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DISTRIBUTION AND DYNAMICS OF DEVELOPMENT OF SMALL AND MEDIUM-SIZED ENTERPRISES AS A METHOD OF DETERMINING THE GROWTH CENTRES. EXAMPLE OF PODKARPACKIE REGION

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Abstract: Many analysis of growth poles do not refer directly to development and dynamics of propulsive activities, but rather to their effects. In this paper the author concluded that essential role may be played by fast-growing and knowledge-based small and medium enterprises (SMEs) while their intra-regional diversity of activity may be a reasonable proxy measure of a role played by specific town as a growth centre. Therefore the article has two main goals: methodical – determining the usefulness of the activity of fast-growing and (potentially) innovative small and medium enterprises as a designatum for the growth pole and cognitive – to capture the spatial differences in the distribution of this kind of SMEs in Podkarpackie region. The study showed strong diversification of the number of fast-growing and (potentially) innovative SMEs on the local level. All techniques of determining the level of economic development and it's dynamics taken into consideration in the analysis testify to strong and rising position of Rzeszów as a regional growth pole. It indicates growing role of metropolisation processes in Poland even in case of peripheral, weakly urbanised region with a relatively small regional centre compared to the biggest Polish cities.

Keywords: theory of polarisation; growth centre south-eastern Poland, fast growing firms, entrepreneurship

JEL codes: L25, L26, P25, R11, R58

1. Introduction

Although the heydays of the growth pole theory are long gone, the concept still exerts a strong influence on the scholars and regional planners (see: Grzeszczak 2007). It is because 'polarized development is a permanent feature of objective reality' – as Kukliński (1987, p. 5) noted nearly thirty years ago. For the policy of regional development, the classic concept of Perroux (1955) *pôle de croissance* has been of limited use as it only indirectly refers to the real (geographical) space. Therefore the J. Boudeville's conceptualisation of the growth pole, who gave a regional character and a specific geographic content to F. Perroux's conception, is used (*implicite* or *explicite*) in the economic regional planning. Boudeville (1966, p. 11) defined a growth pole as a 'set of expanding industries located in an urban area and including further development of economic activity throughout its zone of influence'.

In order to obtain recognition by a particular town as a centre of growth, they must meet four criteria (Sobala-Gwosdz 2005; Domański & Noworól 2010; Grzeszczak 2007):

1. The growth centre must have a sufficiently large internal economic potential which allows to generate adequately strong development impulses.
2. The growth centre is characterized by an above-average growth rate relative to other centres, the source of which lies in so-called propulsive industries (fast growing with an extensive market and an advanced level of technology and managerial expertise (Meardon 2001).
3. The growth centre shows a positive impact on the development of surrounding areas through multiplier effects, movement of capital and innovation.
4. The growth centre is an hub of innovative economic activities.

A study to identify the growth centres, both in Poland and in the world, were repeatedly undertaken (see review by Grzeszczak 1978, 1999, 2007; Sobala-Gwosdz 2005). Yet, most authors focused on determining the centres of this type in a given moment of time. Quite common is the assumption – in my opinion unfounded – that every medium and large city acts as a growth centre. This is due to the fact that the dynamics of development of the growth centre itself and its surroundings were rarely taken into account (its impact) as well as the role of the centre as the innovation hub and the concentration of the propulsive activities.

This article has two main objectives: methodological and cognitive:

1. The methodological aim is to determine the possibilities of using the spatially uneven activity of fast-growing and (potentially) innovative small and medium-sized enterprises (SMEs) to diagnose the level and dynamics of development (including the level of innovation) of the urban centre.
2. The cognitive aim is to investigate the differences in the level of activity of fast growing SMEs in the largest towns of Podkarpackie region).

