DOI: 10.15201/hungeobull.67.3.3 Hungarian Geographical Bulletin **67** 2018 (3) 239–257.

How do various types of regions attract creative industries? Comparison of metropolitan, old industrial and rural regions in Czechia

Jan ŽENKA[1] and Ondřej SLACH[1]

Abstract

In this paper we aim to describe and explain current spatial distribution of creative industries in Czechia. We ask to what extent are localisation patterns of creative industries influenced by specific local contexts. Therefore, we employed a typology of regions (close to local labour areas) that may explain spatial distribution of creative industries: metropolitan cores, metropolitan hinterlands, old industrial regions, urban and rural regions. We use general linear models combining the regional typology as a fixed factor and four covariates – employment density, density of cultural industries, mean firm size in creative industries and diversity of economic activities. We employed horizontal localisation quotient of regional employment in creative industries for the year 2014 as a dependent variable. Our main finding is that the regional typology explains a higher share of variability of the dependent variable (relative specialisation in creative industries) than any other explanatory variable. However, after exclusion of metropolitan cores, the model lost a significant amount of its explanatory power. Urban size/density and position in urban hierarchy are the key explanatory variables. We found only limited empirical evidence that regional contexts affect localisation of CI – regions of similar population/economic size do not differ significantly in spatial concentration of CI.

Keywords: creative industries, localisation, spatial distribution, metropolitan regions, old industrial regions, rural regions, Czechia

Introduction

There are several reasons why *creative industries* (CI) have been standing in the spotlight of economic and urban geographers. Positive effects of these industries on urban regeneration and stimulation of productivity growth and innovation performance in other sectors of the economy have been reported (Stam, E. *et al*. 2008; Müller, K. *et al.* 2009). Over-representation of CI in large urban areas (Lazzeretti, F. *et al.* 2008, 565) may contribute to spatially uneven development and an increasing gap in economic performance between metropolitan and non-metropolitan areas (Rodríguez-Pose, A. and Fitjar, R.D. 2013). City size and status – inherited, slowly evolving and hardly changeable factors in a short time period – are among the key drivers of CI localisation (Musterd, S. *et al.* 2007; Musterd, S. and Gritsai, O. 2010). Most importantly, propensity of firms in CI to cluster into dense hubs suggests the key importance of local amenities and geographical proximity for their productivity and growth. Therefore, urbanization and localisation economies are most frequently mentioned as the key drives for clustering of CI in and around large cities (Lazzeretti, F. *et al*. 2008).

Despite consensus on the key role of agglomeration economies some principal questions remain unanswered (Gong, H. and Hassink, R. 2017). Do varieties in national institutional frameworks lead to distinct spatial patterns of CI at the regional level? How are

[1] Department of Human Geography and Regional Development, Faculty of Science, University of Ostrava, Chittussiho 10, 710 00 Ostrava. E-mails: jan.zenka@osu.cz, ondrej.slach@osu.cz

current geographies of CI rooted in their historical development? To what extent can we explain the spatial patterns of CI by the urban hierarchy and what is the importance of the local contextual factors? What do we know about localisation of firms in CI that focus rather on standardized routine activities and are positioned in lower tiers of the global production networks? Most importantly, while there have been many studies focusing on the effects of various factors on the localisation of CI (e.g. urbanization and localisation economies, related variety, cultural heritage or creative class – Lazzeretti, F. *et al*. 2012), we still lack the theoretical framework and empirical evidence on how these effects interact in various local contexts and in various types of regions such as metropolitan, old industrial or rural (Tödtling, F. and Trippl, M. 2005).

In this paper we aim to fill the gaps and answer at least partly the above mentioned questions. Our primary goal is to describe and explain current spatial distribution of CI employment at inter-urban level (municipalities with extended competences – microregions roughly corresponding to local labour areas). Our primary research question is to what extent can we explain spatial distribution of CI in Czechia by the position and function of regions in national settlement system and their economic structure. We ask how and why do metropolitan cores, metropolitan hinterlands, urban regions, old industrial and peripheral regions differ in their ability to attract CI. In addition, we also examine potential collocation between creative and cultural industries (for definition and comparison see Tomczak, P. and Stachowiak, K. 2015) and collocation between CI, other knowledge-intensive business services and manufacturing industries.

The second section provides a theoretical discussion of the localisation factors of CI, while in the third section we summarize briefly the geographical and institutional context of Czech regions and previous empirical findings concerning the spatial distribution of CI. Fourth question is focused on the data and methods. Fifth section describes current spatial distribution of CI at microregional level, while the sixth explains it using several regression models.

Theoretical framework

Spatial patterns and localisation factors of CI have been empirically documented and tested elsewhere (see e.g. Lazzeretti, F. *et al.* 2008, 2012; Polese, M. 2012; Rehák, Š. and Chovanec, M. 2012; Bertacchini, E.E. and Borrione, P. 2013; Slach, O. *et al*. 2013; Cruz, S.S. and Teixeira, A.A.C. 2015; Escalona-Orcao, A.I. *et al.* 2016; Danko, L. *et al.* 2017; Cerisola, S. 2018). There is a general consensus that CI tend to cluster in four types of locations: large urban agglomerations (Boix, R. *et al.* 2015; van Winden, W. and Carvalho, L. 2016) and their centres or inner cities (Spencer, G.M. 2015; Wood, S. and Dovey, K. 2015), metropolitan hinterlands (Felton, E. *et al.* 2010; Gregory, J. and Rogerson, C. 2018), smaller towns concentrating cultural heritage (Lazzeretti, F. *et al.* 2012), touristic centres/environmentally and residentially attractive regions including some rural and peripheral areas (Cruz, S.S. and Teixeira, A.A.C. 2015; Escalona-Orcao, A.I. *et al.* 2016). The authors mostly agree on the key role of urbanization economies related to diversity of industries, labour, infrastructure and institutions (Lorenzen, M. and Frederiksen, L. 2008), localisation economies resulting from specialisation, allowing for reduction of production/transaction costs, increased efficiency of factors of production and increased dynamic efficiency (Brazanti, C. 2015), cultural heritage and concentration of cultural industries (Lazzeretti, F. *et al.* 2008) and soft factors like local atmosphere, tolerance and amenities (Escalona-Orcao, A.I. *et al.* 2016) that may attract creative workforce and foster development of another key localisation factor: human capital endowments.[2]

[2] Some other factors have been tested: telecommunication infrastructure, settlement factors (proximity to an urban marker or demographic status) and economic performance of the municipality (Escalona-Orcao, A.I. *et al.* 2016), the role of related variety (Lazzeretti, F. *et al.* 2008).

Our primary goal is not to test the effects of above mentioned localisation factors per se (this has been done by Slach, O. *et al.* 2013). We try to determine how urbanization/localisation economies and other explanatory variables affect spatial patterns of CI in different types of regions and to what extent local contextual factors such as historical specialisation, institutional framework and current industrial structure matter. To answer these questions, we will first discuss how various types of (non) metropolitan regions may theoretically affect localisation pattern of CI. In the section 5 we provide empirical tests of these theoretical assumptions that are listed in *Table 1.*

Metropolitan cores provide generally the most favourable conditions for incubation, growth and clustering of CI. Combination of high population/firm density, large market, diversity of industries, labour and institutions (Lorenzen, M. and Frederiksen, L. 2008) stimulates localisation factors of CI both at the demand and supply side. Metropolitan cores are large enough to provide urbanization economies (Rodríguez-Pose, A. and Fitjar, R.D. 2013; Puga, D. 2010) and localisation economies resulting from diversified specialization (Farhauer, O. and Kröll, A. 2012). Intersection of morphological, functional and social diversity in some parts of inner cities can lead into the development of the so-called creative field (Scott, A.J. 2010; Wood, S. and Dovey, K. 2015), characteristic by clustering of creative firms with symbolic knowledge base that require local buzz or noise (Grabher, G. 2002) and unique local atmosphere conducive for dissemination of knowledge. In addition, large (capital) cities often have a gateway function, providing access to knowledge transmitted through trans-local knowledge pipelines (Keeble, D. and Nachum, L. 2002). Metropolitan cores concentrate all service industries that are the key customers for CI and other knowledge-intensive business services (Ciarli, T. *et al.* 2012). CI tend to require geographical proximity to their principal customers – corporate, headquarters, public institutions and firms in various (knowledge-intensive) business services that are disproportionately concentrated in the largest urban agglomerations (Keeble, D. and Nachum, L. 2002; Gallego, J. and Maroto, A. 2015; Ženka, J. *et al.* 2017a).

