

Exploring Spatial Patterns of Creative Industries with Firm Level Micro Geographic Data¹

Skúmanie priestorového usporiadania kreatívnych odvetví s využitím mikro geografických údajov firiem

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Abstract

The concept of creative economy brings new insights to the regional and urban development by focusing on the role of creative industries, creative cities or creative class. Our paper contributes to the discussion on the spatial concentration of firms in creative industries by using point pattern analysis. We analyze spatial distribution of 12 936 points, which represent geocoded firm level micro data from the Business Register of the Slovak Republic (Infostat). Using distance based spatial statistics such as nearest neighbour analysis, Ripley K analysis, and risk adjusted nearest neighbour hierarchical clustering we analyze the level of spatial concentration of firms and identify spatial clusters of firms in creative industries in Slovakia. Our analysis have confirmed that creative industries tend to concentrate in space mainly in large cities such as Bratislava and Košice. Only art and antiques and manufacture of clothes display less concentrated pattern in space.

Key words: creative industries, spatial concentration, point pattern analysis, micro data, Slovakia

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Abstrakt

Koncept kreatívnej ekonomiky prináša nové možnosti porozumenia zákonitosti regionálneho a mestského rozvoja. Zameriava sa na úlohu kreatívnych odvetví, kreatívnych miest a kreatívnej triedy. Náš článok prispieva k diskusii o priestorovej koncentrácii firiem v kreatívnych odvetviach s využitím analýzy bodových údajov. Analyzujeme priestorové usporiadanie 12 936 bodov reprezentujúcich geokódované údaje lokalizácie firiem Registra ekonomických subjektov SR (Infostat). Využitím metód priestorovej štatistiky ako sú analýza najbližšieho suseda, Ripley K analýza a klastrová analýza najbližšieho suseda analyzujeme mieru priestorovej koncentrácie firiem a identifikujeme klastre v kreatívnych odvetviach v SR. Naša analýza potvrdila tendenciu koncentrácie kreatívnych odvetví v SR, najmä vo veľkých mestách akými sú Bratislava a Košice. Výnimku tvoria odvetvia umenie a starožitnosti a výroba odevov, ktoré vykazujú nižšiu mieru koncentrácie v priestore.

Kľúčové slová: *kreatívne odvetvia, priestorová koncentrácia, bodová analýza, mikroúdaje, Slovensko*

JEL classification: R12

Introduction

The books from HOWKINS *The Creative Economy: How People Make Money from Ideas* (2001) and FLORIDA *The Rise of the Creative Class* (2002) restarted the discussion on the role of creativity in economic growth. Creativity is not completely new phenomenon in economic theory, it has been considered as an important growth factor already from its beginnings, pioneered by SHUMPETERs (1975) concept of creative destruction. FLORIDA (2003) recognizes that already the works of MARSHALL (1920) and especially JACOBS (1969) emphasize the role of spatial proximity and diversity as the basis for creativity and innovation. Concepts such as regional innovation systems (BRACZYK, COOKE, HEIDENREICH 1998) learning region (MORGAN, 1997, FLORIDA, 1995), innovative clusters (PORTER, 1990), innovative milieu (CAMAGNI, MAILLAT, ed. 2006) or industrial districts

(PIORE, SABEL, 1984) focused further to explore the role of spatial proximity, for innovation activities (mainly of technological character) in the manufacturing sector and for the regional development in general.

There are two distinct features of the creative industries concepts comparing with the regional innovation studies. At first, it is much more focused on the service sector rather than manufacturing sector, which implies the role of symbolic rather than analytic and synthetic knowledge in the innovation processes (for the overview ASHEIM et. al 2007). Secondly, the concept is closely associated with cultural studies and urban sociology (O'CONNOR, 2000, MARKUSEN et al., 2008). Some authors use the joint term cultural and creative industries (for the more in-deep discussion and critiques see GALLOWAY, DUNLOP, 2007; FLEW, CUNNINGHAM, 2010) to highlight that part of firms which emphasize the cultural and symbolic value of their output.