The analysis of the position and impact of major urban centre is of special importance in the context of semi-peripheral or peripheral regions. Podkarpackie region being commonly regarded as such. It is the least urbanized region in Poland, ranked 15th lowest regional GDP per capita in 2014 in the EU (*Eurostat*). On the other hand

Table. 1. Size of functional urban areas of major towns in Podkarpackie Region

Town	The size of functional urban areas (by population in thous.)			
	By commuting patterns to secondary schools	By transport links	By commuting patterns to work (2006) method A	By commuting patterns to work (2006) method B
Rzeszów	360.3	370.8	634.1	595.1
Stalowa Wola	121.9	131.2	191.5	220.2
Mielec	126.3	130.4	146.5	194.3
Krosno	141.0	144.9	194.1	209.3
Przemyśl	133.3	133.8	153.1	138.2
Dębica	104.2	109.2	138.3	205.4
Jasło	107.4	120.4	109.9	123.2
Sanok	103.3	93.3	117.6	153.0
Jarosław	127.1	112.4	106.0	122.1
Tarnobrzeg	79.8	75.7	120.0	120.0

Note: Differences in the sizes of FUAs' show due to different technique of measuring supply areas.
Sources: A. Sobala-Gwosdz (2005) – column 2–3, author's estimates based on data of Statistical Council Office of Poland – column 4, P. Śleszyński & K. Czapiewski (2011) – column 5.

the region boast some strong clusters in knowledge intensive industries, including aviation and IT (Buczyńska et al. 2016).

Some scholars argue (Christofakis & Apadaskalopoulos 2011), that the operation of a growth pole presupposes a sufficient population size of over 100,000 inhabitants. Because functional rather than administration criteria is more proper to capture the potential of an urban centre, this threshold should refer to the size of functional urban area. There are 10 towns in Podkarpackie Region (Rzeszów, Stalowa Wola, Mielec, Krosno, Przemyśl, Dębica, Jasło, Sanok, Jarosław and Tarnobrzeg) which fulfil this condition, determined on the basis of commuting flows to school and work (Sobala-Gwosdz 2005; Śleszyński & Czapiewski 2011).

2. Fast-growing and innovative SMEs as an indicator of the condition of the local economy

Sustained economic development of the city and the region is based primarily on the development of endogenous entrepreneurship, and the development of local firms, especially small and medium-sized is considered as one of the measures of economic growth and favourable local development processes (Makieła & Rachwał 2005; Dej & Micek 2013; Cabrita et al. 2015). According to Pawłowski (2007), the condition of small and medium enterprises located in the region is much more important than the size of investments done by external companies. Small and medium-sized enterprises (SMEs) are generally more embedded than large external investors (Dej 2009), the sector also adapts faster to changing conditions, as shown by, among others, Stryjakiewicz (1999). According to Glaeser (2011), the cities

work best if they are full of enterprising people and companies created by them, whose high level of innovation results from the high density of mutual interaction and exchange of experience, and according to Taleb (2014) the key to innovation is to experiment and take risks, so the activity characteristic to an entrepreneurial person. Gwosdz (2014) proved on the example of Katowice urban region a strong correlation between the number of fast-growing SMEs and the unemployment rate.

A lot of analysis take into account the rate of entrepreneurship, and some so-called companies' demography indicators. The number of companies itself, however, says little about the scale of success and development dynamics of the individual entities, which is much more interesting from the point of view of determining the potential development of cities. In the recent years a growing body of literature emerged that investigate the role of high-impact firms, defined as enterprises which are characterised by rapidly growing revenues and employment (Acs et. al 2008). Preliminary studies on the geography of fast-growing firm in two Polish regions (śląskie and pomorskie) proved that a large representation of fast growing small and medium-sized companies which are characterized by growing revenue and profitability is in fact a very good indicator of the local economy condition, highly correlated with other desirable measures of socio-economic development (see: Gwosdz 2014; Gwosdz et al. 2015).

From the perspective of growth pole theory the role of the innovativeness of fast-growing companies is especially interesting. The dynamics of the emergence of new companies in the sector of high-tech industries and knowledge-intensive services is an expression of desirable structural changes in the economy. J. Jacobs (1968), the author of one of the most important works on the functioning of the cities stresses indeed that the main indicator of the development of the city is the pace and scale of the formation of the new economic activities.