Metropolitan hinterlands may attract CI by the combination of urbanization economies available thanks to the proximity of metropolitan cores (effect of borrowed size – Meijers, E.J. and Burger, M.J. 2017) and lower diseconomies of agglomeration (Jacobs, W. *et al.* 2014). Lower rents, proximity to the place of residence, less congestion and less stressful lifestyle are among the key advantages of those areas (Felton, E. *et al.* 2010; Grodach, C. *et al.* 2014; Murphy, E. *et al.* 2015). Economic activities with synthetic and analytical knowledge base are generally more prone to move to hinterlands than activities with a symbolic knowledge-base

Table 1. Expected CI in various types of regions

Type of region	Expected CI
Metropolitan cores	High concentration of all kinds of CI and knowledge-intensive business services; over-representation of CI with purely symbolic knowledge-base (publishing, media and advertising); high diversity of CI.
Metropolitan hinterlands	Higher specialisation in CI with partly synthetic knowledge base – printing and reproduction of recorded media, architecture, technical testing and other professional services.
Urban regions	Similar industrial structure as in metropolitan cores; lower representation of CI, higher share of CI with synthetic knowledge base.
Old industrial regions	Limited presence of CI; specialization in technically related CI (printing and reproduction of recorded media; architecture and technical analyses and testing).
Peripheral/rural regions	Minor presence of CI.

Source: Compiled by the authors.

(van Winden, W. and Carvalho, L. 2016). At the same time, routine and standardized lower value-added functions are expected to concentrate in hinterlands rather than skilled jobs and high value-added functions requiring face-to-face contacts with customers or suppliers (Merino, F. and Rubalcaba, L. 2013). Nevertheless, in some hinterlands creative jobs may flourish (Gregory, J. and Rogerson, C. 2018) and "the geography of creative industries is more complex than simple concentric-circle models – in which inner cities are the hub of creative industries activity, and in which that activity diminishes with distance from the inner core – suppose" (Felton, E. *et al.* 2010, 67).

Because urban density and land rents in Czech metropolitan cores are significantly lower than in Western Europe (Ženka, J. *et al.* 2017b), we expect significantly smaller concentration of CI into metropolitan hinterlands compared to metropolitan cores. In addition, we expect that various types of regions will differ in their industrial structure of CI – higher share of CI with purely symbolic knowledge base in metropolitan cores (publishing, media and advertising) and higher specialisation of hinterlands in CI with a partly synthetic knowledge base – printing and reproduction of recorded media, architecture, technical testing and other professional services.

Urban regions represent a residual and relatively heterogeneous category that is "somewhere between" the metropolitan cores and rural regions. Larger urban regions concentrate some metropolitan functions and should attract CI by similar mechanisms and localisation factors as metropolitan cores. However, smaller population size/density, higher rate of specialization (often on manufacturing industries) and limited presence of knowledge-intensive business services reduce the amount and intensity of CI clustering driven by urbanization economies (Ženka, J. *et al.* 2017b). Smaller urban regions are expected to show very limited concentration of CI. They are often highly specialized (could be in manufacturing, transport, tourism or public services) and rarely create a favourable business environment for clustering of market-oriented CI, although they may succeed in attraction of cultural industries (Lazzeretti, F. *et al.* 2008; Cruz, S.S. and Teixeira, A.A.C. 2015). Polese, M. (2012) argued that smaller blue collar industrial cities dominated by large manufacturing firms are less oriented towards the arts, which is probably relevant for market-oriented CI as well.

Cities in old industrial regions (COIR) are generally less expected to attract and develop CI in comparison with metropolitan cities of similar population size (Rumpel, P. *et al.* 2010; Mossig, I. 2011). COIR are generally characteristic by lower diversity of economic activities and less developed generic assets, which are crucial for incubation of new firms and ideas (Boschma, R.A. and Lambooy, J.G. 1999). Births of firms in CI may also be hindered by concentrated firm structure (higher share of large firms), lower entrepreneurial activity, inadequate skill structure (magnified by outflows of highly skilled workforce – Martinez-Fernandez, C. *et al.* 2012) and traditional specialisation in heavy manufacturing industries that mostly supply industrial products to other companies and do not need creative inputs.

On the other hand, CI may emerge in COIR through diversification of manufacturing industries into technologically related knowledge-intensive business services (e.g. software, technical testing and analysis or design activities, see Birch, K. *et al.* 2010) that form a part of broadly defined market-oriented CI or their potential customers. However, probably the most important scenario[3] of CI growth in COIR is an implantation from other regions through offshore outsourcing or captive offshoring (Slach, O. *et al.* 2018). These investment flows are often motivated by the reduction of rents and wages (Hardy, J. *et al.* 2011), leading into the development of rather routine, standardized, lower skilled and lower value-added economic activities that are often represented by relatively large firms or subsidiaries. Combination of lower rents, morphological, functional and social diver-

[3] See Martin, R. and Sunley, P. (2006) for theoretical discussion of various scenarios of regional delocking.

sity, attractive industrial premises (Hutton, T.A. 2004; Martinát, S. *et al.* 2018) and presence of universities can foster clustering of creative firms and workers in inner cities (Slach, O. *et al.* 2015) of COIR. To sum up, we expect smaller presence of CI in COIR, more concentrated firm structure and higher share of technically related CI – NACE 18 and 71.

There is a rich empirical evidence that CI develop and cluster also in some *rural and peripheral regions* (e.g. Escalona-Orcao, A.I. *et al.* 2016; Townsend, L. *et al.* 2017). Creative workforce can be attracted by a plethora of localisation factors including amenities, proximity to the place of residence, local cultural heritage including craft tradition or tourism incomes. Nevertheless, these localisation factors are relevant rather for cultural, artisan and artistic subjects than for purely market-oriented CI and for rural regions close to the metropolitan cores rather than for more distant areas. Therefore, rural regions are expected to concentrate minor share of total CI employment.

As already suggested, CI are heterogenous in their spatial organization, because (among others) they vary significantly in their prevailing knowledge base – see Plum, O. and Hassink, R. (2011) for discussion of the concept, the authors distinguish between analytical, synthetic and symbolic knowledge base. Knowledge bases differ in the character of innovation process, importance of face-to-face communication for knowledge sourcing and the importance of codified/tacit knowledge. The majority of CI (publishing, media, advertising) are characterised by a purely symbolic knowledge base: they require geographical proximity or their customers/suppliers in order to capitalize on local buzz and face-to-face communication. Therefore, they are expected to cluster in the cores and inner cities of the largest metropolitan regions. Technically related CI with a predominantly synthetic knowledge base (printing and reproduction of recorded media, architecture and technical analyses/testing) rely on knowledge sourcing and communication inside the value chains that are not usually local. Thus, this kind of CI are expected to show more dispersed spatial patterns.

Another important source of theoretical arguments was the concept of path dependence that is *intended to capture the way in which small, historically contingent events can set-off self-reinforcing mechanisms and processes that 'lock-in' particular structures and pathways of development* (Martin, R. and Sunley, P. 2006, 5). Current spatial concentrations of CI do not arise 'from scratch', but are rooted in a long-term development trajectory of the region, its historical industrial specialization and institutional context, infrastructural projects, political and business decisions and various other events in the past. Regions that were traditionally highly specialized in mining and manufacturing are generally less likely to develop a strong specialization in CI than diversified regions with high share of services (Slach, O. *et al.* 2018).

Data and methods

Empirical analysis of the spatial distribution of CI is based on the datasets from the Czech Statistical Office (CSO 2009, 2014). The datasets cover firm-level data aggregated into 2-digital industries (NACE rev. 2.0) and 206 spatial units – municipalities with extended competences (microregions). Localisation of CI was measured by the employment, which was available for the years 2009 and 2014, therefore for the (post)crisis period. The data cover roughly two thirds of total national employment, they are not available for several industries: mining and quarrying; energy, water distribution, sewerage and waste management; wholesale and retail trade, repair of motor vehicles and public services. Regional shares of CI are thus not related to the total employment of the region, but to the sum of employment in industries covered by microregional level data: agriculture, manufacturing and business services (NACE 49-53; 55-56; 58-64; 66; 68-75; 77-82). With the exception of mining and energy, the industries not covered by the datases show relatively even spatial distribution. Other indicators employed in our analysis come from public databases.