The concept of creative industries started to be used as a policy concept since 1997 in connection with the implementation of neo-liberal policies mainly in the United Kingdom and Australia (GARNHAM, 2005, FLEW, CUNNINGHAM, 2010). There are several definitions of creative industries (HOWKINS, 2001; WIPO, 2003, UNESCO, 2006, FLEW, CUNNINGHAM, 2010), which substantially differ. There is very critical discussion on the classification of the creative industries and it is beyond the scope of this article to find a common consensus. However, researchers (e.g. LAZARETTI, BOIX, CAPONE, 2008) refer to the definition and classification proposed by the Department of Culture, Media and Sports in UK which defines creative industries as those *“that have their origin in individual creativity, skill and talent and which have a potential to create wealth and jobs through the creation and exploitation of intellectual property”* (DCMS, 1998, p.10).

One of the remarkable features of the creative industries is their concentration in space especially in large cities (LANGE, KALANDIDES, STOBBER, MIEG, 2008; BOIX, LAZZARETTI, HERVÁS, DE MIGUEL, 2011; STAM, DE JONG, MARLET, 2008). Even that concept of creative economy has attracted research

community in Slovakia and Czech Republic, there is missing empirical research on the geography of creative industries in our countries. To what extent are the industries concentrated in space and where are the clusters² located? Do individual creative industries have similar spatial pattern or are there some important differences? These are some of the questions we would like to address in this paper. The paper starts with brief literature review on the research on the geography of creative industries. Second part introduces the methodological approach of the analysis, which is based on the point pattern analysis of firms in creative industries. Last part includes discussion on the results of the spatial analysis of microgeographic data of firms in creative industries in Slovakia.

Geography of creative industries: review of the literature

Large cities are considered to be centres of creative industries, though of course some cities stand out above the rest (EUROPEAN CLUSTER OBSERVATORY, 2009). High level of spatial concentration in urban areas is a typical feature of creative industries (FLORIDA, 2002; LAZARETTI et al., 2008; PRATT, 1997), we can also find small clusters of firms creating located in cultural quarters in large cities (MONTGOMERY, 2003; BRINKHOFF, 2006).

There is no single reason of concentration of creative industries in cities. Most of the authors consider traditional Marshall and especially Jacobs type of externalities (specialised services, knowledge spill-overs and labour pooling) as one of the key factors of spatial concentration (LAZARETTI, BOIX, CAPONE, 2008; ROSENFELD, 2004), however there are other location factors specific for creative industries. Proximity to large local markets plays decisive role for the location of creative industries. As many of firms provide services which are organised and implemented in form of projects (GRABHER, 2002), face to face interactions with clients and suppliers foster firms to be located in larger markets. Newer studies identify additional sector specific location factors such as feedback from social networks (POTTS et. al. 2008; SCOTT, 2004; KARLSSON, 2011), role

² In this paper we use the term *cluster* in a statistical meaning, not as a conceptual approach in Porters' (1990) perspective.

of facilitators - publishers, recording companies or galleries (CAVES, 2003), or proximity to major events (VANG, 2005). The concept of creative class (FLORIDA, 2002) adds tolerance, diversity and urban amenities as necessary ingredients of successful cities capable to attract people in creative professions. Most of the research is focusing on selected industries such as publishing (HEEBELS, BOSCHMA, 2011), advertisement (PRATT, 2006), design (BERTACCHINI, BORRIONE, 2011; ROSENFELD, 2004), film and television industry (TUROK, 2003), music (LEYSHON, 2001; POWER, HALLENCREUTZ, 2002), media (DAVIS, CREUTZBERG, ARTHURS, 2009; BATHELT, 2005) or arts (HELLMANZIK, 2009; EIKHOF, HAUNSCHILD, 2006).

Creative cluster concept differs from the classical concept of cluster (PORTER, 2000). Creative cluster includes not only firms or universities, but also media centres, non-profit organizations - cultural institutions, art centres and artists, and form also place to live and work. De PROPRIIS et al. (2009) characterize creative cluster as:

- place, connecting the community of creative people,
- place where people, relationships, ideas and talent can complement each other,
- an environment offering diversity, initiative, or freedom of expression,
- strong, open and constantly changing networks, that support individual uniqueness and identity.

Creative cluster is considered to be much more based on the social networks and industrial linkages than traditional technological clusters based on agglomeration theories.

Traditional approach of measuring spatial concentration and clustering of creative industries is by using concentration indexes such as location quotient, Gini coefficient of Ellison-Gleaser index using employment data (DE PROPRIIS et., al, 2009; LAZARETTI, BOIX, CAPONE, 2008). These methodologies suffer from problems with definition of statistical units (such as administrative regions) and

difficulties with identifying cluster geographical boundaries (BOIX, et. al., 2011). Spatial statistics, which could provide us with information not only on the level of concentration but also on the location of the clusters and cluster boundaries, is however used only seldom.