So far there are only few studies that have sought to identify factors that affect innovation in fast-growing SMEs. According to Heimonen (2012), who researched continuously growing SMEs in two regions in Finland, about 8 per cent of the enterprise in the sample (n = 348) could be defined as innovative growth SMEs. Kraśnicka et al. (2016) discovered that the innovativeness of rapidly growing firm (gazelles) in Poland was lower *vis-à-vis* the used control group of companies, what suggests that there are other more important factors behind the success of SMEs under study.

3. Research methods and source of data

The organization of the collection and sharing of data by the Polish statistical services makes that, at the local level, even basic data reflecting the economic situation in the city or municipality, such as e.g. the economic activity of the population, the unemployment rate, residents income or structure of the employed are not available or incomplete. There are also publicly unavailable statistical data on the evolution of the economic situation of companies on the lower level than the region (NUTS2), which forces us to seek other sources of information. In the present study, to cap-

ture the extent of differences among the cities of Podkarpackie region, the ranking from the Gazelles of Business was used. The author of this extensive compilation is the Coface Poland which is responsible for verifying the financial data of enterprises, and the results of the statement are published in the economic journal Puls Biznesu. The 'gazelle' is a small or medium company (defined on the basis of revenues[1]) that in the three years preceding the statement has experienced growth in revenues from sales and generated profits. The total number of entities from Podkarpackie region included in the rankings from the years 2001–2014 amounted to 1,768 (742 companies)[2]. This number is large enough to attempt to show diversity at the local scale for medium to large cities of the Region.

When interpreting the data based on the ranking of Business Gazelles, one must bear in mind that this list does not include financial services companies and their related such as banks, insurance companies and factoring. Secondly, because the data collected by the authors of the ranking is based mainly on the available financial statements of companies, they do not cover the entire population of active enterprises, which is due firstly to the fact that mandatory reporting in accordance with the Accounting Act applies to companies which exceeded a certain threshold, the net income (at least 1.2 million Euros) and secondly, a certain percentage of companies that are covered by this obligation makes no systematic annual financial statements. These remarks do not decrease value of the data source in question. There is in fact lack of evidence of a significant correlation of the economy branches at the level of two digit NACE aggregation with the degree of reporting. One should be cautious about interpreting the dynamics indices on a disaggregated spatial level (e.g. small towns or individual PKD) because along with the improvement of financial reporting and the increasing popularity of the analysed ranking, the number of companies covered by the query was also rising. Therefore, the indicators of dynamics are counted in this article since 2005, due to poor representation of entities surveyed in previous years. In this paper, the term *gazelle* is used interchangeably with the term *fast-growing small and medium enterprise*.

Due to the lack of adequate data on the local level to measure the actual rate of innovation (see: Siłka 2010, 2012; Rachwał 2012) it is necessary to use the data which only allow to determine the innovation potential of companies. Such an approximation could be the number of existing and newly established entities classified by the European Statistics Office as knowledge-intensive, so industries of medium-high and high-technology (codes 21 and 26 of NACE Rev. 2 at 2-digit level, codes 20 and 27 to 30 respectively) and knowledge intensive services (codes 50 to 51, 58 to 63, 64 to 66, 69 to 75, 78, 80, 84 to 93 at 2-digit level of NACE Rev. 2). This analysis can be performed for the years 2009–2014 based on the CSO data (*Bank Danych Lokalnych*).

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[1] In the newest version of the ranking (2016), the SMEs was defined as an company with revenue between PLN 3 million and 200 million (1 EUR = 4,4 PLN as of Dec. 2016) [source: http://gazele.pb.pl/static/kryteria]

[2] This difference results from the fact that some companies meet the criteria for the Business Gazelle in several editions of the ranking.