In order to ensure the compatibility of the results with our previous study mapping the spatial distribution of CI in Czechia for 2009 (Slach, O. *et al.* 2013) we employ the same definition and delimitation of market-oriented CI as we used in the former paper. CI are defined as economic activities … *concerned with the creation and provision of marketable outputs (goods, services and activities) that depend on creative and cultural inputs for their value* (Power, D. 2011, 32). Delimitation of CI is based on the sectoral approach (Gibson, C. and Kong, L. 2005), selection of particular industries departs from modified approach of Power, D. (2011). The group of CI includes NACE industries with a strong symbolic content: publishing activities (58), motion picture, video and television programme production, sound recording and music publishing activities (59), programming and broadcasting activities (60), architectural and engineering activities, technical testing and analysis (71), advertising and market research (73) and other professional, scientist and technical activities (74). Following Power, D. (2011) we also added printing and reproduction of the recorded media (18). This industry is tightly connected to the demand of CI firms, but it is more technically oriented: we can't thus expect different localisation patterns in comparison with above mentioned CIs. We tested also the effects of education (85) or cultural industries (90, 91, 93) on localisation of CI. However, spatial distribution of education and cultural industries was measured only by the number of economic subjects due to the unavailability of other indicators.

Spatial distribution of CI in Czechia was evaluated by the *horizontal location quotient (HLQ)* – for the definiton and construction see Fingleton, B. *et al.* (2004, 779–780). This indicator is an improved version of the localisation quotient, which takes into account the employment size of local/regional economy. It is defined as the number of jobs in the local industry that exceeds an expected number. The expected number equals to the number of jobs in local industry that would be present if the share of the local industry in regional employment is the same as the share in the national economy, therefore if the localisation quotient is equal to 1. The *HLQ* is calculated from the standard localisation quotient:

$$LQ = \frac{E_{ij}/E_{in}}{E_j/E_n} \quad (1)$$

In the second step E_{ij} is replaced by $E_{ij\_HLQ,}$ computed as:

$$LQ = \frac{E_{ij\_HLQ}/E_{in}}{E_j/E_n} = 1, \quad (2)$$

where E_{ij_HLQ} is the number of jobs making $LQ = 1$. Finally, *HLQ* is calculated:

$$HLQ = E_{ij} - E_{i\_HLQ}, \quad (3)$$

HLQ was used also as a dependent variable in regression models. However, share of CI in regional employment yielded better results, so it was employed as the main dependent variable and *HLQ* as a supplementary variable.

The most important explanatory variable (fixed factor) used in all regression models was a nominal variable Type of region, distinguishing the metropolitan cores, metropolitan hinterlands, urban regions with metropolitan functions, metropolitan old-industrial regions, non-metropolitan old industrial regions. Although these groups of regions are relatively internally homogeneous, their ability to attract CI still varies. To capture these internal differences, we tested also the effects of selected covariates that may contribute to better explanation of inter-regional differences. After several pre-tests and model calibrations we decided to use employment density per a hectare of built-up area and diversity of local industrial structure as proxies for urbanization economies. While the latter reflects diversity of economic structure as the essence of urbanization economies (Parr, J.B. 2002), the former captures the effects urban size/density that should increase productivity (Ciccone, A. and Hall, R.E. 1996) and innovation perfor-

mance, stimulate the local buzz (Storper, M. and Venables, A.J. 2004) and efficiency of local labour markets (Puga, D. 2010). Moreover, this indicator explained more variability than population size or sophisticated indicators of the position in urban hierarchy, calculated from the population/economic size and accessibility (Ženka, J. *et al.* 2017a). We employed also two indicators of localisation economies – average size of firms in creative industries and the density of firms in education and cultural industries to capture potential knowledge spillovers and other positive effects related to the existence of local cultural milieu.

We ran a general linear regression model in order to explain current spatial distribution of CI in Czechia and its post-crisis development. Dependent variable was the share of CI in regional employment, explanatory variables *(Table 2)* included the *type of region* (TYPE), *employment density* (DENS), number of firms in education and culture industries per a hectare of built-up land and *average firm size* in CI (SIZE). The dependent variable and all covariates were transformed by natural logarithmic transformations. Despite tendency of CI to cluster in and around large urban regions the diagnostic tests did not find a significant autocorrelation, so it was not necessary to employ spatial lag or spatial regression models.

Types of regions in Czechia were delimited according to Ženka, J. and Slach, O. (2018) *(Figure 1)*. Prague and Brno were marked as metropolitan regions (based on the approach of OECD 2012). Ostrava is also a metropolitan core, but we classified both Ostrava and Ústí nad Labem as the cores of old industrial regions Ostravsko and Ústecko. Rural regions were defined by the index of rurality (inspired by Novotný, L. *et al.* 2015), which is based on three criteria: dispersion of the settlement, low population density and low spatial productivity, which suggests higher share of agriculture and limited presence of high value-added knowledge-intensive economic activities (see Ženka, J. *et al.* 2017c for details).

$$Index\ of\ rurality = \frac{settlement\ dispersion + 2 * population\ density + 2 * spatial\ productivity}{5}$$

Dispersion of the settlement was expressed by the share of municipalities with less than 3,000 inhabitants. Population density was calculated using population per one hectare of built-up area, spatial productivity by value added per one hectare of built-up area.

Table 2. Variables employed in regression models

Variable	Proxy indicator and year	Abbreviation	Source of data
Share of CI	Share of CI in regional employment in %, 2014	CI	CSO (2014)
Importance of CI	Horizontal localisation quotient of CI, 2009, 2014	HLQCI	CSO (2014)
Growth of CI	Index of employment growth in CI, 2009–2014 (2009 = 100)	GRCI	CSO (2009), CSO (2014)
Type of region	Type of region according to Ženka, J. *et al.* 2017c	TYPE	Ženka, J. *et al.* (2017c)
Employment density	Number of jobs in CI per one hectare of built-up area, 2014	DENS	CSO (2014), CSO (2018a)
Economic diversity	Herfindahl-Hirschmann index of local employment, 2014 (inverse values)	DIVERS	CSO (2014)
Cultural industries	Number of firms in education (85) and cultural industries (90, 91, 93) per one hectare of built-up land	CULT	CSO (2018b)
Firm size structure	Herfindahl-Hirschmann index calculated from employment size categories in CI, 2014	SIZE	CSO (2018c)

Source: Compiled by the authors.

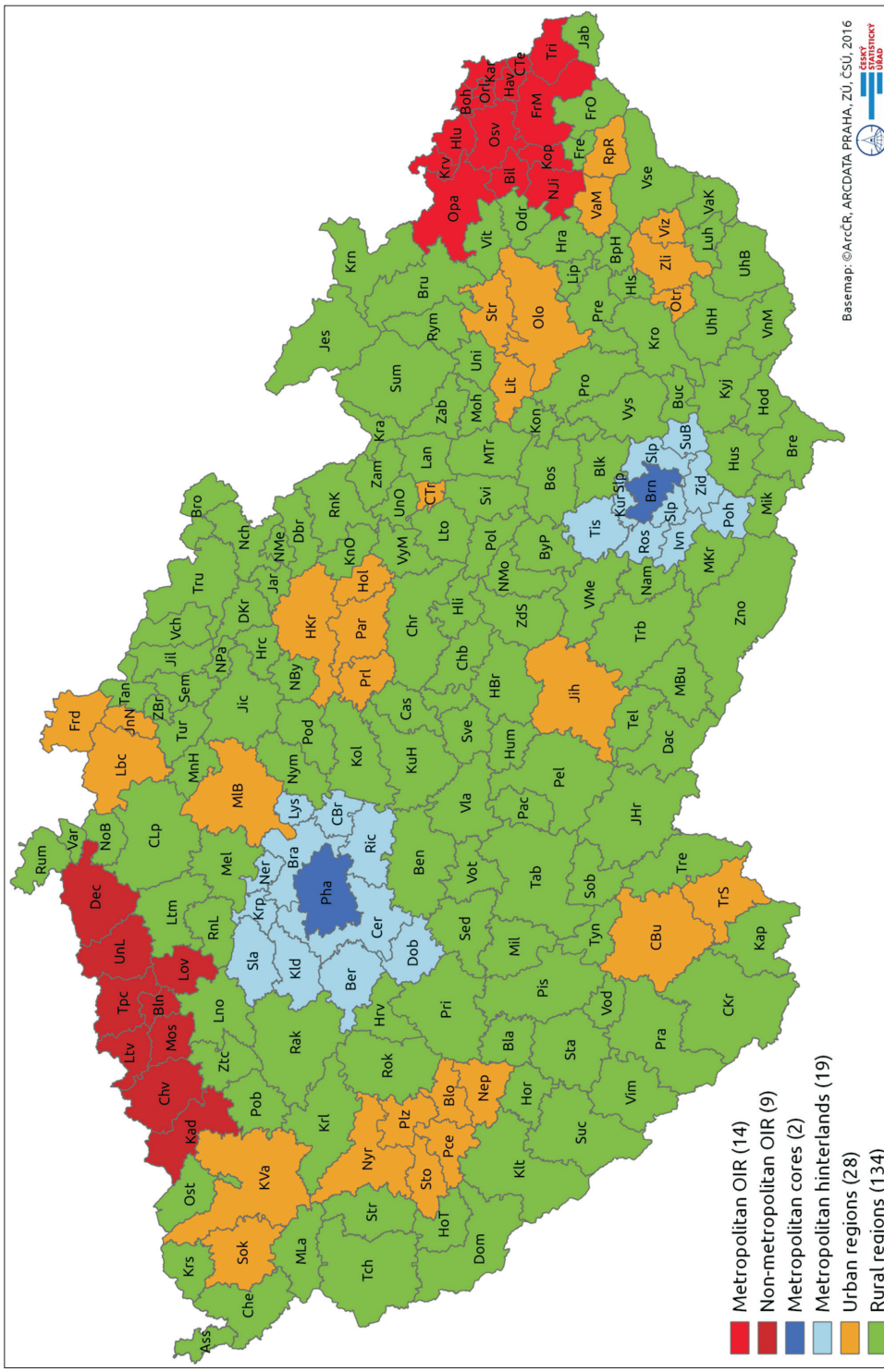

Fig. 1. Metropolitan cores and hinterlands, old industrial, urban and rural regions in Czechia. *Source:* Ženka, J. and Slach, O. (2018).

