writes: “The fact that the industrial function has disappeared or is disappearing in a given town does not have to mean that it is connected with a shift in economy from the industrial to the post-industrial stage.” In turn, Gwosdz (2012) has proposed to describe the Katowice conurbation as a late-industrial region. Indeed, this claim may be supported by the great number of towns in the Katowice conurbation whose economy is based on the so-called traditional industries. At the same time, however, this description does not fully reflect the economic status of those towns where traditional industries have been closed down or have been significantly restructured and have been replaced by new industries, as has been the case in, for example, Gliwice or Tychy.

It is also difficult to describe the Katowice conurbation as a (late-)industrial region, if only because of the significant role of services. Undoubtedly, as has been shown, some towns in the regions are (late-)industrial. Thus, in order to contribute to the discussion on the nature of the functional transformations of such regions as the Katowice conurbation, we propose to describe the region as trans-industrial (Fig. 4). Currently, the term is employed in two ways. In a wider sense, it is related to the character of the social change in the world caused by the role of industry as one of the quantifiers of overall social development in the history of civilisation (Kassiola, 1990). More narrowly, it has been used to explain specific organisational connections in the media market (Meehan, 2005).

In this situation, we would like to draw attention to the process-oriented value of the term in the functional approach – in direct relation to such terms as industrialism, post-industrialism, or re-industrialism. The meaning of this term may also be manifested in the fact that:

- it represents an alternative to the terms late-industrial or post-industrial, especially when the definition of these two stages is questionable;
- it emphasizes the continuity and sustainability of industrial development in the region – a sustainability, which, contrary to stereotypical assumptions, is characterized by the variability of key industries in the region;
- it underlines the fact that neighbouring towns can simultaneously function at very different stages of functional evolution in relation to the development of industry;

- it presents re-industrialisation as an alternative to the de-industrializing path of functional transformations; and
- it finds a place in the general trajectory of transformations for such objects as the fossil-fuel power station “Łagisza” in Będzin which, on the one hand, belongs to the traditional industries in the region and, on the other, after modernisation and extension, is one of the most technologically advanced facilities of this type in Europe.

Above all, “trans-industrialism” departs from the sharp division into stages proposed by Phelps and Ozawa which, in complex settlement systems like polycentric agglomerations or conurbations, can lead to some inconsistencies. Importantly, it suggests that we should see the transformations as a whole in which Phelps and Ozawa’s taxonomy, as well as the phenomena of de-industrialisation and re-industrialisation, are included (Fig. 4).

What is a trans-industrial region? It is a defined region (administrative, economic, urban) which includes towns and settlements at various stages of industrialisation, starting from proto-industrialism and ending with post-industrialism, and in which there appear theoretically opposing trends in economic transformations, such as de-industrialisation and re-industrialisation.

6. Discussion

The above definition of trans-industrialism begs the question of whether the term is not tantamount to industrialism, where the latter is understood as the

development of industry in general. It is definitely not. Trans-industrialism is a much more narrow term. If industrialism points to the overall processes connected to the development of industry in general, trans-industrialism emphasises a specific moment of the development – the here and now. The development includes also the quite diverse evolution of industrial functions in individual towns in the region.

Of course, the term “here and now” is not clear and needs to be clarified. The first issue to be resolved is the issue of the region. Theoretically, the area having the same boundaries at the time of research as in the defined past should be subject to analysis. A barrier to such a depiction of delimitation is the fact that some cities, once they have lost industrial functions and become centres of service industries, “alienate” themselves with respect to the industrial region, with which they were identified even 15 or 20 years before. This process is not dynamic, but noticeable, especially in areas where the industrial region is experiencing an enhanced crisis, and the examined city with services is developing based on the new functions. Changes of administrative boundaries are also problematic, as well as the social and economic delimitations introduced due to various needs. In the Katowice conurbation, administrative changes took place in 1999. Since the 1990s, at least a dozen delimitation projects for the region have been developed.

The time aspect is even more difficult to define. Unless we are able to determine the upper dividing line – the present at the time of research, it is more difficult to determine the lower line of division. In Poland and the CEE countries, the

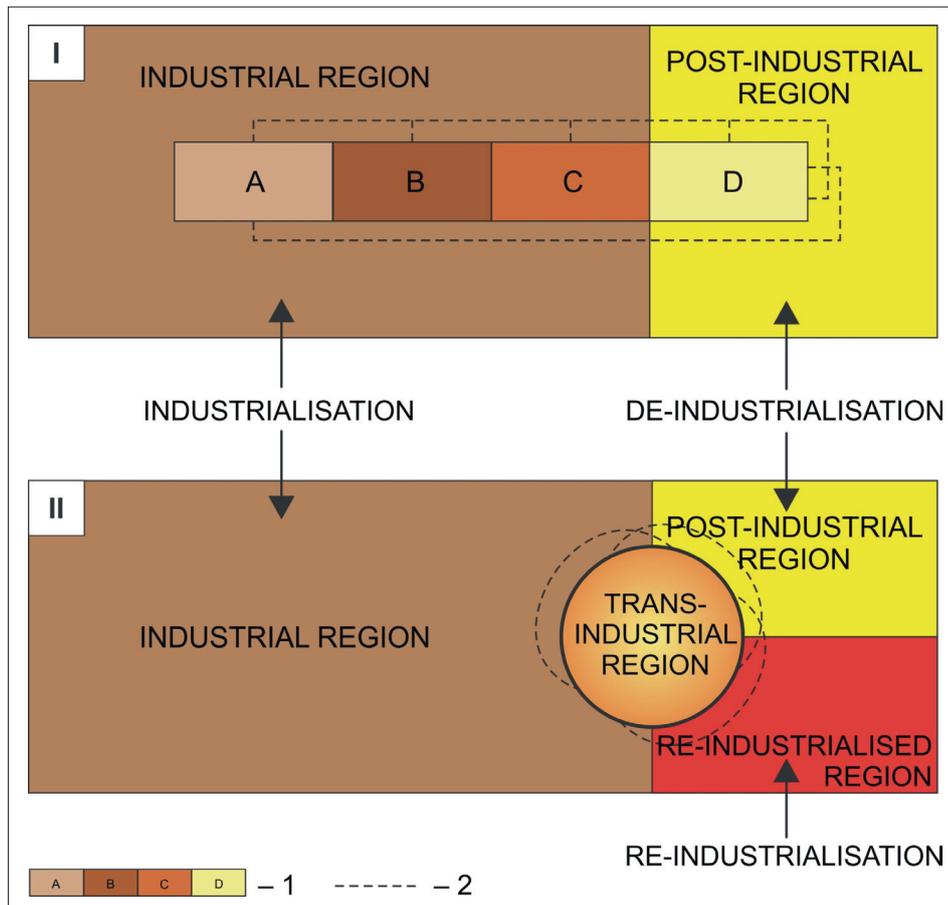


Fig. 4: Model concepts and the location of the trans-industrial region (Legend: I – Phelps and Ozawa’s model; II – the authors’ model; I – Phelps and Ozawa’s model (A – pre-industrial stage; B – industrial stage; C – late-industrial stage; D – post-industrial stage); II – range of changes in future – possibilities
Source: authors

period 1989–1990 might be helpful since it refers to the time of the collapse of the socialist system. A more “fluid” nature of the lower dividing line will be in countries where there was a continuity of the capitalist economy. Referring back to the upper dividing line – the present, however, it should be considered to what point of time we are able to extend the period of study. While for the Katowice conurbation, the period 1990–2015 does not raise any doubts, would it be the same for the period 1990–2030?

The term “trans-industrial” has been proposed as a point of departure for a discussion about the spatial and temporal heterogeneity of economic processes and phenomena, and about the formation of town functions. It is proposed as an answer to the restrictions imposed by the currently used terms and definitions, in particular by the term “post-industrial region”.

This seemingly fairly simple idea is followed by a number of methodological challenges. They mainly concern the ways to assess the role of industry in the regional economy. The methodology in this regard is diverse and significantly complex, starting from simple participation rates of employees in the industry relative to the total number of employees, and ending at fairly complicated procedures, integrating factors of employment, investment, GDP or the number of large enterprises. All of these attributes may be considered both in terms of traditional industries and also new industrial plants. Although there are a number of comparison tools, an undoubted challenge is their clarification. One should assume, however, that getting unanimity on this issue is not going to be easy – even more so due to the fact that a thorough analysis of the issue will also be required for the services sector, the functioning of which is not always possible to be compared simply with the industrial sector.

Despite these undoubtedly objective limitations to the application of the trans-industrialism concept, the authors are convinced that undertaking further studies in this matter, both in terms of methodology, case studies and further theoretical explanations, is worthwhile.