4. Results

The number of fast-growing small and medium enterprises (SMEs) demonstrates clear differences in the rank of the cities in Podkarpackie region. The dominant position occupies Rzeszów – the role of the city as a focus of fast-growing SMEs, far exceeds its importance counted by the number of its population. In absolute terms (number of companies), four centres have a strong position: Stalowa Wola, Mielec, Dębica and Krosno. The other two former provincial cities – Przemyśl and Tarnobrzeg have a weak position on their background which give way much smaller cities in the number of gazelles (Table 2). Among the other centres Jasło highlights the strong position – both in absolute terms and in relation to the population, while Jarosław has got a weak position.

The approximation of the impact of the given centre may be the formation of a number of fast-growing SMEs in the localities hierarchically subordinate to them (belonging to their urban region). The spreading effects can be clearly seen only for Rzeszów which is surrounded by smaller towns characterized by a relatively high level of fast-growing SMEs (Fig. 1). Taking into account all urban centres can further notice significant differences in Podkarpackie region. In particular, it draws attention to the weakness of the eastern part of the region (the former Region of Przemyśl).

There was an absolute increase in the number of fast-growing SMEs in all large and medium cities of Podkarpackie Region in the years 2005–2013 which is consistent with the general trend on GDP growth in the region during this period. Most gazelles were based in Rzeszów followed by Stalowa Wola. The number of such companies in the towns in the eastern part of the region (Przemyśl and Jarosław)

Table 2. Distribution of gazelles of business in the major towns in Podkarpackie Region

Town [NUTS3]		Share in urban population of the region	Total number of gazelles 2001–2014	Share of gazelles (all towns in the regions = 100)	Number of gazelles per 10 thous. inhabitants*	Difference between the number of gazelles in 2014 and 2005 year
Rzeszów	[PL325]	21.0	429	28.2	25.2	+21
Przemyśl	[PL324]	7.2	61	4.0	9.2	+4
Stalowa Wola	[PL326]	7.2	118	7.8	18.1	+10
Mielec	[PL326]	6.9	132	8.7	21.6	+1
Tarnobrzeg	[PL326]	5.5	46	3.0	9.3	+1
Dębica	[PL326]	5.3	114	7.5	24.2	+1
Krosno	[PL323]	5.3	103	6.8	21.6	+2
Jarosław	[PL324]	4.4	33	2.2	8.3	+5
Sanok	[PL323]	4.4	59	3.9	15.0	+2
Jasło	[PL323]	4.1	90	5.9	24.1	0

* average number of inhabitants in the years 2001–2014

Source: based on data of rankings Gazele Biznesu in the years 2001–2014 and data of Statistical Council Office of Poland.

