IN SEARCH FOR REGIONAL CLUSTERS IN LATVIA

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Abstract

Regional business clusters are an important component of the regional economy. The overall aim of the present research is to identify regional clusters in the statistical regions of Latvia. The present paper describes the concept of regional clusters, and two general and widely used regional cluster identification methods, i.e. the shift-share and location quotient methods were employed in it. These methods were used to analyse statistical data for the statistical regions of Latvia while examining the strongest industries and the specializations of the regions. By means of these methods, it was possible to identify the regional industries that had a potential to establish strong regional clusters. The research findings indicated that the strongest regional industries were located outside the Riga region. Industries having high regional growth rates and location quotients were identified in Pieriga and Vidzeme regions – postal and courier activities and forestry and logging, respectively. Presumably supplementing industries were identified in the regions of Kurzeme, Zemgale, and Latgale, which had either high regional growth rates or high location quotients, for instance, the manufacture of fabricated metal products and basic metals and the manufacture of wearing apparel and textiles in the Kurzeme region and the manufacture of fabricated metal products and motor vehicles, trailers, and semi-trailers in the Zemgale region. This research paper is the first attempt towards a broader identification of clusters in Latvia's regions, which, to the best of the authors' knowledge, is not presently carried out in Latvia. Regional cluster identification leads towards better understanding of regional composition and the results of mapping regional clusters are practically applicable in planning regional development and in the process of planning cluster support programmes, as it enables support measures to be focused on particular industries, thus increasing effectiveness of the support programmes.

Keywords: regional clusters, shift-share, location quotients, regional development

1. INTRODUCTION

First discussed by Marshall in the 1920s (2009) as industrial districts, the concept of clusters was viewed in the works of several authors in the 20th century (Krugman, 1991a, 1991b, 1993; Becattini, 1979, 1989, 1990, 2004; Scott, 1988, 1994, Scott and Angels, 1987). However, the concept of clusters has gained popularity in the modern economic literature since the work of Porter (1990, 1998a, 1998b, 1998c, 2000). Already in 1990, Porter classified business clusters into two types – as a non-agglomerated industrial cluster or as an agglomerated regional cluster, but in 1998 he defined a cluster as "*a geographically proximate group of interconnected companies and associated institutions in a specific field based on commonalities and complementarities*", focusing on regional clusters that emerge and develop in a certain geographic area, which is the research object in this paper.

Presently, an increased attention is being paid to the concept of clusters at both the international and local level. International organizations such as the Organization for Economic Co-operation and Development (OECD) (OECD 2007a, 2007b, 2007c, 2005a, 2005b, 2001, 1999) are researching regional clusters and their impact on the global and regional economy. The World Bank is looking

for opportunities to implement cluster strategies (Murphy *et.al.* 2009; Boari 2001; Otsuka and Sonobe 2001) and the European Commission is collecting data on cluster tendencies, statistics, development (Regional Clusters in Europe 2002; the Concept of Clusters... 2008; Innovation Clusters in Europe... 2008). The European Commission is also supporting different initiatives such as the Cluster Innovation Platform, the European Cluster Observatory, and others.