7. Conclusions

The functional transformations in Central European urban regions whose economy has been until recently based mostly on mining and traditional industries, are very diverse. They depend on many factors, the most important of which are the relocation of industry in Europe; GDP; the spatial form of an urban region (conurbation, polycentric agglomeration, monocentric agglomeration), or regional factors, such as labour market, transportation network and economic policy. In this article, however, we have attempted to explain these determinants and their influence on the functional identity of a region.

With respect to the Katowice conurbation – the largest urban region of this type in Central-Eastern Europe – the authors have demonstrated the difficulties involved in defining it in terms of literal post-industrialism. The difficulties are caused by, on the one hand, the interaction between the actual de-industrialisation of the region and the marked signs of its re-industrialisation, and, on the other, by the limited range, at least with respect to demographic potential, of the replacement of industries by exogenous services, particularly by those which could create a functional alternative in the future. Additionally, these are accompanied by the process of de-industrialisation and the shrinkage of some of towns in the conurbation.

The problems with offering an unequivocal definition of the changing functions of the Katowice conurbation have led us to propose the term “trans-industrial” to describe the region. This allows us to uphold a dynamic approach to the changes and to evade answering the question whether the region should be defined in line with the Phelps and Ozawa taxonomy as post-industrial or late-industrial. The proposal to define the region as trans-industrial does not mean that we should stop evaluating and analysing industrialism and post-industrialism in the specific towns of the conurbation. On the basis of the trajectory of the transformations of functions in “model” towns, it is advisable to anticipate changes in functionally complex towns. The importance of the challenge follows the original assumption that urban regions, such as conurbations, are, in fact, strongly integrated urban systems. The problems of one town “spread” to the neighbouring towns. In the Katowice conurbation, it is clearly visible in the directions and intensity of commuting to work. Despite some differences, the Katowice region may be a point of reference for other East Central European urban regions described as post-industrial, such as the Ostrava and Rybnik regions.

References:

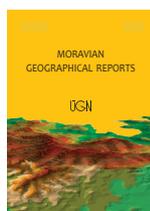
- BIRCH, K., MACKINNON, D., CUMBERS, A. (2010): Old industrial regions in Europe: a comparative assessment of economic performance. *Regional Studies*, 44(1): 35–53.
- BOROWIK, I. M. (2014): Knowledge Exchange Mechanisms and Innovation Policy in Post-Industrial Regions: Approaches of the Basque Country and the West Midlands. *Journal of Knowledge Economy*, 5(1): 37–69.
- BURGER, M. J., MEIJERS, E. J., HOOGERBRUGGE, M. M., TRESSERRA, J. M. (2015): Borrowed Size, Agglomeration Shadows and Cultural Amenities in North-West Europe. *European Planning Studies*, 23(6): 1090–1109.
- COENEN, L., MOODYSSON, J., MARTIN, H. (2014): Path Renewal in Old Industrial Regions: Possibilities and Limitations for Regional Innovation Policy. *Regional Studies*, 1–16. (early view): DOI: dx.doi.org/10.1080/00343404.2014.979321.
- COOKE, P. [ed.] (1995): *The Rise Of The Rustbelt: Revitalizing Older Industrial Regions*. London, UCL Press Limited.
- CORNETT, A. P. (2013): Conceptualisation of Clusters as a Tool in Local and Regional Development. In: Brown K., et al. [eds.]: *Resources and Competitive Advantage in Clusters* (pp. 30–45). München-Mering, Rainer Hampp Verlag.
- VAN DIJK, H. (2002): *The Decline of Industry the Ruhr Area in Germany*. Paper presented to the Urban History Conference Edinburgh.
- DOMAŃSKI, B. (2002): The economic restructuring of Upper Silesian region. In: Stober, G. [ed.]: *Polen, Deutschland und die Osterweiterung der EU aus geographischen Perspektiven* (pp. 91–103). Hannover, Verlag Hahnsche Buchhandlung.
- DOMAŃSKI, B. (2003): Economic trajectory, path dependency and strategic intervention in an old industrial region: the case of Upper Silesia. In: Domański, R. [ed.]: *Recent advances in urban and regional studies*. Studia Regionalia KPZK PAN, 11: 133–153.

- DUBENETSKII, Y. N. (2014): Reindustrialization: Conditions, Goals, and Stages. *Studies on Russian Economic Development*, 25(4): 329–334.
- ECKART, K. [ed.] (2003): Social, economic and cultural aspects in the dynamic changing process of old industrial regions. Ruhr District (Germany), Upper Silesia (Poland), Ostrava Region (Czech Republic). Münster, LIT.
- FRANZ, P. (2010): Political Institutionalisation and Economic Specialisation in Polycentric Metropolitan Regions: The Case of the East German 'Saxony Triangle'. *Urban Studies*, 47(12): 2665–2682.
- FUJITA, M., THISSE, J.-F. (2002): Economics of Agglomeration. Cities, Industrial Location and Regional Growth. Cambridge, Cambridge University Press.
- GWOSDZ, K. (2012): Baza ekonomiczna i specjalizacja funkcjonalna miast konurbacji katowickiej po dwóch dekadach transformacji. *Acta Geographica Silesiana*, 11: 15–29.
- GWOSDZ, K. (2014): Pomiędzy starą a nową ścieżką rozwojową. Mechanizmy ewolucji struktury gospodarczej i przestrzennej region tradycyjnego przemysłu na przykładzie konurbacji katowickiej po 1989 roku. Kraków, IGiGP Uniwersytet Jagielloński.
- GWOSDZ, K., SOBALA-GWOSDZ, A. (2012): Struktura funkcjonalna i powiązania miast konurbacji katowickiej po dwóch dekadach restrukturyzacji. *Przegląd Geograficzny*, 84(4): 483–507.
- HALL, P. (1997): Modelling the post-industrial city. *Futures*, 29(4–5): 311–322.
- HAMILTON, E. F. I. (1984): Industrial Restructuring: an International Problem. *Geoforum*, 15(3): 28–39.
- HASSINK, R., SHIN, D. H. (2005): The restructuring of old industrial areas in Europe and Asia. *Environment and Planning A*, 37(4): 571–580.
- HRUŠKA-TVRDÝ, L. (2010): Proměny trhu práce v Ostravě. In: Tvrďý-Hruška, L. [ed.]: *Industriální město v postindustriální společnosti*. Ostrava: VŠB-TU.
- HUDEC, O., URBANČIKOVÁ, N. (2008): Spatial Disparities based on Human and Social Capital. In: Jenks, M. D., Kozak P. [eds.]: *World Cities and Urban Form. Fragmented, polycentric, sustainable?* (pp. 113–128). New York, London, Takkanon, Routledge.
- KANTOR-PIETRAGA, I. (2014): Systematyka procesu depopulacji miast na obszarze Polski od XIX do XXI wieku. Katowice, Wydawnictwo Uniwersytetu Śląskiego.
- KASSIOLA, J. J. (1990): *The Death of Industrial Civilization. The Limits to Economic Growth and the Repoliticization of Advanced Industrial Society*. Albany, State University of New York Press.
- KLASIK, A. [ed.] (2008): Aktywność przedsiębiorcza i konkurencyjność ekonomiczna miast w procesie restrukturyzacji aglomeracji miejskich, Katowice, Wydawnictwo Akademii Ekonomicznej w Katowicach.
- KLASIK, A., HEFFNER, K. (2001): Polish Regional Policy and the Problems of Upper Silesia Ten Years into Transformation. In: Klasik, A., Heffner, K. [eds.]: *Restructuring Heavy Industrial Regions. Some Experience from Scotland and Upper Silesia* (pp. 11–34). Katowice, Wydawnictwo Akademii Ekonomicznej im. Karola Adamickiego.
- KLOOSTERMAN, R. C., LAMBREGTS, B. (2001): Clustering of economic activities in polycentric urban areas: the case of Randstad. *Urban Studies*, 38(4): 717–732.
- KNAPP, W. (1998): The Rhine–Ruhr area in transformation: Towards a European metropolitan region? *European Planning Studies*, 6(4): 379–393.
- KRUGMAN, P. (1997): *Development, Geography and Economic Theory*. Cambridge, London, The MIT Press.
- KRZYSZTOFIK, R. (2014): Geneza aglomeracji miast na obszarze Polski. Katowice, Wydawnictwo Uniwersytetu Śląskiego.
- KRZYSZTOFIK, R., KANTOR-PIETRAGA, I., SPÓRNA, T. (2013): A Dynamic approach to the typology of functional derelict areas (Sosnowiec, Poland). *Moravian Geographical Reports*, 21(2): 20–35.
- KRZYSZTOFIK, R., RUNGE, A., RUNGE, J., KANTOR-PIETRAGA, I. (2014): Miasta konurbacji katowickiej. In: Stryjakiewicz, T. [ed.]: *Kurczenie się miast w Europie Środkowo-Wschodniej* (pp. 89–101). Poznań, Bogucki Wydawnictwo Naukowe.
- KUCIŃSKI, K. (2008): Miasto w procesie dezindustrializacji. In: Morawski, W. Zawistowski, A. [eds.]: *Stare Okręgi Przemysłowe. Dylematy industrializacji i dezindustrializacji* (pp. 161–179). Warszawa, Oficyna Wydawnicza SGH w Warszawie.
- LEBOUTTE, R. (2009): A space of European de-industrialisation in the late of twentieth century: Nord/Pas-de Calais, Wallonia and the Ruhrgebiet. *European Review of History: Revue europeene d'histoire (Special Issue: Transnational Spaces in History)*, 16(5): 755–770.
- LEVER, W. F. (1991): Deindustrialisation and the Reality of the Post-industrial City. *Urban Studies*, 28(6): 983–999.
- LUX, G. (2009): Divergent patterns of adaptation among Central European Old Industrial Regions. *European Spatial and Research Policy*, 16(1): 145–157.
- MARKUSEN, A. (1996): Sticky places in slippery spaces: a typology of industrial districts. *Economic Geography*, 72(1): 293–313.
- MARTIN, R., SUNLEY, P. (2006): Path dependence and regional economic evolution. *Journal of Economic Geography*, 6(4): 395–437.
- MARTINÁT, S., NAVRÁTIL, J., DVOŘÁK, P., KLUSÁČEK, P., KULLA, M., KUNC, J., HAVLÍČEK, M. (2014): The expansion of coal mining in the depression areas – a way to development. *Human Geographies – Journal of Studies and Research in Human Geography*, 8(1): 5–15.
- MEEHAN, E. R. (2005): Transindustrialism and synergy: structural supports for decreasing diversity in commercial culture. *International Journal of Media & Cultural Politics*, 1(1): 123–126.
- MEIJERS, E. J. (2008): Measuring polycentricity and its promises. *European planning Studies*, 16(9): 1313–1323.
- MIKOŁAJEC, J. (2008): Spatial Restructuring of the Katowice Conurbation. In: Nowak, M., Nowosielski, M. [eds.]: *Declining Cities/Developing Cities: Polish and German Perspectives* (pp. 101–112). Poznań, Wydawnictwo Instytutu Zachodniego.
- MÜLLER, B., FINKA, M., LINTZ, G. [eds.] (2004): *Rise and Decline of Industry in Central and Eastern Europe*. Berlin, Springer.