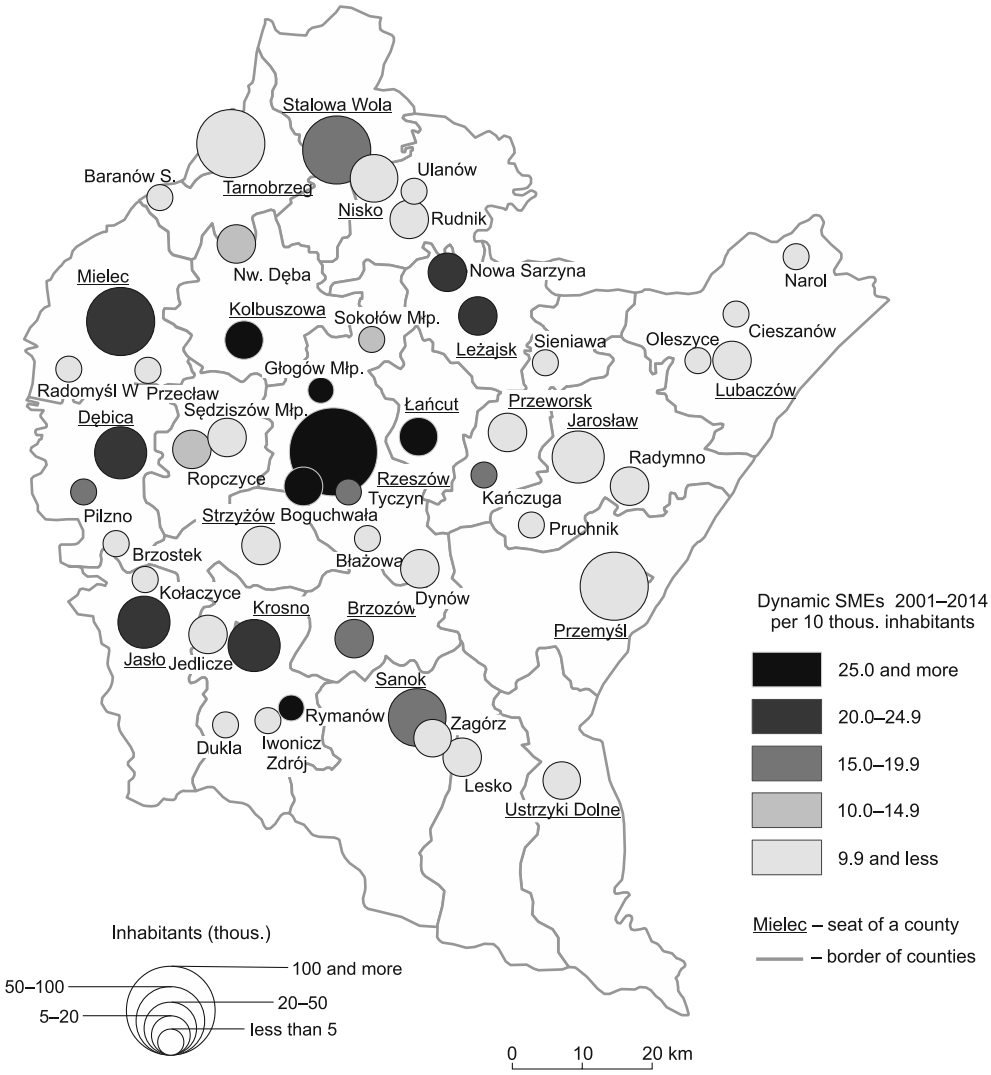

Fig. 1. Distribution of Gazele Biznesu in the towns of Podkarpackie Region
Source: based on data of rankings Gazele Biznesu in the years 2001–2014 and data of Statistical Council Office of Poland.

also noticeably increased while other centres showed a much smaller dynamics. In total, the only centre with a large number of companies, their high saturation (per 10 thousand inhabitants) and high dynamics in the analysed period was Rzeszów.

The observed regularities in the number of gazelles quite clearly refer to the differentiation of gross domestic product by statistical sub-regions (NUTS 3)[3]. The Rzeszów sub-region is characterized by the highest GDP per capita, and also

[3] A sub-region (NUTS 3) is a smallest spatial unit for which data on GDP in Poland are available.

Table 3. Level and dynamics of GDP and distribution of dynamic SMEs

Sub-region (NUTS 3)		GDP per capita in 2011 (Poland = 100)	Dynamics of GDP (2000–2011) in %	Number of gazelles per 10 thous. inhabitants	Dynamics of gazelles (2005–2014)*
rzeszowski	[PL325]	81.1	63.5	11.71	96.2
przemyski	[PL324]	52.7	26.1	3.83	146.2
krośnieński	[PL323]	58.5	31.5	6.75	22.5
tarnobrzeski	[PL326]	70.6	48.2	9.27	43.3

* due to year to year variation index of dynamics is calculated basing on two years average
Source: based on data of rankings Gazele Biznesu in the years 2001–2014 and data of Statistical Council Office of Poland.

the highest dynamics of its growth, unlike the Przemyśl sub-region (Table 3). The distance between the sub-regions measured by the number of dynamic small and medium-sized businesses is even greater than the corresponding variation in the level of GDP. This applies, in particular, to a very weak position of the Przemyśl sub-region. Although the period 2004–2014 was characterized by a highest growth in the gazelles in the latter sub-region, the high value of the indicator is mainly due to a very low initial level.