Along with the international organizations, researchers also focused on cluster studies. Several authors have tried to define clusters by using specific indicators. According to some researchers, regional clusters are a type of cooperation (Knorringa and Mayer-Stamer, 1998), the vertical and horizontal form of network (Pachura, 2010; Cook, 2010), and companies that produce the same product (Arthur, 1990; Sorenson and Audia, 2000), share a common vision and support infrastructure (Cooke and Huggins, 2003) in geographical proximity (Saxenian, 1994). Garanti and Zvirbule-Berzina (2013) suggested defining regional clusters based on five cluster dimensions. The main dimension of any type of cluster is enterprises working in the same industry. Marshall (2009) in early 1890s built his industrial district theory based on companies from the same industry. Cluster theory nowadays suggests that companies from the same industry cooperate and compete and complement each other (Porter, 1998a, 1998b, 1998c, 2000). Companies can be related to buying and selling relations or cooperate in innovation and the development process of a new product or service, or jointly work to attract a skilled workforce (Cortright and Mayer, 2001; Barkley and Henry, 1997). In a regional cluster, companies from complementary industries and supportive institutions play an important role in creating formal and informal relations between enterprises, government institutions, non-governmental organizations; financial, educational, research, and other institutions (Porter, 1998a, 1998b, 1998c, 2000; Saxenian, 1994; Shakya, 2009; Rocha, 2004; Rocha and Sternberg, 2005). All the previously mentioned factors and dimensions are located in geographical proximity, forming the most important dimension of regional cluster (Porter, 2000; Delgado et. al., 2010, 2012). Based on the previously described regional cluster dimensions, the authors (Garanti and Zvirbule- Berzina, 2013) have developed a definition for regional clusters: a regional cluster is a form of cooperation and interaction between companies in the same industry, involving related and complementary businesses, scientific, educational and governmental as well as other related institutions in the same region.

Clusters are offering companies easy access to important resources, lower transport costs, access to customers and the workforce (Marshall, 2009; Porter, 2000; Krugman, 1991), lower transaction costs, access to specialized services (Scott, 1988, 1994; Scott, Angel, 1987), access to infrastructure and competitive environment (Lin, Tung Huang, 2006) that lead to higher efficiency and productivity (Lin and Li Yang, 2011; Rizov et al., 2012). Cluster environment stimulates interactions between business and knowledge centres (Ciu and Wei, 2012; Gebreeyesus and Mohnen, 2011) leading to transfer of knowledge both internally (in the company) and externally (between companies and institutions) (Chyi et al., 2011; Hemertet al., 2012) and higher innovation capacity. All the factors combined have a positive impact on firm growth (Avenel et. Al., 2005; Globerman et al., 2007), employment growth within the companies (Baptista, Preto, 2011; Beaudry and Swann, 2009) and companies' survival rate (Mazzola and Bruni, 2000; Renski, 2011), therefore, clusters are an important tool for regional growth and development.

The present research is a beginning for a broad identification and mapping of clusters in Latvia's regions. The overall **research aim** is to identify the regional industries in which preconditions − such as growth rates of an industry are higher than the average in the country and the industry is concentrated in a particular region − exist for the development of clusters. The **hypothesis of the research** is: each region has specific industries with high potential of forming clusters. The **research materials and methods** for the first chapter include monographic studies of wide scientific literature, analysis and synthesis methods to describe regional cluster identification methodology. In the following chapter, regional clusters are identified using Shift- Share analysis and Location Quotents and results are discussed.

2. REGIONAL CLUSTER IDENTIFICATION METHODS

The identification of regional clusters is a complex process (Garanti and Zvirbule-Berzina, 2013), and economic literature suggests several methods for identifying regional clusters (Vom Hofe and Dev Bhatta, 2007; Zizka, 2010; Stejkal, 2010, Garanti and Zvirbule-Berzina, 2013). Since statistical information is limited, a large number of the methods are based on employment statistics, assuming that a concentration of employees in a certain industry and region as well as regional growth indicates the existence of a regional cluster. It is not possible to determine and identify the type of cluster and the life cycle and development stage of cluster by means of quantitative statistical methods, yet, it is possible to identify the industries in which clusters have already emerged or might emerge, as a "critical mass" of companies and labour is built up and the industry's growth is the fastest in the region. Based on literature studies, the authors employed two widely recognised methods in identifying regional clusters that focus on identifying the strongest regional industries and the specialization of a region.