- MUSIL, J. (2010): Modely vývoje měst a procesy deindustrializace. In: Tvrďý-Hruška, L. [ed.]: *Industriální město v postindustriální společnosti* (pp. 21–32). Ostrava, Vysoká škola báňská-Technická univerzita.
- NEFFKE, F., HENNING, M., BOSCHMA, R. (2011): How do region diversify over time? Industry relatedness and the development of new growth paths in regions. *Economic Geography*, 87(3): 237–265.
- PARR, J. B. (2004): The Polycentric Urban Region: A Closer Inspection. *Regional Studies*, 38(3): 231–240.
- PHELPS, N. A., OZAWA, T. (2003): Contrasts in agglomeration: proto-industrial, industrial and post-industrial form compared. *Progress in Human Geography*, 27(5): 583–604.
- PICKERNELL, D., ROWE, P. A., CHRISTIE, M. J., BROOKSBANK, D. (2007): Developing a framework for network and cluster identification for use in economic development policy-making. *Entrepreneurship & Regional Development*, 19(4): 339–358.
- POPJAKOVÁ, D., TKOCZ, M., VANČURA, M. (2014): New Industrial Spaces in Old Industrial Centres: Selected Examples of Sosnowiec (Poland) and České Budějovice (Czech Republic). In: Ziolo, Z., Rachwał, T. [eds.]: *Contemporary issues of Polish industrial geography* (pp. 212–229). Kraków, Prace Komisji Przemysłu PTG.
- RILEY, R., TKOCZ, M. (1998): Coal Mining in Upper Silesia under Communism and Capitalism. *European Urban and Regional Studies*, 5(3): 217–235.
- RUNGE, J., KANTOR-PIETRAGA, I., KRZYSZTOFIK, R., RUNGE, A. (2014): Model urbanizacji złożonych układów osadniczych w świetle procesu kurczenia się miast w Polsce – próba analizy krytycznej. In: Stryjakiewicz, T. [ed.]: *Kurczenie się miast w Europie Środkowo-Wschodniej* (pp. 115–125). Poznań, Bogucki Wydawnictwo Naukowe.
- RUMPEL, P., SLACH, O. (2012): *Governance of Shrinkage of the City of Ostrava*. Praha, European Science and Art Publishing.
- SCHUYSKY, V. P. (2013): Foreign economic relations of Russia Reindustrialization of Russia: Opportunities of Technology Import. *Russian Foreign Economic Journal*, 1(1): 101–108.
- SCOTT, A. (1982): Locational patterns and dynamics of industrial activity in the modern metropolis. *Urban Studies*, 19(2): 111–142.
- SCOTT, A., STORPER, M. (1987): High technology industry and regional development: a theoretical critique and reconstruction. *International Social Science Journal*, 112: 215–232.
- STEINER, M. (2003): Modernizing Traditional Industries in Declining Regions – Concepts of Transformation in Old and New Market Economies. In: Steiner, M. [ed.]: *From Old Industries to New Regions. Policies for Structural Transformations in Accession Countries* (pp. 9–24). Graz, Leykam Buchverlagsgesellschaft.
- STRANGELMANN, T. (2002): Networks, Place and Identities in Post-industrial Mining Communities. *International Journal of Urban and Regional Research*, 25(2): 253–267.
- SUCHÁČEK, J. (2005): Regional Decline and Restructuring in Ostrava Agglomeration and Katowice Conurbation. ERSA conference papers ersa05p200, European Regional Science Association [cit. 03.03.2015]. Available at: https://www.researchgate.net/publication/23731503_Regional_Decline_and_Restructuring_in_Ostrava_Agglomeration_and_Katowice_Conurbation
- SUCHÁČEK, J. (2010): Na cestě k nové identitě: Ostrava, Katowice a Košice po roce 1989. Ostrava, Vysoká škola báňská, Technická univerzita.
- SWAIN, A. [ed.] (2007): *Re-Constructing the Post-Soviet Industrial Region: The Donbas in Transition*. Abingdon, Routledge.
- TKOCZ, M. (2001): *Restrukturyzacja przemysłu regionu tradycyjnego*. Katowice, Wydawnictwo Uniwersytetu Śląskiego.
- TKOCZ, M. (2006): Efekty restrukturyzacji górnictwa węglowego w Polsce. *Prace Komisji Geografii Przemysłu PTG*, 9: 28–38.
- TRIPPL, M., OTTO, A. (2009): How to turn the fate of old industrial areas: a comparison of cluster-based renewal processes in Styria and the Saarland. *Environment and Planning A*, 41(5): 1217–1233.
- WESTKÄMPER, E. (2014): *Towards the Re-Industrialization of Europe. A Concept for Manufacturing 2030*. Berlin, Heidelberg, Springer Verlag.
- WIRTH, P., ČERNIČ MALI, B., FISCHER, W. [eds.] (2012): *Post-mining Regions in Central Europe. Problems, Potentials, Possibilities*. München, oekon Verlag.
- ŽENKA, J., NOVOTNÝ, S., SLACH, O., KVĚTOŇ, V. (2015): Industrial specialization and economic performance: A case of Czech microregions. *Norsk Geografisk Tidsskrift – Norwegian Journal of Geography*, 69(2): 67–79.

Please cite this article as:

KRZYSZTOFIK, R., TKOCZ, M., SPÓRNA, T., KANTOR-PIETRAGA, I. (2016): Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland. *Moravian Geographical Reports*, 24(1): 42–54. Doi: 10.1515/mgr-2016-0004.