Only several authors have reflected the growing interest on the geography of creative industries in Slovakia and Czech Republic. RUMPEL, SLACH and KOUTSKÝ (2010) have described the geography and evolution of creative industries in the old industrial Moravian--Silesian Region using firm level statistics. On the other way MURGAŠ and ŠEVČÍKOVÁ (2011) tried to analyse and compare Slovak regions with application of creative capital index a la Florida. BLAHOVEC and HUDEC (2012) have introduced combination of industrial employment data with occupational structure to show regional differences in creative industries in Slovakia. CHOVANEC and REHÁK (2011) have used firm establishment data and analysed the evolution of the creative industries at the regional level in Slovakia. These studies opened the discussion on the spatial patterns of the creative industries, however further spatial analysis could bring deeper insights in this issue.

Aim and methodology

The aim of the paper is to analyze spatial patterns of creative industries in the Slovak Republic. We use the DCMS (2011) classification of creative industries with 39 industries, which are divided into 11 groups: Architecture; Digital Media and Entertainment; Music, Visual and Performing Arts; Marketing communication; Fashion design, Radio and television; Publishing software; Art and antiques; Video, film and photography; Publishing, and Manufacture of clothes.³ Micro data were

³ DCMS also includes 78.10 - *Activities of employment placement agencies* in Music, Visual and Performing Arts to order to capture the contribution of casting agencies in movies, theatres etc. This industry is included in DCMS (2011) classification only with 0,7 % proportion in Gross Value Added and 0,5 % proportion in employment, so only a minor part of the industry is considered to be part of creative industries. As our analysis is based on micro data, it does not allow us to identify this group of firms. As taking this industry as a whole could substantially bias our calculations in Music, Visual and Performing Arts we have excluded whole industry from further analysis.

drawn from a Registry of Economic Subjects of Slovak Republic issued by Infostat in 2012. The database encompasses individual data of business organization registered in the Slovak Republic. Firm entries include the name of the firm, date of registration, legal form, type of ownership, activity status, revenue category, employment category, exact location and industrial classification (NACE Rev. 2.0). In total, addresses of 12 936 business have been geocoded, by its geographic coordinates (longitude and latitude). Geocoded firm level micro data allows us to use point pattern analysis (GATRELL, et. al., 1996), which is commonly used for the spatial analysis based on the distance between the firm locations (DURANTON, OVERMAN, 2006).

Nearest Neighbour Analysis is one of the most widely used methods of spatial statistics. For each point (in this case, the location of the firm) takes into account the distance to the nearest point (nearest localized firm). It compares the observed average distance the nearest part of the identified empirically, to the expected average distance to the nearest point, provided that the points were located randomly. The result is called Nearest Neighbour Index (R), which indicates whether the sample points in space is concentrated, arranged randomly or regularly.

$$R = \frac{d_o}{d_e} R = \frac{d_o}{d_e} \quad \text{formula 1}$$

d_{ij} - distance of point i to point nearest point j

n - number of points in the sample

A - area

d_o - the average observed distance of point i to the nearest point j

d_e - the average random distance of point i to the nearest point j

R - value of Nearest Neighbour Index

Index can take values from 0 to 2,15. A value of 1 shows the random distribution of points. If the index value is less than 1, there is a tendency to

concentration of points in space, and if the index value is greater than 1, the points tend to be arranged in the area regularly.

Ripley's K analysis method of spatial statistics measures the spatial concentration by the average number of points contained in circle. For each point i is measured the distance to any other point j . The distances are then compared to distance of radius of circle with a fixed ratio circle t_s . If the value of the index K (formula 2) is higher than a random distribution of points, than the distribution of points is described as clustered, and if the value of the index K is smaller, we can speak about the dispersed distribution of points in space.

$$K(t_s) = \frac{1}{\lambda N} \sum_{i=1}^N \sum_{j=1; i \neq j}^N w_{ij} I(d_{ij})$$

formula 2

$K(t_s)$ – K index

λ – density of points in space

N – number of points in the sample

w_{ij} –weighing factor for correcting the “border effect”

d_{ij} – distance between i th and j th points

I – indicator function

Since the results of $K(t_s)$ are not linear, but tend to grow exponentially (KALUZNY in LEVINE, 2010), it is necessary to transform $K(t_s)$ to the function of square root $L(t_s)$ (formula 3).

$$L(t_s) = \sqrt{\frac{K(t_s)}{\pi}} - t_s$$

formula 3

For the identification of clusters we have used Risk - adjusted Nearest Neighbour Hierarchical Clustering, which merges the points (businesses), that are located closer to each other than expected, based on the distribution of another

variable (density of population at the district level). Threshold distance of merging points into clusters is therefore not fixed, but in space changes dynamically. Identified clusters are thus the result of the test of the threshold distance between points in a cluster and a specified minimum number of points in the cluster.

