Possibilities of Clusters and Cluster Initiative Creation in Selected Sectors within Slovak and Czech Regions

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Abstract: The theory of clusters often develops as a symbiotic relationship between innovation and geographic concentration of companies working within similar areas of industry. Clusters are an important part of regions and during the past years their concept became very popular which is reflected by a growing number of policies and initiatives in the EU countries. The synergies created inside a cluster enhance productivity of companies and their economic performance. An appropriate method of cluster identification is a key element for smart specialization and development of regions. The literature provides several methods for cluster identification. The aim of this paper it is to determine possibilities of cluster creation, mainly to detect the agglomerated sectors, respectively geographic concentration which can be used for the industrial clustering process. This observation offers a new perspective of cluster identification in two neighbouring countries of the Slovakia and Czech Republic and their regions. Five selected areas of economic activities were examined in twenty-two regions of both countries by means of the Location Quotient. Statistical data was provided from official statistic database. Preconditions for the cluster existence were compared to the real clusters operating in those regions. It was shown that the existence of a cluster is not always a condition for employment in the area of its activity and regional disposition. The other outcome includes the fact that quantitative method such as the Location Quotient can vary during the time and that is why calculations in longer periods of time are necessary. The originality of this paper consists of the identification of strong economic perspectives of industrial clusters in regions as the essential base for formation of clusters and their subsequent development.

Key-Words: Cluster, cluster creation, cluster identification methods, location quotient, Slovakia and Czech Republic regions.

1 Introduction

Small and medium-sized enterprises have to face enormous disadvantages in comparison to the large-scale companies, they are not able to use e.g. economy of scales, do not have sufficient capacity and resources for research, education of employees, information acquisition, etc. [32]. This could be an argument for their membership in innovative clusters which would provide them with security, secure their ability to survive and be competitive within the long-term period of time. The interest in cluster establishment is expressed across various industrial branches regardless their economic performance [46]. Cluster, in its subsistence, helps to increase specialisation, provokes government to invest capital in the sector and the region at the same time. This fact, of course, brings the positive effect of region development. This is the reason why clusters are generally considered an important factor which fosters the prosperity of regions, influences direct foreign investments, creates the environment suitable for innovation and knowledge creation and thereby it is a benefit for national economy. Of course, that is why the regions with strong and vital clusters are considered to be innovative leaders. The possibilities of benefiting from the cooperation between enterprises and other institutions within the cluster help to eliminate or at least reduce barriers

which have to be faced not only by small and medium-sized enterprises and which show high vulnerability in the competitive area of regional, national and international markets. Joining a cluster provides benefits to large-scale companies and other types of non-profitable organisations and to a public sector, too. Despite the large amount of writing about clusters there is substantial vagueness and ambiguity about the concept itself [43].

The aim of this paper is to determine the possibilities of cluster creation in two neighbouring countries of the Slovakian and the Czech Republic in the selected areas of economic activities which have the potential to operate while using clusters. At the same time, they do not currently function in this way and this provides the option to compare the gained results with the real cluster activities in those regions. There is a strong need of identifying industries which could, through cluster cooperation, become a driving force of the national/regional economies.

The initial chapters are devoted to the theory of clusters and cluster initiatives. The philosophy of clusters and basic approaches to the creation and organization of clusters are defined. In the fourth chapter, the existing clusters operating in the Slovak and Czech Republic are analysed as well as the preconditions of their creation. The fifth chapter is devoted to the qualitative and quantitative methods of cluster and cluster initiative identification. The method of Local Quotient is introduced in more detail because the authors decided to use this method for the analysis of the potential for the clusters creation in individual regions of the Slovak and Czech Republic in selected five economic sectors. The results of authors' research are presented in the chapter six. In the last chapter, the comparison of the existing clusters in individual regions of the Slovak and Czech Republic with the preconditions of cluster creation in these regions is performed.

2 Theoretical Elements of Cluster and Cluster Initiative Philosophy

An important concept dealing with clustering and cooperation of enterprises is the concept of cooperative entrepreneurship. The cooperative entrepreneurship, by some authors called the "network cooperation" [38, 15] from the English word „network", e.g. is possible to explain as mutual connection of complementary enterprises within enterprises which share the creation of the final product and the cooperation could be e.g. in the area of research and development, creating of a common logistic solution, establishment of joined distribution network, interconnection of services etc. while the enterprises keep their economic independence. The outcome of the network entrepreneurship is access to additional resources, abilities and markets. Firms which are embedded in a dense and a strong-tie network generate redundant knowledge flow [24]. Networks facilitate and accelerate knowledge accretion and education of participants, simplify various innovative processes and enable sharing of overhead cost and using of specific economies of scale for collective activities. For all that, they have not been geographically concentrated. The networks extend their cooperation on research institutions, educational and training agencies and public authorities. Some authors admit that there are some reasons for creation of cooperation links: increase of the product value, cost share and reduction of competitive confrontation. Cooperation (networks) of small and medium-sized entrepreneurship is, according to Zelený & Burget [44], an integral part of the network economy. They are considered the driving force of the economic growth in the global point of view enabling creation of new job positions, disinflation and increase in productivity. For small and medium-sized enterprises (thereinafter SMEs), network entrepreneurship creation is mostly one of many ways to become competitive in comparison to strong and often highly sophisticated partners [33]. At first sight, the network character of entrepreneurship could seem to be a relatively new economic idea; in reality the forms and shapes of networks vary slightly for some decades. Former cooperation and supplier network were amended with new cooperation forms of cooperative business activities.