Table 3. CI in metropolitan, urban, old industrial and rural regions, 2014

Regions	CI employment, persons	Specialisation in CI, %	CI employment	Total employment	Number of firms in education and cultural industries
			% share in Czechia		
Metropolitan cores	55,576	10.0	51.2	26.0	20.5
Metrop. hinterlands	6,733	5.5	6.2	5.7	8.2
Urban regions	18,087	4.3	16.7	19.9	10.5
Metropolitan OIR	8,116	4.1	7.5	9.3	8.1
Non-metrop. OIR	3,188	3.4	2.9	4.4	2.9
Rural regions	16,766	2.3	15.5	34.6	49.9
Czechia	*108,465*	*5.1*	*100.0*	*100.0*	*100.0*

Source: CSO 2014.

Residual category of urban regions includes larger regional cities with metropolitan functions (Plzeň, České Budějovice, Olomouc, Liberec *etc.*), smaller industrial regions dominated by a single large manufacturing firm (e.g. Mladá Boleslav, Jihlava), transport hubs (Děčín, Česká Třebová) or regions specialized in capital-intensive industries apart from old industrial regions (Sokolov, Valašské Meziříčí etc.)

Results

CI jobs in Czechia are heavily concentrated in metropolitan cores of Prague (41.4%) and Brno (9.8%). If we sum all three metropolitan regions (including Ostravsko as metropolitan OIR), we get more than 55 per cent share in national employment in CI. Since 2009 there has been relatively significant increase in geographic concentration of CI – in 2009 three largest units accounted for 49.8 per cent in national CI employment (Slach, O. *et al.* 2013; Slach, O. and Ženka, J. 2017). Increasing concentration was, however, fuelled only by the relatively growing share of Prague in national CI employment, while the position of Brno and Ostrava slightly deteriorated.[4] Metropolitan regions of Prague and Brno experienced a deconcentration of jobs from the cores towards hinterlands, although the numbers are relatively modest. In 2014 metropolitan hinterlands concentrated only 6.2 per cent of jobs in CI, although their relative specialization is above national average *(Table 3)*. The latter contrasts with a dynamic socio-economic development of Czech metropolitan hinterlands in the last two decades (Maier, K. and Franke, D. 2005; Šimon, M. 2017).

Empirical results of Slach, O. *et al*. (2018) did not support theoretical assumption that COIR should in the post-crisis period at least partly reorient from traditional mining and manufacturing industries towards CI. While employment in traditional mining and manufacturing industries declined in the period 2009–2014, COIR experienced a process of reindustrialization that was driven by an expansion of the automotive industry and some related services – transport, warehousing, employment activities or office administrative and business supporting activities (Slach, O. *et al*. 2018).

Ranking of microregions according to their CI employment is primarily driven by their position in urban hierarchy *(Figure 2)*, which almost perfectly corresponds to population size. Only 18 per cent of all microregions show higher share in national CI employment

[4] In the post-crisis period 2009–2014 absolute CI employment at national level decreased by 5 per cent, in urban and rural regions fell by 9 per cent, metropolitan hinterlands grew by 6 per cent, Prague and COIR Ostravsko stagnated. COIR Ústecko experienced a sharp decline in CI employment by 25 per cent (827 jobs were lost) – see also Slach, O. and Ženka, J. (2017).

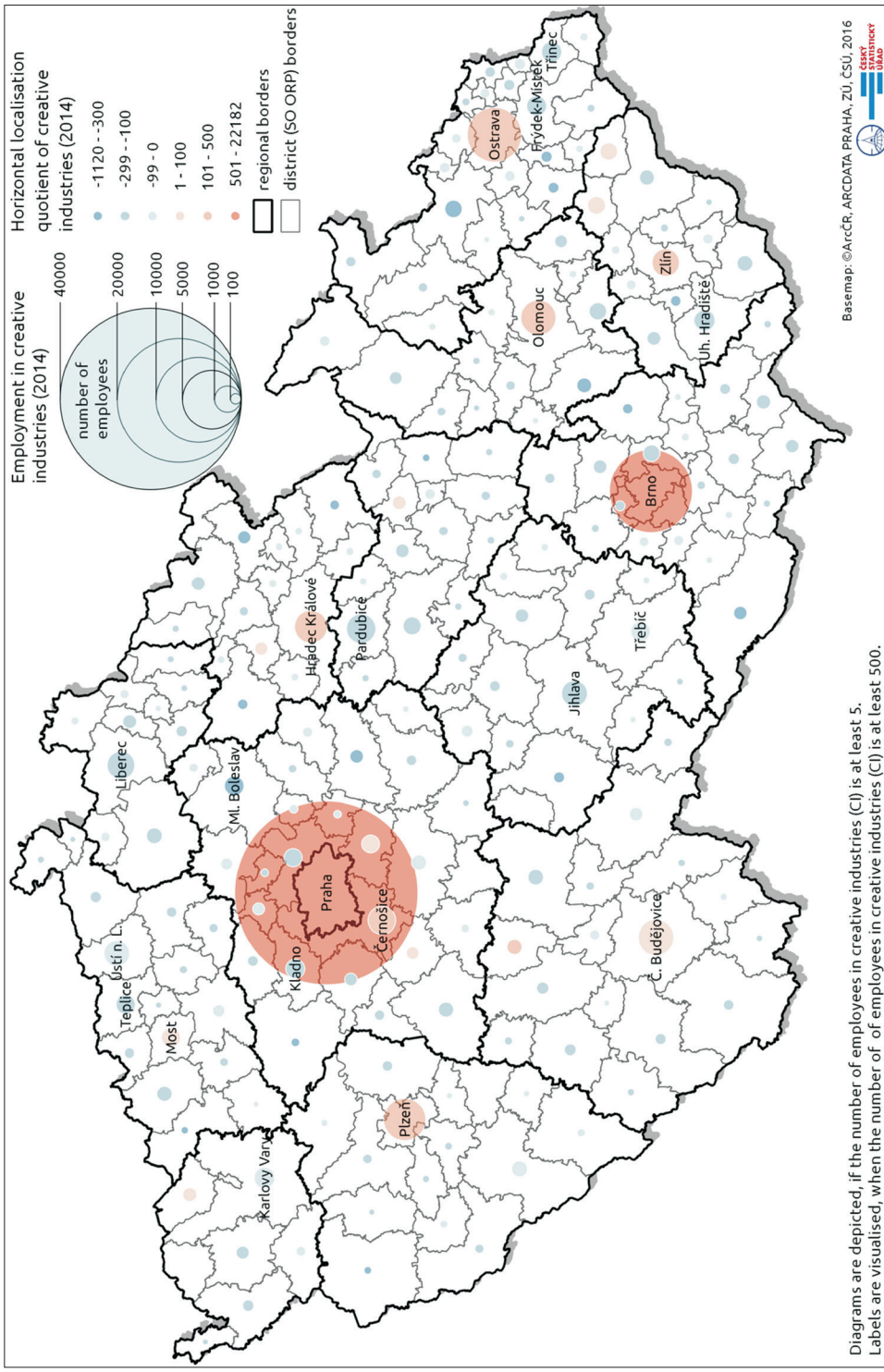

Fig. 2. Spatial distribution of CI employment in Czechia (2014) *Source:* CSO 2014.

compared to their share in population – most of them are located in Prague metropolitan region. On the other hand, Brno and Ostrava show the largest gap in comparison to their population weight (despite high values of horizontal location quotient), the same holds for majority of urban regions with metropolitan functions and also for old industrial regions.