MORAVIAN GEOGRAPHICAL REPORTS



Institute of Geonics, The Czech Academy of Sciences

journal homepage: <http://www.geonika.cz/mgr.html>

doi: 10.1515/mgr-2016-0005

Teenage overweight and obesity: A pilot study of obesogenic and obesoprotective environments in the Czech Republic

Jana SPILKOVÁ^{a*}

Abstract

Child overweight and obesity represent a serious health problem worldwide. The Czech Republic now ranks the fourth most obese country in Europe and obesity and overweight is becoming more and more frequent in children and teenagers. This pilot study estimates the prevalence of obesity and overweight among Czech teenagers aged 14–15 years in terms of neighbourhood characteristics, and assesses the effects of neighbourhood environmental quality versus family or personal-level factors on teenage obesity and overweight. The results show that unsafe environments result in the risk of lesser physical activity of their inhabitants, but since the vast majority (92%) of the students felt safe in their neighbourhoods, mediation through safety of the neighbourhood is not at stake. Second, the housing estates demonstrate the most severe problems with both obesity and overweight and their built environments, but when perceptions of sporting facilities and similar opportunities for physical activity are factored in, they do not have low scores; therefore, mediation by physical activity is not a relevant response to the obesity problem. These findings imply that the most important obesogenic and obesoprotective factors are likely to be found within the family environment and personal life styles.

Keywords: teenagers, obesity, overweight, neighbourhood, Czech Republic

Article history: Received 30 July 2015; Accepted 10 March 2016; Published 31 March 2016

1. Introduction

Child overweight and obesity represent a serious health problem worldwide. A high prevalence of child obesity is no longer only a problem in the USA and other developed countries, as problems with child obesity are often reported from developing countries, as well as from the so-called transition countries of Central and Eastern Europe. The Czech Republic, one of the latter countries, used to rank among the countries with a high prevalence of obesity in adults (Hainer et al., 1999), but even at the beginning of this century the situation with child obesity and overweight was not critical (Kobzová et al., 2004). This started to change rapidly, however, and the Czech Republic is now the fourth most obese country in Europe (measured by adult obesity) and obesity is a major health issue for the Czech population. What is more, obesity and overweight is becoming more and more frequent in children too, mainly among boys. Recently, the Czech Ministry of Health presented the National Health Strategy 2020 focusing on 16 main topics developed into action plans. The fight against obesity and overweight is among the most important of these, because obesity is an epidemic with negative outcomes for an individual's

health – it increases the risk of hypertension about six-fold and the risk of diabetes about seven-fold. There will be about one million Czechs with diabetes as a consequence of overweight in the next ten years. Research into obesity and overweight and their prevention among children and adults is thus a national health policy priority.

2. Theoretical frameworks

The spread of the obesity epidemic worldwide has been a catalyst for a myriad of studies investigating the linkages between the risk of overweight/obesity and various factors. These factors include both individual (genetic conditions, life style, socioeconomic status, ethnicity, gender) and contextual variables. At the contextual level, the effects of a multi-dimensional environment may contribute to obesity or overweight, including the effects of the home environment and parents' influences on diet and physical activity, the broader social environment and the physical environment of the neighbourhood where a person lives. The issue of the geographic factors, especially built environment and its influence on obesity, has attracted significant attention,

^a Department of Social Geography and Regional Development, Faculty of Science, Charles University in Prague, Czech Republic (*corresponding author: J. Spilková, email: spilkova@natur.cuni.cz)

pointing to the evidence that there are some environments which seem to be more obesogenic than others. The built environment encompasses all human-made infrastructure and resources supporting human activity (building, transport infrastructure, parks, stores, service facilities, etc.) (Davis et al., 2005). The implications for interactions between public health policies and urban design have been established in this field of research, involving many disciplines such as urban planning, landscape architecture, geography, economics, epidemiology, sociology, nutrition science, etc.

As Ding and Gebel (2012) indicate, since the beginning of the millennium, research on the built environment and obesity has skyrocketed and critical literature reviews help to summarize the results in this area. There are a number of quality literature reviews (and also reviews of reviews, such as de Vet et al., 2011, Gebel et al., 2007, Ding and Gebel, 2012) on the influence of the built environment on obesity. Booth et al. (2005) presented one of the first reviews based on nine pioneering studies: they stressed the neighbourhood influences, mainly the effect of safer neighbourhoods which often result in more physical activity and less obesity; lower socioeconomic status, which often leads to less physical activity; the walkability of a neighbourhood and more available physical activity resources; and the land-use mix within the neighbourhood, which usually increases physical activity. Their study has an important methodological implication as it concludes that neighbourhood-level analysis is more representative of the daily lifestyles of residents than the metropolitan level, consisting of many counties with varying built environments (Booth et al., 2005, p. 114). Similar to this methodological note, Panter and Jones (2010) suggest that environments outside the home neighbourhood where individuals spend most of their time should also be studied. In compliance with this guideline, both the home and the school environments have been appraised in this paper.

Another review by Black and Macinko (2008) summarizes the literature on neighbourhood determinants of obesity since 2004, when the majority of articles began to appear. Three elements of built environments appear in these studies: urban design and the physical appearance of public spaces; land use, mainly the density of residential and other activities; and transportation systems, the availability of sidewalks, bike paths, etc. The neighbourhood contextual environment in other studies has also included access to sport and leisure facilities, green space and the degree of urbanization, the perceived safety of the neighbourhood, its general attractiveness, and social capital or social support within the community. This review is worthy to mention in the context of this paper because one of the important results is that the authors found that the bulk of the literature focuses on urban neighbourhoods in high-income countries. The current paper thus also aims to fill this gap by focusing on the Czech Republic – a region where very little information about the obesogenic and obesoprotective environments is available.

A more recent review by Feng et al. (2010) presents a systematic and quantitative assessment of an up-dated body of literature (22 context-based and 15 geographic buffer papers). The selected papers evaluated three domains of the built environment: the physical activity, land use and transportation, and food environments. The authors conclude that although it has become increasingly common to attribute obesity to characteristics of the built

environment, existing evidence did not identify a clear and strong role for the built environment. The heterogeneity of the studies limits their comparability and any findings of systematic evidence.

In a similar vein, another review by Durand et al. (2011) studied built environment factors related to physical activity and obesity risk in relation to planning implications, including the so-called “smart growth” principles. These principles in the surveyed studies included a range of housing opportunities and choices, walkable neighbourhoods, communities with a sense of place, mixed land uses, open space and critical environmental areas, a variety of transportation choices, community-oriented development and compact building design. When quantifying the results of the surveyed studies, nevertheless, few studies reported significant associations between the above-mentioned principles and physical activity or the body mass index. These authors concluded that the almost exclusively non-significant results here were not surprising since the majority of the studies were cross-sectional, and therefore they anticipated that there are many important factors on other levels which remain unmeasured (such as eating behaviours, etc.).

A slightly more recent review of literature examining the relationship between built environment (parks, trails, sidewalks) and physical activity or obesity by O. Ferdinand et al. (2012) presented similar results. The majority of the surveyed studies (89%) do report a beneficial contribution to physical activity and health, but since these papers utilized simple observational study designs, they are not suited for determining causality. Based on this extensive review of the literature, this paper aims to use knowledge stemming mainly from U.S. research reports for a pioneering study analysing the built environment and neighbourhood effects on obesity in the context of a post-socialist country. Literature reviews helped to focus interest on the most commonly-used variables describing various facets of the built environment for this paper’s analysis. Furthermore, the micro-geographic level has also been incorporated (quality of the home and school environment, sport facilities, etc.) following the suggestions of Brownson et al. (2009, in Ding and Gebel, 2012), as an audit of the “details” in the quality of the environment and various amenities at a micro-scale. Similarly, the hypothesis that the linkage between the built environment and obesity varies in different geographic settings (type of neighbourhood, metropolitan versus non-metropolitan) has been tested. Still, in the post-socialist context, many specific elements may apply.

The post-socialist countries have experienced a dramatic process of transformation and democratisation since the beginning of the 1990s. The democratisation of society and the introduction of meritocratic principles and economic freedom, however, have had some negative consequences, e.g. a steep increase in criminality, xenophobia and other socio-pathological phenomena. Structural changes and steep price rises lowered the standard of living in some households, whereas other households, on the contrary, profited from the free market economy and the re-establishment of property rights.

In the Czech Republic, the health behaviours of many people changed due to higher stress related to the need to adapt to new conditions, resulting in an even higher prevalence of alcohol consumption, smoking and drug use and unhealthy lifestyles in general. Secondly, the neighbourhood influence is not as clearly pronounced as

in the U.S. studies, where racial, socio-economic and even religious heterogeneity correlate with the specific features of neighbourhoods (Janssen et al., 2006; Lopez, 2007; Story et al., 2002; van Lenthe and Mackenbach, 2002, etc.)¹. The typical housing estates from the communist era with their concrete blocks of flats, housed a wide spectrum of resident classes from manual or blue collar workers to the intelligentsia and elites (Enyedi, 1998; Herfert et al., 2013; Kährlik and Tamaru, 2010; Musil, 1987). Even today, these estates accommodate a socio-economic mixture of residents. The same is true for suburbia, which accommodates both new suburbanites in luxurious family houses and the former dwellers, with a different socio-economic profile.