A cluster became a phenomenon of last years which could be considered a form of free strategic partnership, too. Many theoretical papers analyse the relationship between economic agglomeration and entrepreneurship, e.g. [36]. The first foundations of the cluster concept could be seen approximately at the end of the 19th century when the English economist Alfred Marshal started to investigate regional concentration within industrial sectors. Moreover, in his book Principles of Economics [20] he mentioned that the industrial sectors are often locally concentrated and gain substantial externality merits as the economy of scales and spill overs coming from such concentrations.

The proper term of a cluster has been mentioned firstly in the masterpiece of the American economist Michael Porter and that is why the cluster is joined

predominantly with his name. Porter defined a cluster as a geographically close grouping of mutually joined enterprises, specific suppliers, service providers and related institutions in a particular sector and companies of the related enterprises which cooperate and compete, share common characteristics and support each other [30]. A more extensive definition by Porter [31] determines a cluster as a local concentration of mutually joined enterprises and institutions in a particular sector. Clusters include groups of interconnected industrial areas and other subjects important for economic competition. They include providers of specialised inputs such as components, machines, services and providers of specific infrastructure. The cluster theory states [29] that the synergies created inside a cluster (by the interaction between firms that compete and those that collaborate) enhance the productivity and innovation of firms and therefore their economic performance. Clustering has also a positive effect on employment and growth of industries. Delago, Porter & Stern [7] found evidence of the complementarity between employment and innovation performance in regional clusters and also the evidence that new regional industries emerge in the area where there is a strong cluster. In addition, clusters reduce systematic risk and increase unsystematic risk, while economic diversity and innovativeness increase systematic risk [1].

OECD [26] defines clusters as grouping of horizontally or vertically joined enterprises from the neighbourhood areas cooperating with supporting organizations. Cluster Union of Slovakia [3] and Gajdová [11] determine a cluster as a concentrated grouping of independent, regionally and super-regionally joined subjects, supporting institutions with the potential of increasing their competitiveness and economic development and in this way also the development of the European Union regions. Although at the EU level a common framework for supporting entrepreneurship exists, there are significant differences among the member countries [16]. A cluster is characterised in the documents of the European Union as a group of enterprises, related economic subjects and institutions which are mutually closed and which achieved sufficient level for development of specialized technical devices, services, resources, providers and competence [9, 12]. Those innovative processes require various forms of knowledge and expertise, which are distributed across individuals and organisations at different levels of these industrial clusters [8].

Clusters as well as the individual enterprises joined in them are terms dependent mainly on the needs of market. The Expert Groups on Enterprise Clusters and Networks [22] accepted the definition by Porter [31] and completed it with the following characteristics – clusters are groups of independent companies and associated institutions which are: collaborating and competing (here we can see the phenomenon of cooperation), geographically concentrated in one or several regions, even though a cluster may have a global extension, specialised in a particular field, linked with common technologies and skills, either science-based or traditional, institutional (they have a proper cluster manager) or non-institutionalised.

Insertion of companies into clusters provides access to resources which influence the internationalization process of the companies [45]. Many clusters join also governmental or other types of institutions such as e.g. universities, specialised agencies, research groups or business associations which provide specialised education, training, information or technical support. There are two governance forms: an internally governed cluster network is formed in order to establish ties among cluster representative organizations to share knowledge and pool resources on selected activities; externally governed cluster networks are formed to systematically develop cross-cluster ties and competences on and across the individual levels and are brokered by a central inter-cluster administrative organization as well as several decentralized leading organizations [37].

A cluster as a group of similar objects created is described by various authors (e.g. [6, 27, 41, and 13]) considering a cluster a functional concept and the description of the grouping process (agglomeration). Although the concept of a cluster initiative represents mostly the activity or effort joined with the cluster, it also connects to entrepreneurial and non-entrepreneurial subjects which show the signs of a cluster but are not real clusters „ad hoc“ or within the longer time period. Then, it has to be perceived independently from the existence or non-existence of the cluster itself. Cluster initiatives are according to Gretzinger & Royer [14] a popular instrument of public policy everywhere in the world. This development acknowledges that the organisational units which create the added value are not solely isolated individual businesses but often they are networks of actors. Due to the fact that many authors do not differentiate between a cluster and a cluster initiative we accept this point of view in this article, too.