Shift-share analysis is used to identify industries in the region that are growing faster than average in the country, showing competitive industries in the region (Aya-ay and Prantilla, 2007). This analysis was founded in the 1960s by Ashby (1964) and Fuchs (1962). Nowadays shift-share analysis is used in economic literature to identify regional clusters (Altena and Heijman, 2007; Heijman and van der Heide, 1998; Acs and Ndikumwami, 1998; Zaccomer and Mason, 2011). Shift-share is descriptive analysis that helps to identify fast growing industries in the region, but analysis is not giving any explanation how the region gained an advantage in the particular industry (Hoppes, 1997; Stevens and Moore, 1980). Shift-share analysis is using employment data and dividing employment growth into three components:

- National share (NS) - explains how much of the regional industry's growth is explained by the overall growth of the national economy: if the nation's whole economy is growing, it is expected to have positive industry growth in the region;
- Structural component/industry mix (IM) - represents the share of the regional industry growth explained by the growth of the specific industry at the national level;
- Regional shift (RS) - explains how much of the change in a given industry is due to some unique competitive advantage that the region possesses.

The authors used Ashby's (1964) methodology to calculate NS (Formula 1), IS (Formula 2) and RS (Formula 3).

$$NS_{j;k} = NOD_{j;k;t} \times (\frac{NOD_{v;t}}{NOD_{v;t-1}} - 1)$$

(1)

$$IS_{j;k} = NOD_{j;k;t} \times ((\frac{NOD_{v,k,t}}{NOD_{v;k,t-1}} - 1) - (\frac{NOD_{v;t}}{NOD_{v;t-1}} - 1))$$

(2)

$$RS_{j;k} = NOD_{j;k;t} \times ((\frac{NOD_{j,k,t}}{NOD_{j;k,t-1}} - 1) - (\frac{NOD_{v,k,t}}{NOD_{v;k,t-1}} - 1))$$

(3)

Where:
- NOD –   number of employees;
- v –   country;
- j –   region;
- k –   industry;
- t –   reporting year (year 2012);
- t-1 –   base year (year 2005).

Within the context of the regional economy, the most important indicator is the change in the regional economy due to RS.

Location quotient (LQ) shows that regional specialization is an important factor in cluster establishment and growth phase (Audretsch and Feldman, 2004). The LQ method is widely used to identify regional clusters (Guimaraes and Woodward, 2009). Porter's cluster mapping project (Cluster Mapping Project, 2003; Porter, 2000), the EU cluster mapping project (Cluster Mapping, 2008) and researchers (Szanyi, 2012; Szanyi et. al. 2010; Lazzeretti et al., 2009) used the LQ method to identify regional clusters. The method's main advantage is its relatively simple application and calculation by using employment data, while some researchers criticize the method because it is static and does not look at the trends over the years (Szanyi, 2012; Szanyi et. al. 2010). To overcome this problem, some researchers (Primont and Domazlicky, 2008) suggest using LQ together with shift-share and dynamic analysis. If LQ<1 - employment intensity in the region is lower than the national average; if the LQ=1 - employment intensity in the region is equal to the national average; if LQ>1 - employment intensity in the region is higher than the national average (the region is specialized in the particular industry).

A location quotient (LQ) is calculated according to Formula 4 which is based on the Cluster Mapping Project's methodology (Cluster Mapping Project, 2003).

$$LQ_{j;k} = \frac{NOD_{j;k} / NOD_j}{NOD_{v;k} / NOD_v}$$

(4)

Where:
- NOD – number of employees;
- v – country;
- j – region;
- k – industry.

Scientific literature presents no single opinion on the minimum LQ which might indicate the potential emergence and development of regional clusters in an industry; yet, Malizia and Faser (1999) suggest assuming a localization quotient of 1.25 to be sufficient.

Both methods of regional cluster identification methods are using employment data. According to authors (Porter, 2001; Zizka, 2010; Stejkal, 2010, Garanti and Zvirbule-Berzina, 2013) the main benefit of these data is its easy access. But it also has a serious limitation as geographic concentration is calculated only according to the number of employees in the current industry and can exclude high-tech and low manpower industries from the result, as well as show high cluster potential to industries with only one or few large plants in the region. Likewise, in Latvia the only available data for mapping are the employment data at the Central Statistical Bureau for the years 2005 and 2012.