This paper presents a pilot study of several diverse effects on teenage overweight and obesity, taking into account facets of the built environment (the existence of playgrounds, recreational space, adequate housing, etc.), social capital (perceived neighbourhood safety, behaviour norms, area deprivation), family background (economic status, social status), and individual behaviours (physical activity, walking activities) that are thought to influence overweight and/or obesity. There are two broad objectives:

- to estimate the prevalence of obesity and overweight among Czech teenagers aged 14–15 years, using a variety of neighbourhood and built environment characteristics; and
- to assess the effects of neighbourhood environment quality versus the family or personal level influences on teenage obesity and overweight.

3. Methods

3.1 Data collection

The data for this pilot study came from an on-line survey among elementary school students (9th grade), which was administered in 38 selected schools in the Czech Republic, between October 2013 and March 2014. The schools were selected by a purpose-built sampling frame (Dzúrová et al., 2015): First, the schools in Prague were classified for the survey according to their neighbourhood type so that they represented different built environments. The seven built environments included blocks of flats in housing estates, new family houses in suburban areas, row houses, old city apartment houses, newer apartment houses, family houses and semi-detached houses, etc. Second, the schools outside Prague were selected based on their previous results in the ESPAD (The European School Survey on Alcohol and Other Drugs survey). Schools differed according to the trend of their health risk behaviour development – four types of trends were selected: improving, problematic, stable but good, and stable but bad. The Directors of the selected schools representing each trend type were contacted and asked for permission to conduct the survey. The questionnaires were completed in class, usually during lessons of computer education. Students were given a unique code for each school, ensuring the anonymity of individual data. After entering this school-code, the on-line survey form opened and was ready to be filled out. The research process followed the ethical guidelines proposed by the Czech government; thus, all procedures were performed in compliance with the relevant laws and institutional guidelines which appropriate institutional committees have approved.

Only students aged 14–15 years were selected for the analysis. Altogether, 1,025 valid responses were received: 48.5% of the sample was girls and 51.5% boys; 39% of the surveyed students lived in the capital city of Prague and the remaining 61% in other areas of the country. Most of the students lived in housing estates with blocks of flats (38.2%), 20.2% lived in traditional family houses, 18% lived in newly-built family houses in suburbia, 9.5% in new apartment houses in outer city areas, 7.2% in older city apartment houses in inner city neighbourhoods, 4.5% in row houses and 2.3% in semi-detached houses.

3.2 Measures

The dependent variable for the analysis in this paper was the odds of obesity and overweight defined according to the international sex- and age-specific cut-off points for body mass index of 25 kg/m² and 30 kg/m². These cut-off points were constructed in order to define child obesity based on the same principle at different ages, based on averaging the reference population of children from a mix of large representative surveys in different countries (Cole et al., 2000). The body mass index (BMI) proved to be one of the most satisfactory indicators of relative obesity (Keys et al., 2014).

Besides the above-mentioned neighbourhood type (with respect to the built environment), other neighbourhood and school environmental factors were the primary independent variables of interest. We use similar characteristics of neighbourhoods to the U.S. studies (Singh et al., 2010). Since the disorder or delinquency issues differ in the USA and the Czech Republic, however, we chose those appropriate for the Czech context. In contrast to the aggregate data, we used the adolescents' own perceptions of their home and school environment to extract subjective measures of the environmental contexts (for the importance of individual perceptions, see, e.g. Winstanley et al., 2008; Pacione, 2003; Weden et al., 2008). These selected characteristics included, for example, signs of violence or vandalism, poor or dilapidated housing, garbage or litter in the neighbourhood, drugs or alcohol consumed on the streets, and racial or religious problems. Built environment factors such as access to parks, greenery, playgrounds and sport facilities, were also assessed in the survey. These items were scored on a scale from 1 to 4 points, coded as 1 = no problem, 2 = small problem, 3 = bigger problem, 4 = serious problem, so that the higher scores indicated a greater degree of neighbourhood disadvantage. Last, neighbourhood safety was based on the question, "Do you feel safe and secure in the area of your home: never, sometimes, usually or always?"

A second important group of variables was presented by determinants of behavioural factors with potential effects on obesity, such as physical activity (at school, at home, with friends, specialized training etc.), and the student's mode of transportation to school (both changed to binary variables for the analysis). The last group of variables covered individual and family demographic and socio-economic characteristics such as age, gender, family affluence (below average, average, above average), education of parents (elementary school, secondary school, university degree), etc.

3.3 Statistical analysis

The data were transferred into a database and analysed statistically using SPSS (Statistical Package for the Social

¹ As regards ethnic and religious heterogeneity, the Czech Republic is rather homogenous (70% ethnic Czechs, 89% Czech-speaking) and mostly atheist (34.2% without religion) (Czech Statistical Office, 2011).

Sciences), version 17 (SPSS, Chicago, IL). First, descriptive analyses were conducted to explore the character of the data and their basic distributions (SPSS command Analyze – Descriptive Statistics). Second, contingency analyses (chi-square statistics) were applied to test the overall associations between the covariates (SPSS command Analyze – Descriptive Statistics – Crosstabs). Subsequently, logistic regression models were used to estimate the odds of obesity and overweight in the sample of Czech teenagers. The dependent variable was defined as binary (underweight or normal weight coded as 0, versus overweight and/or obese coded as 1). Next, logistic regression models were conducted to examine the effects of the particular factors (SPSS command Analyze – Regression – Binary Logistic). A three-level data structure was applied in the logistic regression models: the environmental level (1); the family level (2); and the personal level (3) which has entered into the analysis as individual blocks of variables. Thus, a multilevel model was used, but the data structure has to take into account the fact that in some cases, the data were collected for one class in any chosen school, which likely means that the data will be clustered, i.e. there is a within-class correlation of responses.

4. Results

The prevalence of overweight and obesity in this study is depicted in Tab. 1. Altogether, 17.2% teenagers were overweight and 3.8% were obese. At the age of 14–15 years, boys were more likely to be both overweight (20.8% overweight boys versus 13.3% girls) and obese (4.7% versus 2.8%). The results show that there are significant gender differences for overweight (chi-square = 10.27, $p = 0.001$) but not for obesity (chi-square = 2.57, $p = 0.109$).

As regards the type of neighbourhood (Tab. 2), the highest prevalence of overweight and obese teenagers was found in the neighbourhoods with row houses (26.1% and 6.6% respectively), followed by teenagers living in housing estates with blocks of flats (19.1%, and 4.3%), however, the differences are not statistically significant. Chi-square analysis of the Tab. 2 shows Overweight: chi-square = 7.47, $p = 0.29$; Obese: chi-square = 1.78, $p = 0.939$, but table has too many cells with expected frequencies less than 5 for the association to be tested properly.

The exploratory data analyses further show that the majority of students came from average income families (60.4%), 29.1% rated their family as above average (somewhat

			Overweight			Obesity		
			no overweight	overweight	total	no obesity	obesity	total
gender	Girl	Count	431	66	497	483	14	497
		% within gender	86.7%	13.3%	100%	97.2%	2.8%	100%
	Boy	Count	418	110	528	503	25	528
		% within gender	79.2%	20.8%	100%	95.3%	4.7%	100%
Total		Count	849	176	1,025	986	39	1,025
		% within gender	82.8%	17.2%	100%	96.2%	3.8%	100%

Tab. 1: Prevalence of overweight and obesity among ninth-grade students. Source: author's calculations

		Overweight			Obesity		
		no overweight	overweight	total	no obesity	obesity	total
block of flats	Count	317	75	392	375	17	392
	% within neighbourhood	80.9%	19.1%	100%	95.7%	4.3%	100%
new family house	Count	156	29	185	178	7	185
	% within neighbourhood	84.3%	15.7%	100%	96.2%	3.8%	100%
row house	Count	34	12	46	43	3	46
	% within neighbourhood	73.9%	26.1%	100%	93.5%	6.5%	100%
older city apartment house	Count	63	11	74	71	3	74
	% within neighbourhood	85.1%	14.9%	100%	95.9%	4.1%	100%
newer apartment house	Count	82	15	97	94	3	97
	% within neighbourhood	84.5%	15.5%	100%	96.9%	3.1%	100%
older family house	Count	174	33	207	201	6	207
	% within neighbourhood	84.1%	15.9%	100%	97.1%	2.9%	100%
semi-detached house	Count	23	1	24	24	0	24
	% within neighbourhood	95.8%	4.2%	100%	100.0%	0.0%	100%
Total	Count	849	176	1,025	986	39	1,025
	% within neighbourhood	82.8%	17.2%	100.0%	96.2%	3.8%	100.0%

Tab. 2: Prevalence of overweight and obesity according to neighbourhood type
Source: author's calculations

rich and very rich), and 10.5% came from families with lower than average income. Teenagers reported doing vigorous physical exercise alone or with friends (57.3% and 53.4% respectively), 16.6% participated in sports teams and 29.5% reported some professional training. Surprisingly, the majority of the children (82.1%) said they did not take part in school physical education. As for transportation, 53.5% of respondents walked to school and 38% used public transport, while only 0.5% cycled to school. The remaining 8.1% used car, motorcycle or other means of transport.