Spatial concentration of creative industries

The largest group are firms in Marketing communication with 4 025 firms (31.11 %) and Art and antiques with 2 962 firms (22.90 %). On the other hand number of firms in Radio and television (60) or Publishing software (48) is much lower, so we decided to run our calculation separately on 11 industries. This also allows us to take into the account the differences in the production mode of the industry (manufacturing vs. services), or size structure of firms (small vs. large firms) which substantially differ among the subgroups and affect also the location pattern of the industry.

Table 1: Number of firms in each group of creative industries (30.4.2012)

Industry	Count	Share	Industry	Count	Share
Architecture	1 019	7,88 %	Publishing software	48	0,37 %
Digital Media and Entertainment	1 313	10,15 %	Art and antiques	2 962	22,90 %
Music, Visual and Performing Arts	279	2,16 %	Video, film and photography	873	6,75 %
Marketing communication	4 025	31,11 %	Publishing	1 163	8,99 %
Fashion design	285	2,20 %	Manufacture of clothes	909	7,03 %
Radio and television	60	0,46 %			

Source: Own calculation in CrimeStat, data from the Registry of Economic Subjects (Infostat)

The level of Nearest Neighbour Index (NNI) ranges from 0,18 in Marketing communication to 0,63 in Publishing software and Radio and television, which means that the level of spatial concentration is well below 1. It means that the point pattern of all

creative industries is more clustered than random which implies the spatial concentration of firms. We may observe that the NN index is positively influenced by the number of observations. It is obvious, that once the industry demonstrates the concentrated pattern (NNI below 1), adding more firms will lower the level of the index. Even that NNI is a good measure for analysis of the level of spatial concentration of individual industry; it is not suitable for direct comparisons between groups of industries of different size.

Table 2: Nearest Neighbour Index of creative industries (30.4.2012)

Industry	Nearest Neighbour Index	Industry	Nearest Neighbour Index
Architecture	0,20662	Publishing software	0,63079
Digital Media and Entertainment	0,20993	Art and antiques	0,24145
Music, Visual and Performing Arts	0,34430	Video, film and photography	0,22326
Marketing communication	0,18160	Publishing	0,22200
Fashion design	0,23346	Manufacture of clothes	0,30881
Radio and television	0,63372		

Source: Own calculation in CrimeStat, data from the Registry of Economic Subjects (Infostat)

To overcome this effect, we use Ripley K statistics, which is an index of non-randomness for different scale values. Ripley K is a distance based method that measures the concentration of an industry by counting the number of neighbours each firm has in a circle of given radius. The null hypothesis is a complete spatial randomness (CSR) of a point pattern ($L(t_s) = 0$). Our analysis shows that all empirical values of the $L(t_s)$ function of firms in each industry are higher than theoretical $L(t_s)$ value (Figure 1), this indicates the spatial concentration of point pattern in the short distances and is statistically significant. The spatial scale at which the level of maximal concentration is reached slightly differs between the sectors between 8.55 and 13.40 km. This implies that clusters are formed in relatively small areas, suggesting the concentration of firms in cities or in their parts. With increasing distance from the center of the area, however, all functions decrease (Figure 1).

The graphs illustrate that all industries show very similar spatial pattern of spatial concentration, and is higher than the simulated Lt_{max} random distribution, which indicate the statistical significance of the results. Even that all industries concentrate on the short distances, Radio and TV shows dispersed pattern (negative value of L) at the distance larger than 81.51 km, however not statistically significant.