Majority of gazelles active in Podkarpackie region represents medium- and low-technology sectors (Fig. 2). Firms classified as high-tech industries (mainly pharmaceuticals) and medium high industries (mainly automotive) are concentrated in the towns of rzeszowski and tarnobrzeski sub-region (Mielec, Dębica and Stalowa Wola), to a smaller degree in krośnienski sub-region. Quite surprising, no single company active in aviation industry (there are about 30 active companies in the region) were included the Gazelles of Business ranking. Knowledge-intensive services (3.8% of all gazelles) shows strong concentration in Rzeszów sub-region (61%), followed by Krosno and Mielec. It is worth stressing the lagging position of Przemyśl (the second largest town in terms of population) as a site of knowledge-intensive gazelles.

The technological structure of fast-growing SMEs and all companies registered in Podkarpackie region are strikingly different (Fig. 2). The main difference is the much larger share of fast-growing companies in the manufacturing sector, while knowledge-intensive services are strongly underrepresented (Fig. 1). More detailed sectoral disaggregation reveals, that the companies in medium-high technology branches are the most successful. This suggest, that in case of Podkarpackie a semi-peripheral region, devoid of large metropolitan centre, the manufacturing industries do play a role of major propulsive activities, especially outside Rzeszów.

In terms of concentration of all registered in Podkarpackie region medium- and high-tech industry companies, definitely the leaders are the two towns – Rzeszów and Mielec which possess respectively 23 and 21% of all such bodies in the cities of the Region[4]. A larger clusters of such entities are Dębica, Krosno and Stalowa

[4] Mielec is by far the largest concentration of companies producing parts and components for automotive industry in the region (over 80 registered companies) as well as three other industries classified as medium-high on two digit level: manufacture of electric equipment (NACE 27), machinery and

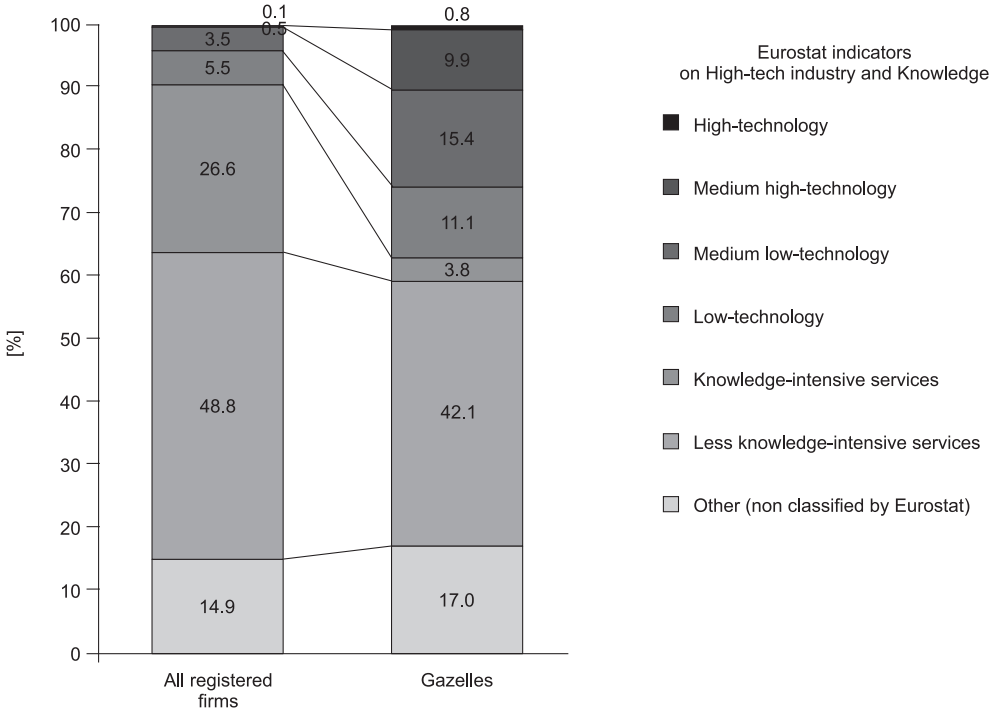

Fig. 2. Comparison of technology level: all registered enterprises and gazelles in Podkarpackie region in 2014