The vast majority of responding teenagers evaluated their neighbourhood as safe ('always safe' 45.9%, or 'most of the time safe' 46.2%), 6.6% felt safe in the vicinity of their homes only sometimes, and just 1.3% of the surveyed teenagers responded that they never felt safe in their neighbourhood. As regards particular problems of the built environment, in average drug and alcohol consumption around schools, violence and vandalism, and garbage or litter around schools have been often mentioned as a large problem (17.3%, respectively, 14.9% and 12.6%), as well as drugs and alcohol consumed around home (13.2%, a serious problem), dilapidated neighbourhoods, litter in the streets, etc. around home (10.7%), and vandalism, violence and crime in the home neighbourhood (10.1%).

The inhabitants of particular neighbourhoods differed significantly in their health behaviours (physical activity, transportation to school) and in their assessments of the qualities of built environment characteristics. Teenagers living in unsafe neighbourhoods were significantly the most likely to be physically inactive ($C = 0.123$, $p < 0.001$)². The same is true for those teenagers who reported that they perceive violence and vandalism in their home neighbourhood as a serious problem ($C = 0.102$, $p < 0.05$). Even stronger is the consequence of negative perceptions of the school environment and physical activity: those students who criticize the racial, religious or ethnic disorder around their schools were those who were physically inactive ($C = 0.100$, $p < 0.05$), and the same applies to those who perceive the consumption of drugs in the vicinity of their school as a serious problem ($C = 0.101$, $p < 0.05$). Also, rather important is the revealed relation between the type of the neighbourhood and transportation to school ($C = 0.414$, $p < 0.001$): the children from the housing estates are much more likely to walk to school compared to the children from older and new family houses, as these students are more reliant on public transport. The relation between perceived safety of the neighbourhood and the mode of transport is statistically significant ($C = 0.198$, $p < 0.001$), but it brings mixed results.

Rather surprisingly, those living in housing estates were significantly less likely to negatively evaluate the access to sporting facilities of the housing estates' schools, while teenagers from row-houses and older family houses significantly more often evaluated the sporting facilities in their neighbourhood schools as problematic ($C = 0.196$, $p < 0.05$). When we turn to characteristics of the built environment around the homes of respondents, the inhabitants of housing estates were significantly less likely to positively evaluate their neighbourhoods and the racial or religious problems, while those living in suburban areas

with new family houses are more likely to evaluate these issues positively ($C = 0.220$, $p < 0.001$). Exactly the same is the case for the question about violence and vandalism in the neighbourhoods of housing estates and new family houses ($C = 0.198$, $p < 0.05$), for the lack of greenery ($C = 0.199$, $p < 0.05$), use of drugs and alcohol in public spaces ($C = 0.216$, $p < 0.001$), and overall dilapidation of the neighbourhood ($C = 0.226$, $p < 0.001$).

The binary logistic regression models for the measures of teenage overweight and obesity is depicted in the next table. Tab. 3 presents three models which are (1) environmental, (2) family, and (3) personal. It reflects the survey structure by assessing particular levels of the analysis. It showed significant results only for the gender and family affluence explanatory variables. Boys are about 1.6 times more likely to be overweight than girls at the age of 14–15 years. Teenagers from average affluent families are 2.45 times more likely to be overweight and/or obese than teenagers from more affluent families. Also, teenagers from less affluent families have a higher likelihood of being overweight and/or obese (1.7 times more than those from affluent families). The effects of the built environment of home and school neighbourhoods, the differences between Prague and the rest of the country, or the perceived safety of the neighbourhood were insignificant or mixed, as well as the results for physical activity or means of transport in the second model (Tab. 3).

5. Discussion

Despite the fact that our results have not revealed significant associations between built environment characteristics and teenage overweight and/or obesity, as is common for many studies coming from the U.S. or "western" context (Booth et al., 2005; Janssen et al., 2006; Lopez, 2007; van Lenthe and Mackenbach, 2002, etc.), there are many results related to particular covariates of overweight and obesity worth noting in the Czech sample.

Housing estates with blocks of flats seem to be the most problematic type of neighbourhood when considering overweight and obesity, and for many reasons³. First, their residents are more likely to suffer from the effects of racial, ethnic or religious disorder, violence and vandalism, use of alcohol and drugs in public spaces, and overall untidiness, garbage and litter in the surroundings of their homes, as well as the overall dilapidation of the houses and whole neighbourhoods. Such environments are perceived as unsafe and, according to our results, this also brings a higher probability of being physically inactive. Similar outcomes were found by Saelens et al. (2003a, b), who showed that safer neighbourhoods with a mixture of functions often result in more physical activity and less overweight and obesity. Similarly depicted by the results of Franzini et al. (2009), it seems that a favourable social environment of the neighbourhood positively influences overall physical activity.

We agree with their findings, although Franzini et al. (2009, p. 275) in their study concluded that the physical environment was not significantly associated with measures of physical activity, because the children get

² $C =$ Contingency coefficient: $\sqrt{[\chi^2 / (N + \chi^2)]}$

³ Only the built environment of row houses proved to be more obesogenic in our study; however, the sample of teenagers from these neighbourhoods is quite small.

	Model 1		Model 2		Model 3	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
<i>Type of neighbourhood</i>						
housing estate	ref		ref		ref	
new family house	0.183	0.666	0.124	0.604	0.332	0.718
row house	0.716	1.181	0.723	1.176	0.567	1.309
older apartment house	0.803	0.902	0.619	0.810	0.514	0.749
newer apartment house	0.400	0.724	0.318	0.678	0.523	0.776
older family house	0.130	0.631	0.111	0.592	0.146	0.616
semi-detached house	0.089	0.166	0.082	0.159	0.109	0.181
<i>Prague vs. Non-metropolitan</i>						
non-metropolitan	0.305	1.258	0.290	1.278	0.336	1.255
<i>Feeling safe in the neighbourhood</i>						
always	ref		ref		ref	
most of the time	0.371	2.739	0.410	2.531	0.242	3.869
sometimes	0.530	2.026	0.519	2.063	0.345	2.979
scarcely or never	0.204	4.394	0.203	4.396	0.129	6.104
<i>Perception of racial, ethnic or religious disorders around school</i>						
no problem	ref		ref		ref	
small problem	0.557	1.405	0.466	1.529	0.431	1.599
bigger problem	0.346	1.726	0.304	1.818	0.247	1.993
serious problem	0.411	1.635	0.369	1.717	0.333	1.812
<i>Perception of litter, rubbish, untidiness around school</i>						
no problem	ref		ref		ref	
small problem	0.843	1.104	0.909	1.059	0.851	1.100
bigger problem	0.346	1.514	0.359	1.498	0.307	1.582
serious problem	0.784	0.889	0.782	0.887	0.708	0.848
<i>Perception of drug or alcohol use in the public space around school</i>						
no problem	ref		ref		ref	
small problem	0.201	1.819	0.176	1.888	0.210	1.814
bigger problem	0.140	1.928	0.122	1.990	0.116	2.032
serious problem	0.521	1.336	0.464	1.395	0.460	1.406
<i>Perception of vandalism and dilapidation around school</i>						
no problem	ref		ref		ref	
small problem	0.591	0.748	0.579	0.740	0.455	0.664
bigger problem	0.564	0.751	0.582	0.761	0.386	0.645
serious problem	0.998	0.999	0.984	0.990	0.875	0.925
<i>Perception of traffic congestions and other traffic problems around school</i>						
no problem	ref		ref		ref	
small problem	0.338	0.608	0.394	0.638	0.262	0.547
bigger problem	0.359	0.625	0.409	0.651	0.303	0.578
serious problem	0.828	0.890	0.889	0.927	0.737	0.830
<i>Perception of greenery around school</i>						
no problem	ref		ref		ref	
small problem	0.951	1.036	0.972	1.021	0.848	0.894
bigger problem	0.689	1.243	0.731	1.209	0.876	1.091
serious problem	0.676	1.270	0.698	1.251	0.880	1.091