3. REGIONAL CLUSTER IDENTIFICATION RESULTS

The regional cluster identification methods were employed in the analysis of the statistical regions of Latvia, and the results of the regional cluster identification are examined further in the paper. Table 1 presents the results of the regional cluster identification for the statistical regions of Latvia using the employment data for the years 2005 and 2012.

In the Riga region in 2012, compared with the base year, the total number of jobs rose by more than 6 thousand, yet, in certain industries, the number of jobs increased much faster particularly in the result of regional competitiveness and growth. The industry with the highest RS was retail trade. As a result of the overall growth of the national economy (NS), the number of jobs in this industry in the Riga region declined by 4521. In the result of growth of the specific industry (IS) in the Riga region, the number of jobs decreased by 4971. Yet, in the result of regional growth (RS), 17 thousand more individuals were employed in the retail trade industry in the Riga region. The

industries with a high RS were as follows: education, public administration and defence, warehousing and support activities for transportation, and human health activities. After analysing the location quotients, one could conclude that the industries with the highest regional concentration were the industries of air transport, gambling, insurance, pharmaceuticals, and financial services, yet, their location quotients were relatively low.

In the Pieriga region in 2012, the total number of jobs rose by 13 thousand. The industries with the highest share of regional economic growth were postal and courier activities. Besides, in the result of the Pieriga region's growth in 2012, new jobs were created in wholesale trade, retail trade, as well as warehousing and support activities for transportation, which pointed to stable growth in the region's industries. The key specialization in the Pieriga region over the entire period of analysis was air transport and postal and courier activities. Both industries employed on average 6 times more employees than elsewhere in Latvia. Besides, the Pieriga region had specialized in remediation activities, pharmaceuticals, and quarrying.

In the Vidzeme region in 2012, the total number of jobs decreased by 7 thousand, however, an increase in the number of jobs was observed in certain industries particularly owing to the regional growth. The industry with the highest share of regional economic growth was electricity, gas, steam, and air conditioning supply, as 752 jobs were created owing to the regional growth. Other industries with high regional economic growth were forestry, trade and repair of motor vehicles and motorcycles, and others. The Vidzeme region mainly specialized in manufacturing industries, for instance, the location quotient for mining support service activities was equal to 12, thus indicating that 12 times more individuals were employed in this industry in Vidzeme compared with the average in Latvia. In the Vidzeme region, forestry and logging had not only high growth rates, but also a high location quotient.

Over the period of analysis in the Kurzeme region, the total number of jobs declined by 13 thousand. Yet, regardless of the decrease in the total number of jobs, an increase in the number of jobs was observed in certain industries. The industry with the highest increase in the number of occupied jobs in the result of growth of the regional economy (RS) was the manufacture of fabricated metal products, except machinery and equipment. In this industry in the Kurzeme region, owing to the overall growth of the national economy (NS), the number of occupied jobs decreased by 105, while owing to the industry's structural component (IS) it declined by 203; however, in the result of regional growth (RS), the number of occupied jobs rose by 740. In the Kurzeme region, the industries with a high share of regional economic growth (RS) were construction, the manufacture of wearing apparel, legal and accounting activities, and the manufacture of food products. The key specialisation in the Kurzeme region was the manufacture of basic metals with 8 times more employees than elsewhere in Latvia. Besides, the region had specialised in fishing, textiles, the manufacture of coke and refined petroleum products, and other manufacturing. In general, one could conclude that in this region, too, just like in Vidzeme, industries of high specialisation were associated with manufacturing.