Source: based on data of rankings Gazele Biznesu in the years 2001–2014 and data of Statistical Council Office of Poland.

Wola, and after them Przemyśl, Jasło and Tarnobrzeg. The role of Stalowa Wola, Tarnobrzeg and Przemyśl is thereby significantly smaller than their population potential would indicate (Table 4). Among all medium-sized cities in the region, the least medium and high technology manufacturing companies are by far located in Sanok, and Jarosław. Rzeszów was characterized by the most dynamic development of new medium- and high-tech industry companies in the year 2009–2014, where it was founded nearly 1/3 of all entities registered at that time in the cities of the Region. Above-average dynamics was characterized by Mielec, Dębica and Krosno, in the other centres it was much smaller, and the lowest in Jarosław, Sanok, Stalowa Wola and Przemyśl (Table 4).

The undisputed leader in the number of entities in the branches of services classified as knowledge-based is Rzeszów (nearly 1/3 of all such entities in the cities of the Region). Significant clusters of those involved in knowledge-intensive services are also Krosno, Mielec, Przemyśl and Stalowa Wola, and after them Tarnobrzeg,

equipment n.e.c (NACE 28) and manufacture of other transport equipment (NACE 30). The value of location quotient (LQ) for those industries (exceeding 10 for the automotive and 2,0 for the other branches) indicate a strong specialisation of Mielec. Rzeszów is specialised in pharmaceuticals industries (LQ=1,6) and to lesser degree in manufacture of electric equipment (LQ =1,2).

Table 4. Concentration of knowledge based sector in the towns of Podkarpackie Region

Town	Share in urban population of the region	Share in all registered companies classified as medium-high and high-technology industries	Share in newly registered in the years 2009–2014 companies classified as medium-high and high-technology industries	Share in all registered companies classified as knowledge intensive services	Share in newly registered in the years 2009–2014 companies classified as knowledge intensive services
Rzeszów	21.0	23.0	31.6	30.7	32.4
Przemyśl	7.2	3.8	3.0	6.3	6.3
Stalowa Wola	7.2	5.5	2.7	5.6	5.6
Mielec	6.9	21.2	12.9	6.3	6.4
Tarnobrzeg	5.5	3.3	4.9	4.9	5.0
Dębica	5.3	7.7	8.7	4.2	4.2
Krosno	5.3	6.2	7.6	6.9	6.2
Jarosław	4.4	2.0	1.9	3.9	3.6
Sanok	4.4	2.3	1.5	4.0	3.9
Jasło	4.1	3.6	4.6	4.0	3.7

Source: based on data of Statistical Council Office of Poland.

Dębica, Sanok and Jasło and Jarosław. Rzeszów and Krosno are both centres whose importance in the field of knowledge-intensive services is particularly high, compared to their share in the population of the cities in Podkarpackie region. The rank of other cities analysed in the test is much smaller.

Rzeszów is the only city in the Region where the dynamics of the emergence of new players in the sector of knowledge-intensive services in the period 2009–2014 substantially exceed its role as an already created place of concentration of such services. As a result, the position of the capital of the Region in five years 2009–2014 significantly increased. Other towns mostly maintained their position at the expense of mainly smaller centres.

All in all, in the five years 2009–2014, the main regularity in terms of the creation of new knowledge-intensive activities in the towns of Podkarpackie region in manufacturing and services industries was strengthening the leading position of Rzeszów.