Tab. 3: Binary logistic regression models for teenage overweight and/or obesity. Notes: ref. = reference category; results in bold = $p < 0.05$. Model 1 is for the (home and school) environmental factors; Model 2 adds in family characteristics; Model 3, individual characteristics. Source: author's calculations

	Model 1		Model 2		Model 3	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
<i>Perception of sport facilities around school</i>						
no problem	ref		ref		ref	
small problem	0.234	0.628	0.386	0.708	0.693	0.851
bigger problem	0.100	0.520	0.206	0.599	0.423	0.718
serious problem	0.046	0.410	0.085	0.460	0.169	0.531
<i>Perception of racial, ethnic or religious disorders around home</i>						
no problem	ref		ref		ref	
small problem	0.366	0.555	0.386	0.566	0.410	0.572
bigger problem	0.259	0.475	0.301	0.503	0.352	0.529
serious problem	0.075	0.292	0.080	0.297	0.077	0.286
<i>Perception of vandalism and dilapidation around home</i>						
no problem	ref		ref		ref	
small problem	0.946	0.957	0.997	0.998	0.950	0.958
bigger problem	0.770	1.198	0.722	1.250	0.691	1.284
serious problem	0.824	0.878	0.853	0.896	0.834	0.882
<i>Perception of greenery around home</i>						
no problem	ref		ref		ref	
small problem	0.371	1.759	0.436	1.635	0.318	1.914
bigger problem	0.888	1.094	0.989	1.009	0.799	1.184
serious problem	0.469	1.562	0.552	1.443	0.336	1.841
<i>Perception of litter, rubbish, untidiness around home</i>						
no problem	ref		ref		ref	
small problem	0.151	0.421	0.121	0.393	0.126	0.390
bigger problem	0.797	0.868	0.770	0.851	0.709	0.812
serious problem	0.325	1.638	0.324	1.643	0.347	1.614
<i>Perception of drug or alcohol use in the public space around home</i>						
no problem	ref		ref		ref	
small problem	0.728	0.831	0.721	0.825	0.848	0.900
bigger problem	0.201	0.518	0.167	0.486	0.173	0.488
serious problem	0.005	0.197	0.007	0.206	0.008	0.214
<i>Mother's education</i>						
university degree			ref		ref	
secondary school			0.631	0.771	0.658	0.787
elementary school			0.467	0.825	0.539	0.849
<i>Father's education</i>						
university degree					ref	
secondary school			0.118	2,258	0.087	2.455
elementary school			0.535	1.184	0.501	1.202
<i>Economic affluence of the family</i>						
above average			ref		ref	
average			0.031	2.286	0.022	2.450
below average			0.061	1.637	0.044	1.712
<i>Physically active (yes/no, yes = ref.)</i>						
					0.586	1.267
<i>Transportation to school (passive/active, active = ref.)</i>						
					0.526	1.171
<i>Gender (girl = ref.)</i>						
					0.029	1.627

Tab. 3: continued

most of their physical exercise in school, gym etc., so that neighbourhood physical characteristics are less relevant. This becomes problematized in our study and its results, which show that the level of physical activity at school is critically low and most of the teenagers who are physically active get the majority of their exercise alone or with friends in their spare time.

There is another paradox related to physical activity and the built environment in the Czech context: as our results show, the teenagers from housing estates (perceived as highly problematic environments) obviously do not suffer from any major lack of sporting facilities around their home or in the schools in their neighbourhoods, and they are also those who are most likely to walk to school. The housing estates were built during the communist era and often represented a challenge for urban planners and architects, who aimed to fulfil the requirements of architectural competitions (Musil, 1985; van Kempen et al., 2009). Therefore, despite the fact that today's housing estates may already be dilapidated or in need of repair and reconstruction, there is a surprisingly large amount of green space and accessible sport facilities both within the school complexes and within the public spaces of these neighbourhoods.

Carrying out this pilot study has turned out to be an important step towards a future research agenda in the realm of obesogenic and obesoprotective environments in the Czech Republic, where we evidently can obtain a more intricate picture. First, it is true that unsafe environments result in the risk of lesser physical activity for their inhabitants, but, on the contrary, the vast majority (92%) of the students felt safe in their neighbourhoods. Thus, mediation through the safety of the neighbourhood is not at stake. Second, the housing estates demonstrate the most severe problems with both obesity and overweight and their built environment, but when it comes to the perception of the sporting facilities and similar opportunities for physical activity, they were not attributed low scores; moreover, the students from the housing estates are more used to walk to school and back. Therefore, again, mediation by physical activity is not the most relevant response to the obesity problem. This implies that the most important obesogenic and obesoprotective factors 'hide' within the family environment.

6. Limitations

There are many limitations to this pilot study and its results should be interpreted cautiously. First, our pilot sample is small, so that its statistical power is limited. Second, the study is based on the self-reported height and weight of teenagers, which may be affected by certain underestimations – under-reporting for weight and over-reporting for height (Legleye et al., 2014). The inaccuracies of self-reported weight and height may affect the distribution of overweight and obesity risk in our sample, but the degree of these effects, if any, cannot be determined. Third, we have not studied the health food availability and food choices in the particular neighbourhoods, although these are also very often related to the risk of obesity.

Fourth, the data structure employed in this research is clearly multi-level in nature, i.e. the 'students-in-classes' is a first hierarchical level of responses, such that the student responses will be affected by their shared class location, and hence not independent of other responses. As such, schools would be represented as Level 2 units. A full response to

this data structure is to employ a multi-level /mixed model approach. For this pilot study, with relatively few cases per level, we have chosen to employ regular regression estimation methods for the models. Fifth, the results of any statistical analysis do not necessarily imply causality.

7. Conclusions

This pilot study contributes to a growing body of research on the covariates of child and teenage overweight and obesity, especially the effects of built environments and neighbourhood characteristics. The findings of this research project, similar to other studies cited in the theoretical background, indicate that teenagers living in unsafe and socio-economically disadvantaged neighbourhoods in a state of dilapidation – housing estates with blocks of flats – are at increased risk of overweight and obesity. The effects of contributing factors behind these results, however, do not seem to act in the same way. The majority of children perceived their neighbourhood environment as safe, thus lack of safety does not put Czech children and teenagers at risk of overweight or obesity by discouraging physical activity, as it does in many U.S. studies. Also, the history of Czech housing estate construction is different and these neighbourhoods were not perceived as "social living", neither at the very beginning of their construction nor today, such that these areas do not suffer from a critical lack of green spaces or sport facilities. Thus the built environment was not recognized as playing an important role in the development of child and teenage obesity in the Czech Republic.

Obesity is caused by complex interactions between various genetic and environmental factors. From our study, it is obvious that micro-geographic characteristics (such as the built environment and neighbourhood quality) do not seem to significantly influence the overweight/obesity of the surveyed teenagers, so that the main influences reside in the family environment and individual life-style habits. Public health policies therefore have to focus on individual-, family-, and school-based interventions to promote a healthy life style (Dodson et al., 2009; Kipke et al., 2007; Nestle, 2010; Simon et al., 2008). Parents might be targeted to increase their involvement in their children's leisure time activities, mainly hobbies and physical exercise. Given the extremely low involvement in school physical education revealed in this pilot study, considerable attention should be focused on school environments, their sport facilities and the quality of their physical education courses. Last but not least, after revealing the significant association between family affluence and overweight/obesity, it can be concluded that schools should also have a role in promoting the available physical activities for everybody, including those children whose parents cannot afford to pay for commercial physical activity courses.

Acknowledgements

The author would like to thank Dr. Ladislav Csémy for his assistance with obtaining data from the elementary schools. This study was supported by the SOPHIE project ("Evaluating the impact of structural policies on health inequalities and their social determinants and fostering change") which received funding from the European Community's Seventh Framework Program (FP7/2007–2013) under grant agreement No. 278173, and from the Czech Ministry of Health via the grant: "The analysis

of the relation of youth health risk behaviour and socio-demographical determinants of the environment” (No. 12118-5/2011). This publication was also supported by the project “National Institute of Mental Health (NIMH-CZ)”, grant number ED2.1.00/03.0078, and the European Regional Development Fund.