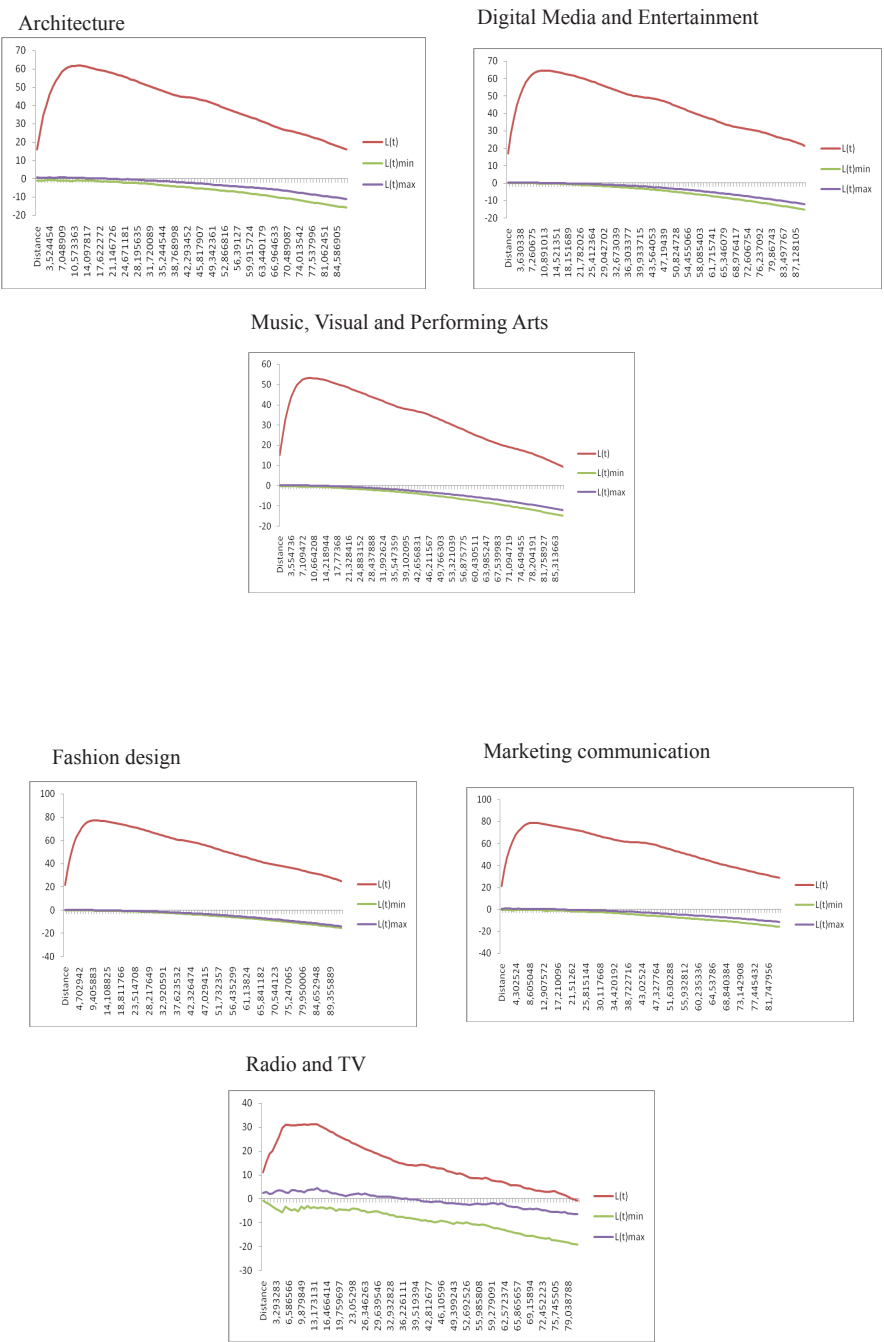
Table 3: Ripley K analysis

Industry	Maximum		Industry	Maximum	
	km	Lt_s		km	Lt_s
Architecture	10,66	53,18	Publishing Software	8,64	45,01
Digital Media and Entertainment	12,71	64,51	Art and Antiques	10,21	28,35
Music, Visual and Performing Arts	12,34	61,73	Video, Film and Photography	13,13	84,13
Marketing Communication	11,29	77,36	Publishing	10,00	59,83
Fashion Design	10,33	78,64	Manufacture of Clothes	8,55	19,53
Radio and Television	13,40	31,15	Creative Industries total	10,53	57,96

Source: Own calculation in CrimeStat, data from the Registry of Economic Subjects (Infostat)

Using the values of the maximum of $L(t_s)$ allows us to point out the intensity of the concentration among the industries. Video, film and photography is most concentrated creative industry (maximal $L(t_s) = 84,13$), followed by following industries in descending order - Fashion Design; Marketing Communication, Digital Media and Entertainment; Music, Visual and Performing Arts; Publishing; Architecture; Publishing Software; Radio and Television; Art and Antiques and Manufacture of Clothes.