5. Conclusions

As Herbst (2012, p. 203) pointed out 'sometimes, lack of data leads to innovative solutions'. In this article, the author used data from the Business Gazelles ranking as a data source on fast-growing small and medium-sized enterprises. Most studies analysing the level of development do not expressly refer to the degree of development of propulsive activity, but rather to the effects of its operation (e.g. the unemployment rate, the structure of the economic base, residents' income and

local governments). In this study it was found that fast-growing SMEs play an important role as propulsive industry and they can be used as the indicator of the role of growth centre performed by a particular city. Moreover, it was estimated the dynamics of development of (potentially) innovative entities, by examining the rate of formation of companies classified as medium-high and high-tech industry and knowledge-intensive services.

The results of the study delivered a strong support to the Dej et al. (2011) thesis on the manufacturing sector as the potentially the major propulsive activities in the peripheral regions of Eastern Poland. Indeed, it was medium-high technology industries followed by high-technology industries that showed the largest ratio between share of fast-growing companies (gazelles) vis-à-vis overall share in the registered entities in Podkarpackie region. By contrast, the knowledge-intensive services were strongly underrepresented in the set of rapidly growing firms, a clear sign of specific regional pattern of the economy and settlement network of Podkarpackie region (low urbanisation, no large metropolitan centre).

The survey revealed strong differentiation within medium and large cities in Podkarpackie region in the number of fast growing SMEs and the rate of formation of potentially innovative economic activities. All techniques included in the analysis determining the level of economic development and its dynamics indicate a strong and growing position of Rzeszów as a regional growth centre[5]. This demonstrates the growing role of metropolisation processes even in the case of poorly urbanized Region, with relatively small – compared to the largest Polish cities – regional centre. The author claim that it would be an oversimplification to see in the political and administrative factors the main catalyst of this process. Without a doubt, as indicated by Zaborowski (2013), the designation of a relatively small city as the capital of a vast region will accelerate its economic development. The leading position of this city in terms of fast-growing small and medium-sized businesses and high number of private entities in knowledge-intensive industries indicates that the factors responsible for the observed dynamics of the process of development of the city are more complex.

The situation of sub-regional and potentially sub-regional centres is quite diverse. In the light of the research results neither Tarnobrzeg nor Przemyśl has been played the role of dynamic growth centre in the last 10–15 years. The position of the sub-regional growth centre is hosted by Krosno, although the dynamics of its development in the last decade has been mostly moderate. It is reflected in both relatively weak GDP growth and an increase in the number of business gazelles. Stalowa Wola and Mielec aspire to the group of potential sub-regional growth centres. The latter city, in the light of the indicators used, is seen today after Rzeszów as the second strongest economic centre in Podkarpackie region. Mielec is undoubtedly one of the best examples in Poland of successful mono transformation industrial centre after 1990, whose main sources should be seen in a unique scale of Polish quality management structural change and the consequences of the implementation of the

[5] As Makieła and Sobala-Gwosdz (2009) prove, it is unjustified to include Rzeszów as a supra-regional centre.

strategic vision of the city (see: Domański & Gwosdz 2005; Sobala-Gwosdz 2005; Jarczewski & Gwosdz 2007). However, Mielec should be further seen as a potential growth pole of the sub-regional rank, mainly because of weak spreading effects of the development in the area of its base. On the other hand, Stalowa Wola, the largest city centre in the north of the Region, is still in transition from the monofunctional city to the multi-service industry centre. A major challenge for the city will be – in the light of demographic Central Statistical Office's projections – shrinking demographic potential. Among the other urban centres of Podkarpackie region in the rank of supra-local, i.e. those whose area of influence – at least in some categories – goes beyond their own district is today Dębica – the economically strongest city. The emergence of Dębica as an independent centre in the sub-regional rank is hampered by its location between Rzeszów and Tarnów. It might be better to consider the area of Dębica stretching to Łańcut as shaping the axis of dynamic economic development, the core of which is Rzeszów.

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