Table 1

Industries with the highest regional shift and location quotents in the statistical regions of Latvia in year 2012

Industry	National Share	Industry Mix	Regional Shift	Industry	Location Quotient
Riga region					
Retail trade, except of motor vehicles and motorcycles	-4521	-4971	17268	Air transport	1.47
Education	-3504	1001	14053	Gambling and betting activities	1.47
Public administration	-3359	-4410	13736	Insurance, reinsurance and	1.47

Industry	National Share	Industry Mix	Regional Shift	Industry	Location Quotient
and defence; compulsory social security				pension funding, except compulsory social security	
Warehousing and support activities for transportation	-849	1115	11096	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1.47
Human health activities	-1821	2171	6699	Financial service activities, except insurance and pension funding	1.46
Pieriga region					
Postal and courier activities	-7	9	4592	Air transport	6.44
Wholesale trade, except of motor vehicles and motorcycles	-266	-292	2556	Postal and courier activities	5.91
Retail trade, except of motor vehicles and motorcycles	-1525	-1676	2325	Remediation activities and other waste management services	4.50
Warehousing and support activities for transportation	-129	169	2212	Manufacture of basic pharmaceutical products and pharmaceutical preparations	3.54
Education	-1085	310	1562	Mining and quarrying	2.57
Vidzeme region					
Electricity, gas, steam and air conditioning supply	-52	21	752	Mining support service activities	11.85
Forestry and logging	-137	125	442	Manufacture of other non-metallic mineral products	3.64
Wholesale and retail trade and repair of motor vehicles and motorcycles	-104	-114	433	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	3.42
Libraries, archives, museums and other cultural activities	-10	-6	401	Forestry and logging	3.09
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-574	-1105	370	Mining and quarrying	2.70
Kurzeme region					
Manufacture of fabricated metal products, except machinery and equipment	-105	-203	740	Manufacture of basic metals	7.81
Construction	-254	-40	679	Fishing	6.00

Industry	National Share	Industry Mix	Regional Shift	Industry	Location Quotient
Manufacture of wearing apparel	-197	-378	582	Manufacture of textiles	2.67
Legal and accounting activities	-2	8	451	Manufacture of coke and refined petroleum products	2.66
Manufacture of food products	-434	-836	335	Other manufacturing	2.51
Zemgale region					
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-285	-550	799	Manufacture of tobacco products	4.63
Manufacture of fabricated metal products, except machinery and equipment	-55	-105	770	Manufacture of motor vehicles, trailers and semi-trailers	4.25
Social work activities without accommodation	-111	133	564	Other manufacturing	3.89
Wholesale trade, except of motor vehicles and motorcycles	-138	-151	541	Crop and animal production, hunting and related service activities	3.82
Real estate activities	-109	69	475	Mining and quarrying	3.24
Latgale region					
Manufacture of food products	-257	-496	826	Manufacture of other transport equipment	6.06
Manufacture of fabricated metal products, except machinery and equipment	-35	-66	626	Manufacture of machinery and equipment not elsewhere specified	2.97
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-267	-514	402	Social work activities without accommodation	2.61
Public catering	-69	92	398	Manufacture of electrical equipment	2.59
Libraries, archives, museums and other cultural activities	-15	-9	394	Water collection, treatment and supply	2.08

Source: authors' calculations

In the Zemgale region, over the period of analysis, the total number of jobs decreased by 7 thousand. Regardless of this decrease, by means of shift-share analysis, industries in which an increase in the number of jobs took place owing to regional economic growth were identified in the region. The industries with the highest share of regional economic growth was the manufacture of wood and cork, the manufacture of fabricated metal products, except machinery and equipment, as well as social work activities without accommodation, wholesale trade, and real estate activities.

The Zemgale region had specialised in the manufacture of tobacco products and the manufacture of motor vehicles, trailers and semi-trailers – in these industries in Zemgale, 4 times more employees were employed than elsewhere in Latvia. Besides, high specialisation in the Zemgale region was observed in industries such as other manufacturing, crop and animal production, and mining and quarrying.