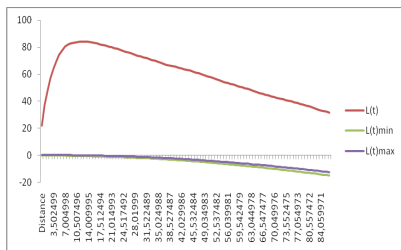
Figure 1: Ripley L function



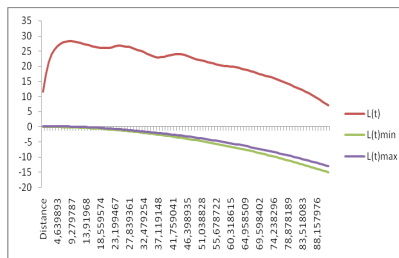
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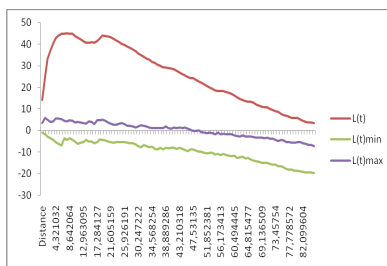
Video, film and photography



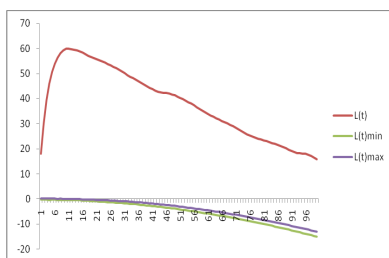
Art and antiques



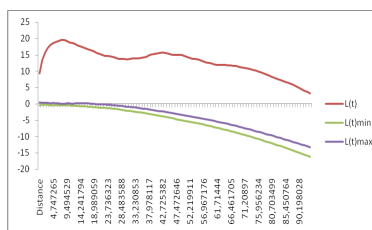
Publishing software



Publishing



Manufacture of clothes



Note: X axis – distance (km), Y axis - L_t

Spatial clusters of creative industries

Finally, our task was to identify and describe individual clusters of firms. This was done by Risk Adjusted Nearest Neighbor Hierarchical Spatial Clustering. This technique combines hierarchical clustering capabilities of the Nearest Neighbor Hierarchical Spatial Clustering routine with kernel density interpolation techniques. We have identified those groups of firms that are closer together than it would be expected on the basis of population distribution and in which the minimum number of points was greater than 10. We have used the distribution of the population in municipalities in Slovakia in 2010. Results are presented in following table.

Table 4: Clusters of creative industries using Risk – adjusted Nearest Neighbour Hierarchical Spatial Clustering

Creative industry	First level clusters	Number of businesses in cluster	Share of business in cluster
Architecture	7	500	49,07%
Digital Media and Entertainment	7	755	57,50%
Music, Visual and Performing Arts	2	152	54,48%
Marketing communication	24	2664	66,19%
Fashion design	1	181	63,51%
Radio and television	2	26	43,33%
Publishing software	1	22	45,83%
Art and antiques	20	917	30,96%
Video, film and photography	4	591	67,70%
Publishing	7	638	54,86%
Manufacture of clothes	6	201	22,11%

Source: Own calculation in CrimeStat, data from the Registry of Economic Subjects (Infostat)

Similar to our previous results all creative industries demonstrate certain level of spatial clustering. More than 50 % of firms are located in spatial clusters, it means spatial proximity between similar firms it important feature of the creative industries. In most cases number of firms in clusters exceeds more than half of the firms in the industry. Most clustered industry is Video, film and photography

where 4 clusters comprise 67,70 % of all firms in this industry. Also Fashion design with one cluster which comprise 63,51 % of firms. Manufacture of clothes and Art and antiques demonstrate more even distribution of firms. Clustering process is weaker and clusters in these industries contain much less number of firms than other industries. Results from hierarchical clustering once again prove our previous calculations. The geographical perspective show that clusters are mostly located in the largest cities in SR such as Bratislava, Košice, Žilina and Prešov, which confirms the hypotheses on the role of large cities in the process of clustering.⁴ Bratislava highly dominates as a centre of creative industries. All largest clusters in individual industries are located in Bratislava, especially industries such as Fashion design (64 %), Music, Visual and Performing Arts (47 %) and Publishing software (44 %) are those with highest share of firms. Two industries are exceptions from the general pattern. Art and antiques and Marketing communication create much higher number of smaller clusters which are located also outside main urban regions.