As already noted by Slach, O. *et al*. (2013), it is possible to distinguish between two major groups of CI *(Figure 3).* The first group includes printing, architectural and engineering activities and other professional, scientific and technical activities (NACE 18, 71, 74), while publishing, media and advertising (NACE 58, 59, 60, 73) belong to the second group. While the former industries are characteristic by a mix of knowledge bases (symbolic and synthetic) and show more dispersed patterns, the latter have almost purely symbolic knowledge base and are heavily concentrated into the metropolitan cores. The higher share of activities and knowledge with synthetic knowledge base, the higher rate of spatial concentration of employment.

Printing and reproduction of recorded media (industries with significant portion of manufacturing production and technical activities) are by far the most dispersed and significantly represented in metropolitan hinterlands (Beroun, Pohořelice) and some old industrial (Český Těšín) and urban regions (Plzeň, Zlín, Olomouc etc.). Media form the second extreme industries heavily concen-

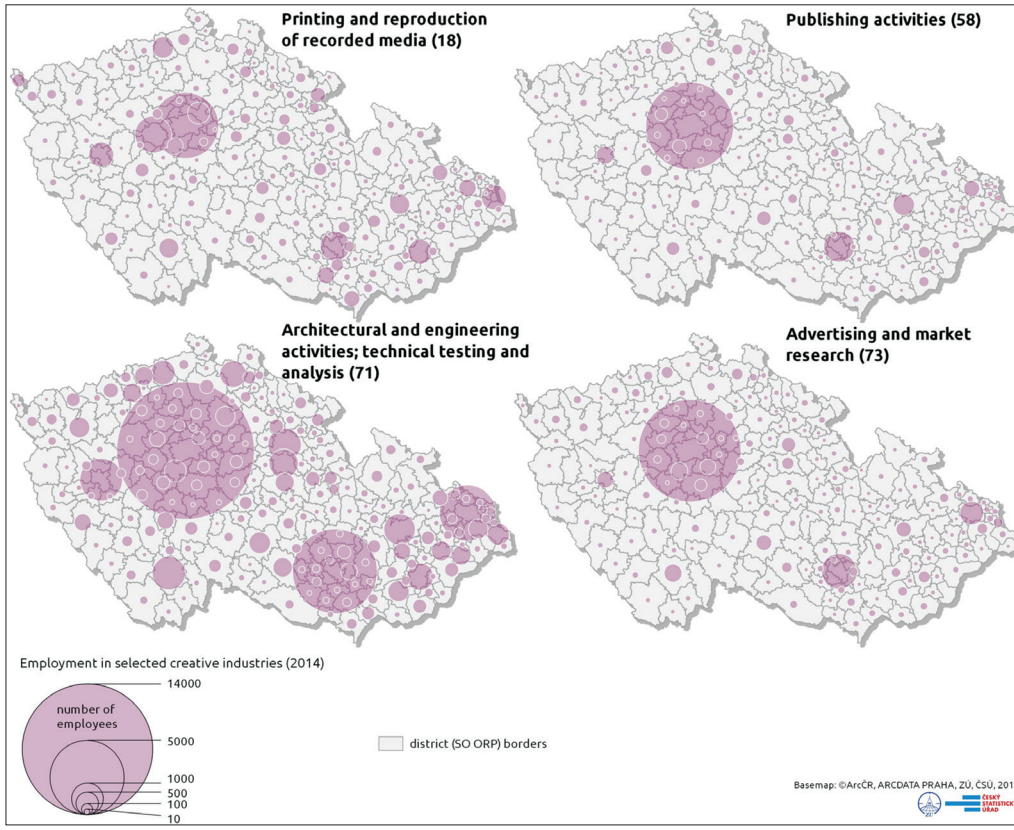

Fig. 3. Spatial distribution of employment in selected CI (2014). *Source*: CSO 2014.

trated in Prague, while other professional, scientific and technical activities are somewhere between these two extremes *(Figure 4)*.

As we have expected, analysed types of regions differ relatively significantly in the industrial structure of CI. There are two common features – high share of architectural and testing activities (NACE 71) and comparable shares of other professional, scientific and technical activities in employment. Printing is over-represented especially in metropolitan hinterlands and also in rural and non-metropolitan old industrial regions, which are characteristized by a high specialisation in industries with (partly) synthetic knowledge base. Metropolitan cores, on the other hand, are distinct by higher representation of publishing and media, although even in Prague and Brno the first group of CI (NACE 18, 71, 74) clearly dominate in terms of employment.

We employed four general linear models in order to explain spatial distribution of CI. While the first two models aim to test the effects of selected explanatory variables on regional specialisation in CI as a dependent variable, the third model explains localisation patterns of advertising and market research representing industry with purely symbolic knowledge base, the fourth focuses on architecture and testing as an industry with the mix of symbolic and synthetic knowledge-base. Specialisation in CI is measured by the horizontal localisation quotient, so the size of local economic base matters. Therefore, in the first model we include all 206 microregions, while in the second we exclude metropolitan cores. Explanatory variables are the type of regions, employment density, economic diversity, density of cultural industries and mean size of a firm in CI.

The *first model* explained 75.5 per cent of variability in CI specialization *(Table 4)*. Employment density, cultural industries, firm size in CI and a dummy variable marking the metropolitan cores showed statistically significant ($p < 0.001$) positive relationship. Economic diversity, on the other hand, was not significant. This does not mean that diversity has no relevance for localisation of CI. Diversity is related to urban size, density and corresponds also with the typology of regions, so its effects

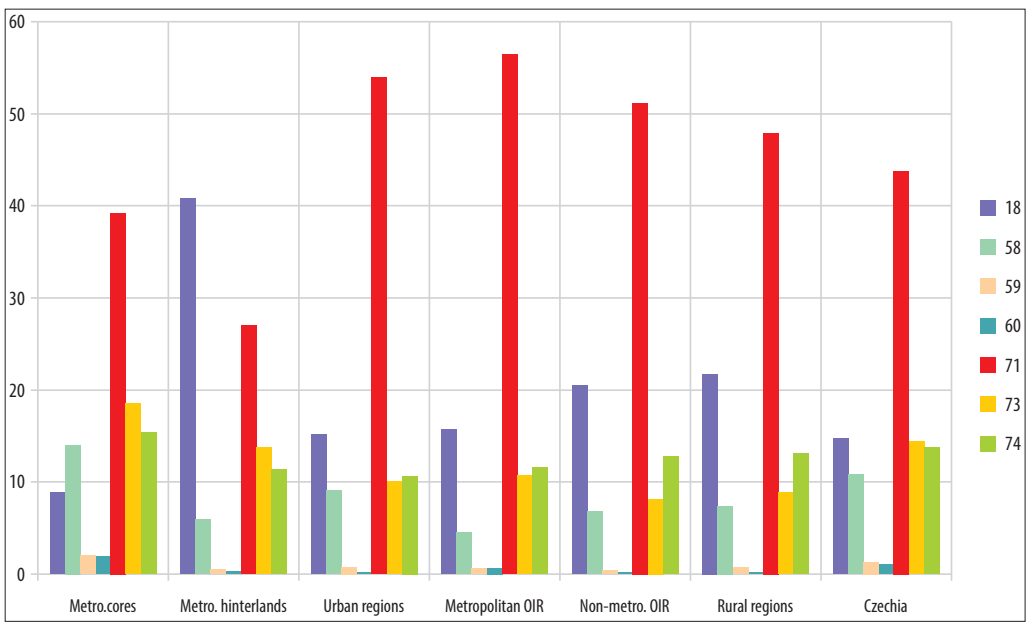

Fig. 4. Industrial structure of CI employment in various types of regions (2014). *Source*: CSO 2014.