In the Latgale region, over the period of analysis, the total number of jobs fell by 14 thousand. In the Latgale region, strong industries were identified, in which an increase in the number of jobs was observed owing to regional factors, regardless of the decrease in the total number of occupied jobs. The industry with the highest share of regional economic growth (RS) was the manufacture of food products. A high RS was also specific to the manufacture of fabricated metal products and the manufacture of wood and cork products. In the Latgale region, the manufacture of other transport equipment was an industry with the highest location quotient. Besides, the region had specialised in the manufacture of machinery and equipment not elsewhere specified social work activities without accommodation, and the manufacture of electrical equipment.

The results show a significant gap between natural clusters that form in Latvia and are identified in the research and policy promoted clusters. During the planning period of 2009 and 2015 government and EU funds are available for cluster establishment and development. Funds have supported the establishment of 13 clusters in Latvia:

1) Clean technology cluster,
2) Light industry cluster,
3) Chemistry and pharmacy cluster,
4) Furniture producers cluster,
5) Food producers cluster,
6) IT cluster,
7) Mechanical engineering and metalworking cluster,
8) Electrical engineering and electronics cluster,
9) Timber construction cluster,
10) Latvian sustainable tourism cluster,
11) Industrial energy efficiency cluster,
12) Space technology cluster in Ventspils,
13) Gauja national park cluster in Sigulda.

Policy support is concentrated in industries that, according to the cluster identification methods, do not show fast growth and development in the regions. According to researchers in Hungary (Szanyi, 2012; Szanyi et. al. 2010) the main reason for it is that policy planning is not based on prior empirical analyses. To decrease the gap between policy supported and natural clusters, authors suggest using empirical analysis prior implementing support programmes.

4. CONCLUSIONS AND RECOMMENDATIONS

The present research is a beginning of the broad identification and mapping of clusters in Latvia's regions; yet, the initial results point to several trends in the statistical regions of Latvia.

- In the Riga region, the industries with the highest regional growth rates and concentration indicators were changeable and inconstant, and this region, according to the calculation of location quotients, had no high specialization in any industry. Such results could be expected and were in line with the researches already performed (Szanyi, 2012; Szanyi et al. 2010), which indicated that the methods employed in the present research did not point to strong industries, in which regional clusters might emerge, in the capital city owing to the multifunctionality of it.
- In the Pieriga region, data pointed to high specialization and regional growth in the industries of postal and courier activities.

- In the Vidzeme region, the industries with a high RS and LQ were forestry and logging.
- In the Kurzeme region, the industries with a high RS and LQ were several manufacturing industries, including the manufacture of fabricated metal products and basic metals, wearing apparel, and textiles, which presumably were supplementing industries; however, in order to assure it, a more detailed research has to be conducted.
- In the Zemgale region, just like in the Kurzeme region, two presumably supplementing industries had a high RS and LQ – the manufacture of fabricated metal products and the manufacture of motor vehicles, trailers and semi-trailers.
- In the Latgale region, too, industries which were presumably supplementing ones and the RS or LQ of which were high, i.e. the manufacture of fabricated metal products and the manufacture of machinery and equipment not elsewhere specified, were identified.

The findings of the analysis point that only in a few cases industries with a high share of regional economy are also concentrated in the particular region (for instance, postal and courier activities in the Pieriga region and forestry and logging in the Vidzeme region). Most of the industries with a high share of regional economy are not concentrated in the region, and it is not presently possible to determine which analysis points to the presence and possibility of regional clusters more precisely and whether in the case of possibility of regional clusters both indicators – RS and LQ – have to be high. Besides, the analysis points to presumably supplementing industries having either a high RS or high LQ.

Presently, one can conclude that the findings are general and it is necessary to conduct further research by employing broader research methods and comparing results of these methods in order to identify regional clusters in the statistical regions of Latvia. After broad identification results are practically significant as it can contribute towards industrial policy development and regional policy planning.

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