Table 5: Location of largest clusters

Industry	Largest cluster (share on total firms)	Second largest cluster (share on total firms)	Third largest cluster (share on total firms)
Architecture	Bratislava (32 %)	Košice (5%)	Prešov (4%)
Digital Media and Entertainment	Bratislava (33%)	Košice (6%)	
Music, Visual and Performing Arts	Bratislava (47 %)		
Marketing communication	Bratislava (36 %)	Košice (4%)	
Fashion design	Bratislava (64 %)		
Radio and television	Bratislava (32 %)		
Publishing software	Bratislava (44 %)		
Art and antiques	Bratislava (9 %)	Žilina (9%)	
Video, film and photography	Bratislava (48 %)		
Publishing	Bratislava (34 %)	Košice (7%)	
Manufacture of clothes	Bratislava (8%)	Prešov (6%)	Partizánske (5 %)

Source: Own elaboration.

⁴ Detailed map of clusters is in the Annex.

Discussion and conclusions

The ambition of this paper was to analyze the spatial pattern of the location of firms in creative industries in Slovakia and to bring empirical evidence of spatial clustering of firms. Using point pattern analysis, which is based on the firm level micro data and uses distance measures, allows us to avoid traditional problems of statistical analysis based on the areal data (problems with delimitation of spatial units). The basic idea of point pattern analysis was to compare the distribution firms in an industry to the hypothetical industry with the same number of establishments randomly distributed in space or with the distribution of population. We have analysed the location of totally 12 936 firms from 39 industries (4 digit level, NACE 2), aggregated into 11 groups of industries. There is important difference in the size of the groups and also organisational and production structure of the industries differs. The largest groups are Marketing communication, Art and antiques and a Digital Media and Entertainment with more than 1000 firms, on the other hand Radio and television or Publishing software have less than 100 firms. Taking into consideration these differences our research analysed differences of the spatial patterns of these industries and identified spatial clusters. All industries demonstrate very similar spatial pattern, however Video, film and photography, Fashion Design or Marketing Communication are concentrated more than firms in general. Art and Antiques and Manufacture of Clothes display on the other hand less concentrated pattern. Spatial clustering is very strong for creative industries, in general more than half of the firms are located in spatial clusters. The size of the city is an important factor; larger cities such as Bratislava, Košice, Banská Bystrica outperform smaller cities. It was beyond the scope of this paper to explore the reasons of spatial clustering of firms in creative industries, so our results have predominately descriptive character. Even that our analysis does not support us with argument for the reasons of these differences; we could discuss some of the industries. Most of the creative industries belong to the service sector with high level of individual creativity as a major production factor, Manufacture of Clothes and Art and Antiques represent very different subcategories. Manufacturing of Clothes is more industrialized in its mode of production in case of large firms or with higher manual and routine

based production in case of smaller firms. Larger number of firms in this sector and location in smaller communes implies the significance the proximity to smaller local markets for the firms. Firms in Art and Antiques represent the final part of the value chain, the retailing of creative products. Firms sell the products directly to households which mean that they will follow the distribution of more dispersed population rather than distribution of spatially more concentrated firms (as this is the case in other creative industries). In Fashion Design the proximity to the upper class households and the factor of location of arts related universities could explain the concentration in largest city. The case study of Music, Visual and Performing Arts (CHOVANEK, 2012) based on the in depth interviews with firms, brings deeper insights to the location factors. Proximity to media, firm clients, institutions such galleries or theatres, larger public support for arts were most important factor for these firms. Our study empirically contributed to the discussion on the location patterns of creative industries. Our specific methodology with microgeographic data does not allow us to direct comparison with other studies. There is clear pattern showing on the role of the city size for the location of firms in creative industries in Slovakia, which is typical feature in developed countries.