Table 4. Correlates of regional specialisation in CI, 2014

Dependent variable	HLQ of CI employment				HLQ of CI employment except for metropolitan cores			
Source	Type III sum of squares	B	St. error	p	Type III sum of squares	B	St. error	p
Corrected model	14.040[a]	–		.000	831.497[a]	–		
Intercept	40.73	7.435	191	.000	273.957	651.41	164.637	.000
ln_empl_dens	0.62	–.153	030	.000	441.334	–129.32	26.210	.000
ln_divers	0.00	.012	028	.672	67.885	46.81	24.191	.054
ln_kult	0.50	.098	021	.000	237.866	67.92	18.752	.000
ln_AVG_CI	0.37	.055	014	.000	221.546	42.60	12.187	.001
Type_region	11.43	–		.000	76.375	–	12.187	.381
Error	4.55	–			3,535.275		–	
Corrected total	18.59				4,366.773			
region_core	–	2.562	0.121	.000	–	.673	41.498	.673
region_hinter		–0.048	0.047	.309		.385	51.948	.385
reg_OIR_Ostr		–0.082	0.059	.166		.706	44.593	.706
reg_OIR_Ust		–0.076	0.051	.137		.072	29.805	.072
region_rural		–0.093	0.034	.007				
R^2	0.755				0.190			

Source: CSO 2014, compiled by the authors.

are probably obscured by other explanatory variables. Dummies of all other types of regions had negative effects, but only the effect of rural regions was significant ($p < 0.01$) due to their small economic base and low density. Therefore, urban scale and concentration of metropolitan functions seem to be the most important factors of CI localisation, while differences among metropolitan hinterlands, urban and old industrial regions do not affect spatial patterns of CI significantly.

This finding is supported also by the *second regression model (Table 5)* that tested the same explanatory variables after exclusion of metropolitan cores. Results are in some aspects similar to the former model (significant positive effects of employment density, cultural industries, firm size structure: $p < 0.01$; economic diversity: $p < 0.1$), but there are two major differences – type of region did not show significant effects (except for rural regions) and R^2 fell rapidly: this model explained only 19 per cent of total variability. Employment density, cultural industries, economic diversity and CI firm size explained much more than the type of region. Therefore, the effects of urbanization and localisation economies matter for the spatial distribution of CI in urban and non-metropolitan regions. On the other hand, when we exclude metropolitan cores, regional contexts cease to be important for CI localisation.

Third model tested spatial distribution of publishing. Maybe surprisingly, share of explained variability is lower (52.2%) compared to models that tested regional specialisation in CI as a whole. Type of region is the key explanatory variable. Cultural industries showed no significant effect, while the firm size was the second most important explanatory variable.

When we turned to regional specialisation in architecture and testing as dependent variable (*fourth model*), we found results that are very similar to the findings of the first model. This may be explained by high share of architecture and testing in total CI employment.

Table 5. Correlates of regional specialisation in publishing (58) and architecture and testing (71)

Dependent variable	HLQ of employment in publishing (58)				HLQ of employment in architecture and testing (71)			
Source	Type III sum of squares	B	St. error	p	Type III sum of squares	B	St. error	p
Corrected model	692.146[a]	–		.000	144.357[a]	–		.000
Intercept	3.925	3.287	2.587	.296	.103	–497	.756	.604
ln_empl_dens	26.611	1.217	.446	.007	11.106	.648	.120	.000
ln_divers	18.703	.884	.386	.023	7.023	.476	.111	000
ln_kult	187	.073	.318	.819	3.153	.246	.086	.005
ln_AVG_CI	84.398	1.086	.223	.000	7.790	.253	.056	.000
Type_region	96.485			.000	11.754			.000
Error	571.220	–		–	75.104	–		–
Corrected total	1,263.367				219.461			
region_core		–2.263	1.515	.137		.942	.490	.056
region_hinter		–1.242	.657	.060		.203	.191	.288
reg_OIR_Ostr	–	–854	.754	.259	–	–047	.239	.843
reg_OIR_Ust		–523	.657	.427		.031	.205	.879
region_rural		–946	.506	.064		–446	.137	.001
R^2	0.548				0.658			

Source: CSO 2014, compiled by the authors.

Discussion

Empirical results showed an excessive and increasing spatial concentration of CI into the two largest metropolitan cores – Praha and Brno. Localisation patterns of CI (especially CI with with symbolic knowledge base) reflect to a certain degree a process of metropolization, understood as "selective concentration of research-intensive industries and knowledge-intensive services on metropolitan regions and major urban agglomerations" (Krätke, S. 2007, 1). High transaction intensity of CI firms (Growe, A. 2012) is one of the reasons why these industries tend to concentrate heavily in the largest cities. Therefore, large and increasing spatial concentration of CI in Czechia corresponds with the intensification of metropolization, a tendency discussed and documented also by other authors (Hampl, M. and Marada, M. 2015; Viturka, M. *et al.* 2017). Nevertheless, it is necessary to distinguish between two basic types of metropolization. The first is based on the difference in urban size/density between metropolitan and non-metropolitan regions, the second refers to the differences among metropolitan regions.

The dominant position of Praha is not surprising, although its increase in total CI employment does not correspond to the overall economic development in the post-crisis period (Ženka, J. *et al.* 2017c). However, considering strong position of the capital city in other knowledge-intensive services (Blažek, J. and Bečicová, I. 2016; Sucháček, J. *et al.* 2017) and concentration of corporate headquarters (Dostál, P. and Hampl, M. 1994; Sucháček, J. and Baránaek, P. 2013) we argue that Praha has been moving from the sectoral to the functional specialization (Duranton, G. and Puga, D. 2005), at least within Czechia.

Although urban size/density has been identified as a key explanatory variable, individual comparisons among selected microregions indicate some ambiguity. Significance of urban size is well illustrated by the difference

in concentration of CI between metropolitan OIR (Ostravsko) and non-metropolitan (Ústí nad Labem). On the other hand, metropolitan region Ostravsko has approximately 2.5 times lower concentration of market-oriented CI and also significantly lower representation of cultural industries (Ivan, I. *et al.* 2015) than metropolitan region of Brno, which is comparable in terms of urban size. Existing disproportions can be at least partly explained by a different regional context in terms of positive and negative path dependency (Henning, M. *et al.* 2013), or between the "good" inheritance of Brno and "bad" inheritance of Ostrava (paraphrase of Storper, M. 2013; for empirical illustration see Ženka, J. *et al.* 2017a). The influence of path dependency can also explain the mismatch between CI size/concentration in urban regions, namely relatively higher concentration of CI into Olomouc (university city) in comparison to larger and economically better performing Plzeň, traditionally specialized in engineering.

The concept of path dependency (partly co-evolution) can also be used to explain regional differentiation of industrial structure of CI (Berg, S.H. and Hassink, R. 2014). High share of architecture and testing (NACE 71) in employment of urban regions and COIR (to some extent also to rural and peripheral regions) results from traditional specialisation in manufacturing industries (architecture is of minor importance, technical testing and analyses clearly dominate – Ivan, I. *et al.* 2015). Path-dependence is relevant also for metropolitan hinterlands. Low employment in CI in these regions is in direct contradiction with their dynamic economic and demographic growth (Maier, K. and Franke, D. 2015). The first explanation is relatively weak importance of agglomeration disadvantages for the spatial distribution of printing. The second reason can be seen in the fact that in Czechia the process of metropolization was "delayed" (Musil, J. 1993; Hampl, M. 2005) in comparison with Western European economies due to the centrally planned economy. For this reason, these regions are not yet able to offer adequate infrastructure and environment for more intensive localization of CI, which is not the case for less knowledge-intensive services (Sýkora, L. and Ouředníček, M. 2007).

Conclusions

In this paper we aimed to describe and explain spatial distribution of CI in Czechia. More specifically, we tried to determine to what extent localisation patterns can be explained primarily by traditional factors such as the position in urban hierarchy, urbanization and localisation economies and to what extent do regional contexts (metropolitan cores and hinterlands, old industrial, urban and rural regions) matter. We tested the effects of regional contexts (types of regions) together with traditional factors: employment density and economic diversity as proxies for urbanization economies, CI firm size structure and density of cultural industries representing localisation economies.

Regression model testing the effects of these explanatory variables explained more than 70 per cent of the total variability of the dependent variable, which was represented by horizontal location quotient of CI. Types of regions showed stronger effect than traditional explanatory variables. However, only two types were significant – positive effect of metropolitan cores and negative effect of rural regions. After exclusion of metropolitan cores the model significantly lost its explanatory power. Position in urban size/density and position in urban hierarchy seem to be the key explanatory variables. Differences among regions with similar size and density are of minor importance. Despite several theoretical arguments supporting assumptions that regional contexts should affect spatial concentration of CI, we found only limited empirical evidence to prove this statement – above mentioned comparisons of Plzeň and Olomouc or explanations for high share of architecture and testing in urban regions and COIR. Minor differences were found between spatial patterns of publishing, architecture-testing, advertisement and market research. Industries with a mix of symbolic and synthetic knowledge base

showed more dispersed localisation patterns, while purely symbolic industries were heavily concentrated into metropolitan cores.

Therefore, above mentioned types of (non) metropolitan regions differ significantly in their industrial structure of CI employment. Metropolitan cores are characterised by higher shares of purely symbolic industries, for which urban amenities, centrality and local buzz (see Polese, M. 2012, 1813) are of key importance. CI employment in metropolitan hinterlands, on the other hand, is dominated by printing, architecture and testing. The same applies to lesser degree also for urban, old industrial and rural regions, where architecture and testing accounts for (almost) more than half of the jobs in CI.