References:

- BLACK, J. L., MACINKO, J. (2008): Neighborhoods and obesity. *Nutrition Reviews*, 66: 2–20.
- BOOTH, K. M., PINKSTON, M. M., POSTON, W. S. C. (2005): Obesity and the built environment. *Journal of the American Dietetic Association*, 105: 110–117
- BROWNSON, R. C., HOEHNER, C. M., DAY, K., FORSYTH, A., SALLIS, J. F. (2009): Measuring the built environment for physical activity: state of the science. *American Journal of Preventive Medicine*, 36: S99–S123.
- COLE, T. J., BELIZZI, M. C., FLEGAL, K. M., DIETZ, W. H. (2000): Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ*, 320: 1–6.
- CZECH STATISTICAL OFFICE (2011): Předběžné výsledky sčítání lidu, domů a bytů 2011 [Preliminary results of the Census 2011]. [online] [cit. 25.12.2015] Available at: www.czso.cz.
- DAVIS, R., COOK, D., COHEN, L. (2005): A community resilience approach to reducing ethnic and racial disparities in health. *American Journal of Public Health*, 95: 2188–2173.
- DE VET, E., DE RIDDER, D. T., DE WIT, J. B. (2011): Environmental correlates of physical activity and dietary behaviours among young people: a systematic review of reviews. *Obesity Reviews*, 12: 130–142.
- DING, D., GEBEL, K. (2012): Built environment, physical activity, and obesity: What have we learned from reviewing the literature? *Health and Place*, 18: 100–105.
- DODSON, J. L., HAI, Y., KASAT-SHORS, M., MURRAY, L., NGUYEN, N. K., RICHARDS, A. K., GITTELSON, J. (2009): Formative research for a healthy diet intervention among inner-city adolescents: The importance of family, school and neighborhood environment. *Ecology of Food and Nutrition*, 48: 39–58.
- DURAND, C., ANDALIB, M., DUNTON, G., WOLCH, J., PENTZ, M. (2011): A systematic review of built environment factors related to physical activity and obesity risk: implications for smart growth urban planning. *Obesity Reviews*, 2011: 5.
- DZÚROVÁ, D., CSÉMY, L., SPILKOVÁ, J., LUSTIGOVÁ, M. (2015): Zdravotně rizikové chování mládeže v Česku. Prague, National Institute of Public Health.
- ENYEDI, G. (1998): Transformation in Central European postsocialist cities. In: Enyedi, G. [ed.]: *Social Change and Urban Restructuring in Central Europe* (pp. 9–34). Budapest, Akadémiai Kiadó.
- FENG, J., GLASS, T. A., CURRIERO, F. C., STEWART, W. F., SCHWARTZ, B. S. (2010): The built environment and obesity: A systematic review of the epidemiologic evidence. *Health and place*, 16: 175–190.
- FRANZINI, L., ELLIOT, M. N., CUCCARO, P., SCHUSTER, M., GILLILAND, J., GRUNBAUM, J. A., FRANKLIN, F., TORTOLERO, S. R. (2009): Influences of Physical and Social neighborhood environments on children’s physical activity and obesity. *American Journal of Public Health*, 99: 271–278.
- GEBEL, K., BAUMAN, A. E., PETTICREW, M. (2007): The physical environment and physical activity: a critical appraisal of review articles. *American Journal of Preventive Medicine*, 32: 361–369.
- HAINER, V., KUNEŠOVÁ, M., PAŘÍZKOVÁ, J. (1999): Prevalence and causality of obesity in central and eastern Europe. In: Ailhaud, B. and Guy-Grand, B. [eds.]: *Progress in Obesity Research* (pp. 653–663). London, Libbey.
- HERFERT, G., NEUGENBAUER, C. S., SMIGIEL, C. (2013): Living in residential satisfaction? Insights from large-scale housing estates in Central and Eastern Europe. *Tijdschrift voor economische en sociale geografie*, 104: 57–74.
- JANSSEN, I., BOYCE, W. F., SIMPSON, K., PICKETT, E. (2006): Influence of individual- and area-level measures of socioeconomic status on obesity, unhealthy eating, and physical inactivity in Canadian adolescents. *American Journal of Clinical Nutrition*, 83: 139–145.
- KÄHRIK, A., TAMMARU, T. (2010): Soviet prefabricated panel housing estates: Areas of continued social mix or decline? The case of Tallin. *Housing Studies*, 25: 201–219.
- KEYS, A., FIDANZA, F., KARVONEN, M. J., KIMURA, N., TAYLOR, H. L. (2014): Indices of relative weight and obesity. *International Journal of Epidemiology*, 43: 655–665.
- KIPKE, M. D., IVERSON, E., MOORE, D., BOOKER, C., RUELAS, V., PETERS, A. L., KAUFMAN, F. (2007): Food and park environments: Neighborhood-level risks for childhood obesity in east Los Angeles. *Journal of Adolescent Health*, 40: 325–333.
- KOBZOVÁ, J., VIGNEROVÁ, J., BLÁHA P. et al. (2004): The 6th nationwide anthropological survey of children and adolescents in the Czech Republic in 2001. *Central European Journal of Public Health*, 12: 126–130.
- LEGLEYE, S., BECK, F., SPILKA, S., CHAU, N. (2014): Correction of Body-Mass index using body-shape perception and socioeconomic status in adolescent self-report surveys. *PLOS ONE*, 9: 1–9.
- LOPEZ, R. P. (2007): Neighborhood risk factors for obesity. *Obesity*, 15: 2111–2119.
- MUSIL, J. et al. (1985): Lidé a sídliště. Prague, Svoboda.
- MUSIL, J. (1987): Housing policy and the sociospatial structure of cities in a socialist country: the example of Prague. *International Journal of Urban and Regional Research*, 11: 27–36.
- NESTLE, M. (2010): Strategies to prevent childhood obesity must extend beyond school environments. *American Journal of Preventive Medicine*, 39: 280–281.
- O FERDINAND, A., SEN, B., RAHURKAR, S., ENGLER, S., MENACHEMI, N. (2012): The relationship between built environments and physical activity: a systematic review. *American Journal of Public Health*, 102: 7–13.
- PACIONE, M. (2003): Urban environmental quality and human wellbeing – a social geographical perspective. *Landscape and Urban Planning*, 65: 19–30.

- PANTER, J. R., JONES, A. (2010): Attitudes and the environment as determinants of active travel in adults: what do and don't we know. *Journal of Physical Activity Health* 7(4): 551–561.
- SAELENS, B. E., SALLIS, J. F., FRANK, L. D. (2003): Environmental correlates of walking and cycling: Findings from the transportation, urban design, and planning literatures. *Annals of Behavioral Medicine*, 25: 80–91.
- SAELENS, B. E., SALLIS, J. F., BLACK, J. B., CHEN, D. (2003): Neighborhood-based differences in physical activity: An environment scale evaluation. *American Journal of Public Health*, 93: 1552–1558.
- SIMON, P. A., KWAN, D., ANGELESCU, A., SHIS, M., FIELDING, J. E. (2008): Proximity of fast food restaurants to schools: Do neighborhood income and type of school matter? *Preventive medicine*, 47: 284–288.
- SINGH, G. K., SIAHPUSH, M., KOGAN, M. D. (2010): Neighborhood socioeconomic conditions, built environments, and childhood obesity. *Health Affairs*, 29: 503–512.
- STORY, M., NEUMARK-SZTAINER, D., FRENCH, S. (2002): Individual and environmental influences on adolescent eating behaviors. *Journal of the American Dietetic association*, 102: S40–S51.
- VAN KEMPEN, R., MUSTERD, S., ROWLANDS, R. (2009): *Mass Housing in Europe: Multiple Faces of Development, Change and Response*. New York, Palgrave Macmillan.
- VAN LENTHE, F. J., MACKENBACH, J. P. (2002): Neighborhood deprivation and overweight: the GLOBE study. *International Journal of Obesity Related Metabolic Disorders*, 26: 234–240.
- WEDEN, M. M., CARPIANO, R. M., ROBERT, S. A. (2008): Subjective and objective neighborhood characteristics and adult health. *Social Science and Medicine*, 66: 1256–1270.
- WINSTANLEY, E. L. et al. (2008): The association of self-reported neighborhood disorganization and social capital with adolescent alcohol and drug use, dependence, and access to treatment. *Drug and alcohol dependence*, 92: 173–182.

Please cite this article as:

SPIPKOVÁ, J. (2016): Teenage overweight and obesity: A pilot study of obesogenic and obesoprotective environments in the Czech Republic. *Moravian Geographical Reports*, 24(1): 55–64. Doi: 10.1515/mgr-2016-0005.



Fig. 6: OC Olympia, Brno – the highest rated shopping centre in the Czech Republic according to the value of “aggregate attractiveness” (Photo: Josef Kunc)



Fig. 7: Eurovea Galleria, Bratislava – the largest and most spectacular shopping centre in the Slovak Republic, connecting Danube river embankment with the city centre (Photo: Josef Kunc)