Creative industries attract growing attention from researchers and practitioners and the results of our analysis brings also important information for the identification of promising cases for future in-depth qualitative research on the location and clustering of creative industries. If we accept the idea, that creativity is a key source of economic growth in cities, then dedicated policy focused on creative industries may significantly help to restructure the local economy and initiate new development paths. Our analysis could also support the discussion on the classification of the creative industries. Higher internal homogeneity of the classification could improve reasoning on the selection of problematic creative industries.

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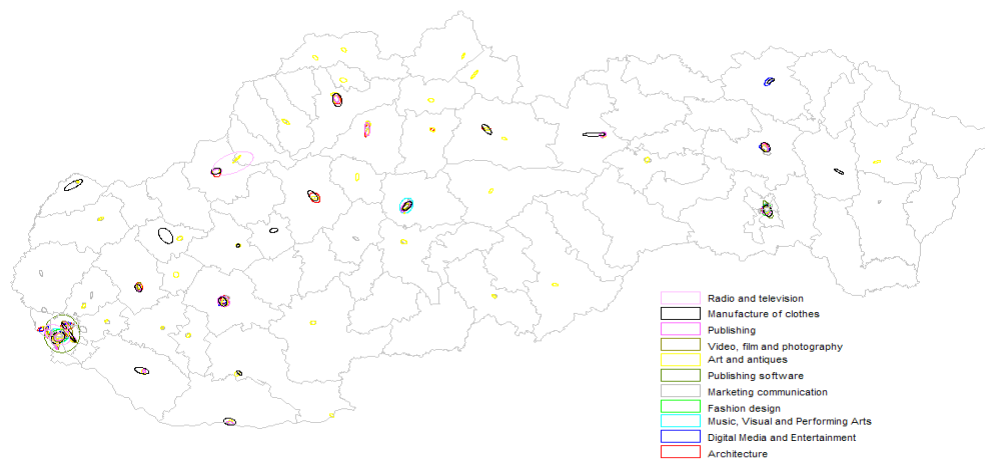
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Annex 1: Classification of creative industries

Creative industry	NACE rev. 2	description of NACE rev. 2 code
Architecture	71.11	Architectural activities
Digital Media and Entertainment	58.21	Publishing of computer games
Digital Media and Entertainment	62.01	Computer programming activities
Music, Visual and Performing Arts	59.20	Sound recording and music publishing activities
Music, Visual and Performing Arts	90.01	Performing arts
Music, Visual and Performing Arts	90.02	Support activities to performing arts
Music, Visual and Performing Arts	90.03	Artistic creation
Music, Visual and Performing Arts	90.04	Operation of arts facilities
Marketing communication	73.11	Advertising agencies
Marketing communication	73.12	Media representation
Fashion design	74.10	Specialised design activities
Radio and television	60.10	Radio broadcasting
Radio and television	60.20	Television programming and broadcasting activities
Publishing software	18.20	Reproduction of recorded media
Publishing software	58.29	Other software publishing
Art and antiques	47.78	Other retail sale of new goods in specialised stores
Art and antiques	47.79	Retail sale of second-hand goods in stores
Video, film and photography	74.20	Photographic activities
Video, film and photography	59.11	Motion picture, video and television programme production activities

Video, film and photography	59.12	Motion picture, video and television programme postproduction activities
Video, film and photography	59.13	Motion picture, video and television programme distribution activities
Video, film and photography	59.14	Motion picture projection activities
Publishing	18.11	Printing of newspapers
Publishing	18.13	Pre-press and pre-media services
Publishing	58.11	Book publishing
Publishing	58.13	Publishing of newspapers
Publishing	58.14	Publishing of journals and periodicals
Publishing	58.19	Other publishing activities
Publishing	63.91	News agency activities
Manufacture of clothes	14.11	Manufacture of leather clothes
Manufacture of clothes	14.12	Manufacture of workwear
Manufacture of clothes	14.13	Manufacture of other outerwear
Manufacture of clothes	14.14	Manufacture of underwear
Manufacture of clothes	14.19	Manufacture of other wearing apparel and accessories
Manufacture of clothes	14.20	Manufacture of articles of fur
Manufacture of clothes	14.31	Manufacture of knitted and crocheted hosiery
Manufacture of clothes	14.39	Manufacture of other knitted and crocheted apparel
Manufacture of clothes	15.12	Manufacture of luggage, handbags and the like, saddlery and harness
Manufacture of clothes	15.20	Manufacture of footwear

Map: Clusters of creative industries in Slovakia



Note: The ellipse represent the first level clusters from hierarchical nearest neighbour clustering of individual industries