To summarize previous findings, localisation patterns of CI reflect existing spatial differentiation of social and economic phenomena in Czechia. It is a question if spatial concentration of CI is a cause or a consequence of reginal economic growth (Lee, N. 2014). Empirical results suggest an existence of a strong asymmetry in spatial division of labour between metropolitan and non-metropolitan regions (Massey, D. 1984; Maillat, D. 1998). Although the primary goal of this paper was not to evaluate dynamics of CI localisation and its regional development effects, it seems that CI contribute rather to divergence in regional economic performance than to convergence. Empirical studies testing these effects on the urban or microregional level are needed not only in Czechia, but also in other Central European countries.

***Acknowledgement*:** The authors acknowledge support from the Czech Science Foundation (Grant Agreement No.18-11299S).

REFERENCES

Berg, S.H. and Hassink, R. 2014. Creative industries from an evolutionary perspective: A critical literature review. *Geography Compass* 8. (9): 653–664.

Bertacchini, E.E. and Borrione, P. 2013. The geography of the Italian creative economy: The special role of the design and craft-based industries. *Regional Studies* 47. (2): 135–147.

Birch, K., Mackinnon, D. and Cumbers, A. 2010. Old industrial regions in Europe: a comparative assessment of economic performance. *Regional Studies* 44. (1): 35–53.

Blažek, J. and Bečicová, I. 2016. The takeover of Prague's banking cluster by multinational groups from an evolutionary perspective. *Geografie* 121. (2): 254–278.

Boix, R., Hervás-Oliver, J.L. and Miguel-Molina, D. 2015. Micro-geographies of creative industries clusters in Europe: From hot spots to assemblages. *Papers in Regional Science* 94. (4): 753–772.

Boschma, R.A. and Lambooy, J.G. 1999. Evolutionary economics and economic geography. *Journal of Evolutionary Economics* 9. (4): 411–429.

Brazanti, C. 2015. Creative clusters and district economies: Towards a taxonomy to interpret the phenomenon. *European Planning Studies* 23. (7): 1401–1418.

Cerisola, S. 2018. Multiple creative talents and their determinants at the local level. *Journal of Cultural Economics* 42. (2): 243–269.

Ciarli, T., Meliciani, V. and Savona, M. 2012. Knowledge dynamics, structural change and the geography of business services. *Journal of Economic Surveys* 26. (3): 445–467.

Ciccone, A. and Hall, R.E. 1996. Productivity and the density of economic activity. *American Economic Review* 86. (1): 54–70.

Cruz, S.S. and Teixeira, A.A.C. 2015. The neglected heterogeneity of spatial agglomeration and colocation patterns of creative employment: evidence from Portugal. *Annals of Regional Science* 54. 143–177.

CSO 2009. *Register of economic subjects in selected production industries.* Prague, Czech Statistical Office.

CSO 2014. *Register of economic subjects in selected production industries.* Prague, Czech Statistical Office.

CSO 2018. *Public database*. Prague, Czech Statistical Office.

Danko, L., Bednář, P. and Matošková, J. 2017. Managers' activities within cultural and creative clusters: an essential element for cluster development in the Visegrád countries. *Creativity Studies* 10. (1): 26–42.

Dostál, P. and Hampl, M. 1994. Changing economic base of Prague: towards new organizational dominance. In *Development and Administration of Prague*. Eds.: Barlow, M., Dostál, P. and Hampl, M., Amsterdam, Universiteit van Amsterdam, Instituut voor Sociale Geografie, 29–46.

Duranton, G. and Puga, D. 2005. From sectoral to functional urban specialisation. *Journal of Urban Economics* 57. (2): 343–370.

Escalona-Orcao, A.I., Escolano-Utrilla, S., Sáez-Pérez, L.A. and Sánchez-Valverde Garcia, B. 2016. The location of creative clusters in non-metropolitan areas: A methodological proposition. *Journal of Rural Studies* 45. 112–122.

Farhauer, O. and Kröll, A. 2012. Diversified specialisation – going one step beyond regional economics'

specialisation-diversification concept. *Jahrbuch für Regionalwissenschaft* 32. (1): 63–84.

Felton, E., Collis, C. and Graham, P. 2010. Making connections: creative industries networks in outer-suburban locations. *Australian Geographer* 41. (1): 57–70.

Fingleton, B., Igliori, D.C. and Moore, B. 2004. Employment growth of small high-technology firms and the role of horizontal clustering: Evidence from computing services and R&D in Great Britain, 1991–2000. *Urban Studies* 41. (4): 773–799.

Gallego, J. and Maroto, A. 2015. The specialization in knowledge-intensive business services (KIBS) across Europe: permanent co-localization to debate. *Regional Studies* 49. (4): 644–664.

Gibson, C. and Kong, L. 2005. Cultural economy: a critical review. *Progress in Human Geography* 29. (5): 541–561.

Gong, H. and Hassink, R. 2017. Exploring the clustering of creative industries. *European Planning Studies* 25. (4): 583–600.

Grabher, G. 2002. Cool projects, boring institutions: temporary collaboration in social context. *Regional Studies* 36. (3): 205–214.

Gregory, J. and Rogerson, C. 2018. Suburban creativity: The geography of creative industries in Johannesburg. *Bulletin of Geography. Socio-economic Series* 39. (39): 31–52.

Grodach, C., Currid-Halkett, E., Foster, N. and Murdoch, J. 2014. The location patterns of artistic clusters: A metro-and neighborhood-level analysis. *Urban Studies* 51. (13): 2822–2843.

Growe, A. 2012. Raummuster unterschiedlicher Wissensformen. Der Einfluss von Transaktionskosten auf Konzentrationsprozesse wissensintensiver Dienstleister im deutschen. *Raumforschung und Raumordnung* 70. (3): 175–190.

Hampl, M. 2005. *Geografická organizace společnosti v České republice: transformační procesy a jejich obecný kontext* (Geographic organization of the society in the Czech Republic: transformation processes and their general contex). Praha, Demo Art.

Hampl, M. and Marada, M. 2015. Sociogeografická regionalizace Česka (Socio-geographic regionalization of Czechia). *Geografie* 120. (3): 397–421.

Hardy, J., Micek, G. and Capik, P. 2011. Upgrading local economies in Central and Eastern Europe? The role of business service foreign direct investment in the knowledge economy. *European Planning Studies* 19. (9): 1581–1591.

Henning, M., Stam, E. and Wenting, R. 2013. Path dependence research in regional economic development: Cacophony or knowledge accummulation? *Regional Studies* 47. (8): 1348–1362.

Hutton, T.A. 2004. The new economy of the inner city. *Cities* 21. (2): 89–108.

Ivan, I., Raabová, T., Slach, O. and Žáková, E. 2015. *Kulturní a kreativní průmysly v Brně a v Ostravě: Specializovaná mapa s odborným obsahem* (Cultural and creative industries in Brno and Ostrava: specialized map with a technical content). Praha, Institut umění – Divadelní ústav.

Jacobs, W., Koster, H.R. and van Oort, F. 2014. Co-agglomeration of knowledge-intensive business services and multinational enterprises. *Journal of Economic Geography* 14. (2): 443–475.

Keeble, D. and Nachum, L. 2002. Why do business service firms cluster? Small consultancies, clustering and decentralization in London and Southern England. *Transactions of the Institute of British Geographers* 27. (1): 67–90.

Krätke, S. 2007. Metropolisation of the European economic territory as a consequence of increasing specialisation of urban agglomerations in the knowledge economy. *European Planning Studies* 15. (1): 1–27.

Lazzeretti, L., Boix, R. and Capone, F. 2008. Do creative industries cluster? Mapping creative local production systems in Italy and Spain. *Industry and Innovation* 15. (5): 549–567.

Lazzeretti, L., Capone, F. and. Boix, R. 2012. Reasons for clustering of creative industries in Italy and Spain. *European Planning Studies* 20. (8): 1243–1262.

Lee, N. 2014. The creative industries and urban economic growth in the UK. *Environment and Planning A* 46. (2): 455–470.

Lorenzen, M. and Frederiksen, L. 2008. Why do cultural industries cluster? Localisation, urbanization, products and projects. In *Creative Cities, Cultural Clusters and Local Economic Development.* Eds.: Cooke, P. and Lazzeretti, L., Cheltenham, Edward Elgar, 155–179.

Maier, K. and Franke, D. 2015. Trendy prostorové sociálně-ekonomické polarizace v Česku 2001–2011 (Trends in spatial socio-economic polarisation in the Czech Republic 2001–2011). *Czech Sociological Review* 51. (1): 89–124.

Maillat, D. 1998. Innovative milieux and new generations of regional policies. *Entrepreneurship & Regional Development* 10. (1): 1–16.

Martin, R. and Sunley, P. 2006. Path dependence and regional economic evolution. *Journal of Economic Geography* 6. (4): 395–437.

Martinát, S., Navrátil, J., Hollander, J.B., Trojan, J., Klapka, P., Klusáček, P. and Kalok, D. 2018. Re-reuse of regenerated brownfields: Lessons from an Eastern European post-industrial city. *Journal of Cleaner Production* 188. 536–545.

Martinez-Fernandez, C., Audirac, I., Fol, S. and Cunningham-Sabot, E. 2012. Shrinking cities: Urban challenges of globalization. International *Journal of Urban and Regional Research* 36. (2): 213–225.

Massey, D. 1984. *Spatial divisions of labour: Social structures and the geography of production.* Basingstoke, Macmillan.

Meijers, E.J. and Burger, M.J. 2017. Stretching the concept of 'borrowed size'. *Urban Studies* 54. (1): 269–291.

Merino, F. and Rubalcaba, L. 2013. Are knowledge-intensive services highly concentrated? Evidence from European regions. *Tijdschrift voor Economische en Sociale Geografie* 104. (2): 215–232.

Mossig, I. 2011. Regional employment growth in the cultural and creative industries in Germany 2003–2008. *European Planning Studies* 19. (6): 967–990.

Müller, K., Rammer, C. and Trüby, J. 2009. The role of creative industries in industrial innovation. *Innovation* 11. (2): 148–168.

Murphy, E., Fox-Rogers, L. and Redmond, D. 2015. Location decision making of "creative" industries: The media and computer game sectors in Dublin, Ireland. *Growth and Change* 46. (1): 97–113.

Musil, J. 1993. Changing urban systems in post-communist societies in Central Europe: analysis and prediction. *Urban Studies* 30. (6): 899–905.

Musterd, S. and Gritsai, O. 2010. *Conditions for 'Creative Knowledge Cities'. Findings from a comparison between 13 European metropolises. 'Going Creative' – an option for all European cities?* ACRE Report WP9. Amsterdam, AISSR.

Musterd, S., Bontje, M.A., Chapain, C., Kovács, Z. and Murie, A. 2007. *Accommodating creative knowledge. A literature review from a European perspective.* (ACRE wp; No. 1). Amsterdam, Amsterdam I*nstitute* for *Metropolitan* and *International Development Studies* (AMIDSt).

Novotný, L., Hruška, V., Egedy, T. and Mazur, M. 2015. Defining rural areas of Visegrad countries. *Studia obszarow wiejskich / Rural Studies* 39. 21–33.

Parr, J.B. 2002. Agglomeration economies: ambiguities and confusions. *Environment and Planning A* 34. (4): 717–731.

Plum, O. and Hassink, R. 2011. Comparing knowledge networking in different knowledge bases in Germany. *Papers in Regional Science* 90. (2): 355–371.

Polese, M. 2012. The arts and local economic development: can a strong arts presence uplift local economies? A study of 135 Canadian cities. *Urban Studies* 49. (8): 1811–1835.

Power, D. 2011. *Priority sector report: creative and cultural industries*. The European Cluster Observatory, European Commision.

Puga, D. 2010. The magnitude and causes of agglomeration economies. *Journal of Regional Science* 50. (1): 203–219.

Rehák, Š. and Chovanec, M. 2012. Exploring spatial patterns of creative industries with firm level micro geographic data. *Region Direct* 2. 10–35.

Rodríguez-Pose, A. and Fitjar, R.D. 2013. Buzz, archipelago economies and the future of intermediate and peripheral areas in a spiky world. *European Planning Studies* 21. (3): 355–372.

Rumpel, P., Slach, O. and Koutský, J. 2010. Creative Industries in Spatial Perspective in the Old Industrial Moravian-Silesian Region. *E+M Ekonomie a Management* 8. (4): 30–46.

Scott, A.J. 2010. Cultural economy and the creative field of the city. *Geografiska Annaler: series B, Human Geography* 92. (2): 115–130.

Šimon, M. 2017. Multi-scalar geographies of polarisation and peripheralisation: A case study of Czechia. *Bulletin of Geography. Socio-economic Series* 37. (3): 125–137.

Slach, O. and Ženka, J. 2017. Post-Crisis Spatial Development of Creative Industries: Evidence from Czechia. In *Creative Industries in Europe: Creative Industries in Europe Drivers of New Sectoral and Spatial Dynamics*. Eds.: Chapain, C. and Stryjakiewicz, T., Cham, Springer International Publishing, 201–226.

Slach, O., Bosák, V., Ženka, J. and Pavlík, A. 2018. Vznik a role znalostně náročných obchodních služeb ve starých průmyslových regionech: perspektiva evoluční ekonomické geografie (Birth and role of knowledge-intensive business services in old industrial regions: a perspective of evolutionary economic geography). In *Rozmístění služeb v Česku*. Eds.: Ženka, J. and Slach, O., Ostrava, En Face, 98–123.

Slach, O., Ivan, I., Ženka, J. and Sopkuliak, A. 2015. Intra-urban patterns of creative industries in polycentric city. *GeoScape* 9. (1): 1–16.

Slach, O., Koutský, J., Novotný, J. and Ženka, J. 2013. Creative Industries in the Czech Republic: A Spatial Perspective. *Ekonomie a Management* 6. (4): 14–28.

Spencer, G.M. 2015. Knowledge neighbourhoods: Urban form and evolutionary economic geography. *Regional Studies* 49. (5): 883–898.

Stam, E., De Jong, J.P. and Marlet, G. 2008. Creative industries in the Netherlands: Structure, development, innovativeness and effects on urban growth. *Geografiska Annaler: series B, Human Geography* 90. (2): 119–132.

Storper, M. 2013. *Keys to the city: How economics, institutions, social interaction, and politics shape development.* Princeton, Princeton University Press.

Storper, M. and Venables, A.J. 2004. Buzz: face-to-face contact and the urban economy. *Journal of Economic Geography* 4. (4): 351–370.

Sucháček, J. and Baránaek, P. 2013. Largest enterprises in the Czech Republic: A spatio-temporal perspective. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis* 60. (7): 329–336.

Sucháček, J., Skaličková, J. and Široký, J. 2017. Managerial decision-making on the location of banking headquarters in the Czech Republic. *GeoScape* 11. (2): 76–83.

Sýkora, L. and Ouředníček, M. 2007. Sprawling post-communist metropolis: commercial and residential suburbanisation in Prague and Brno, the Czech Republic. In *Employment deconcentration in European metropolitan areas: Market forces versus planning regulations.* Eds.: Razin, E., Dijst, M. and Vázquez, C., Dordrecht, Springer, 209–233.

Tödtling, F. and Trippl, M. 2005. One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy* 34. (8): 1203–1219.

Tomczak, P. and Stachowiak, K. 2015. Location patterns and location factors in cultural and creative industries. *Quaestiones Geographicae* 34. (2): 7–27.

Townsend, L., Wallace, C., Fairhurst, G. and Anderson, A. 2017. Broadband and the creative industries in rural Scotland. *Journal of Rural Studies* 54. 451–458.

Van Winden, W. and Carvalho, L. 2016. Urbanize or perish? Assessing the urbanization of knowledge locations in Europe. *Journal of Urban Technology* 23. (1): 53–70.

Viturka, M., Pařil, V., Tonev, P., Šašinka, P. and Kunc, J. 2017. The metropolisation processes – A case of Central Europe and the Czech Republic. *Prague Economic Papers* 26. (5): 505–522.

Wood, S. and Dovey, K. 2015. Creative multiplicities: Urban morphologies of creative clustering. *Journal of Urban Design* 20. (1): 52–74.

Ženka, J. and Slach, O. eds. 2018. *Rozmístění služeb v Česku* (Spatial distribution of services in Czechia). Ostrava, En Face.

Ženka, J., Novotný, J., Slach, O. and Ivan, I. 2017a. Spatial distribution of knowledge-intensive business services in a small post-communist economy. *Journal of the Knowledge Economy* 8. (2): 385–406.

Ženka, J., Slach, O. and Sopkuliak, A. 2017b. Typology of Czech non-metropolitan regions based on their principal factors, mechanisms and actors of development. *Geografie* 122. (3): 281–309.

Ženka, J., Pavlík, A. and Slach, O. 2017c. Resilience of metropolitan, urban and rural regions: a Central European perspective. *GeoScape* 11. (1): 25–40.