3 Preconditions for Creation of a Cluster and Cluster Initiatives in the EU Countries

In Europe, there is not absence of clusters but due to permanent market fragmentation, weak connection between industry and research and not sufficient cooperation within the EU, the clusters cannot achieve always their critical size and innovative capacity to face global competitiveness and achievement on the world-wide scale. Various analyses which have been performed (e.g. [42]) show that local ownership ties and local market orientation have positive moderating effects on relationship between the cluster size, technological knowledge spill-overs, and performance.

Nowadays, cluster policies are largely focused on strengthening of the already existing agglomerations and not on creation of new ones [18]. The member countries are permanently challenged to continue with the implementation of their own cluster policies into their national reform programmes within the partnership for growth and employment and to present results they achieved annually. The most successful clusters are created spontaneously as a consequence of natural competitive advantages, power of the market or as an outcome of a coincidence. The clusters enhance growth and survival of the company [34]. Thanks to the specialised cluster policies in the member states there are more and more situations when public policies, entrepreneurial initiatives or first class universities and research agencies determining decisively about the creation of strong clusters are, at the same time, acting as the accelerators of the grouping and are helping to use their economic and scientific potential of the specific regions. There are two basic approaches to the creation and organisation of clusters:

1. The Bottoms-up Approach (for natural clusters) – their creation is initiated by the natural need of creation of tighter regional networks and enterprise cooperation. It leads to spontaneous development of cooperation links and creation of common strategies. The reason for the cluster formation could be, in this case, an initiative from the entrepreneurial subjects which have the need of closer regional network creation and common entrepreneurial cooperation. The influence of clusters on the competitiveness of business sectors and business firms consists of at least three dimensions [19]: entrepreneurship (new businesses), productivity and innovation.

During the first period un-formal links between actors are established until the moment when their growth intensity reaches the level when they are interested in creation of more formal links. Growth intensity of links influences the need of cluster initiative which will then cover the individual links among subjects in order to share effectively the benefits of the cluster activities by all interested subjects. The incentive for the creation could be the following factors: local concentration of production factors, existence of another enterprise within the same sector, allocation of providers, inputs, sale channels, presence of educational and research institutions within the sector, associated companies which become attractive for investors, concentration of qualified work force, etc.

2. A Top-down Approach (for designed clusters) – in this case the natural internal development of clusters is not evident. The institutionalized clusters are typically created on the top-down basis and financed from public resources including the EU structural funds. These clusters are initiated and organised from externally, mainly from the representatives of governmental administrative. More attention should be paid to appropriate spatial scale for various horizontal interventions [25]. Using this approach, there are the key development factors of social capital for fostering of the cluster effort, support or creation of the trust mechanism creation, following the vision and strategy formulation and finally the realisation of the particular activity.

An incentive for the cluster creation which is initiated by the country can be: understanding and comparison (benchmarking) of the regional policy, activation of employers and institutions (creation of specifically trained workforce), allocation and attraction of resources and investments, marketing activities and objective image creation of the region on the basis of the new cluster, stimulation of creation of innovative products and processes and enlargement of entrepreneurial activities, etc.

3. There is a very effective option of **combination of the two previously mentioned variants**, too.

The aim of the new clusters creation is support; it is mainly about development of products with higher added value. It is possible, within innovations, to join various enterprises and share the costs on development of new products and technologies. Thanks to the common closeness and connection, enterprises can inform each other quickly about the new technology development, achievable components and machines, new services and marketing concepts. Research institutions, agencies and universities create an important part of such clusters very often. Common cooperation leads

to mutual inspiration and information flow. Nevertheless, it is supposed [48] that there is no systematic dependence between the innovative outputs in the regions and outputs of the clusters. Mutual competition of enterprises within a cluster supports their innovation through which they try to improve their own individual effectiveness and competitiveness across regions, cities and municipalities.

4 Slovakian and Czech Clusters/Cluster Initiatives and the Preconditions for their Creation

Recently, in Slovakia, there are some clusters operating successfully mainly in the area of IT, automotive industry and tourism. As examples, the following clusters can be named:

1. Automotive Cluster of Western Slovakia (Automobilovy klaster zapadne Slovensko) was established by the Trnava region, Trnava city and the Faculty of Material Technique of the STU in Trnava in December 2007.
2. Electrotechnical Cluster of Western Slovakia (Elektrotechnicky klaster zapadne Slovensko) was established by the Trnava region in March 2008 together with the city of Galanta. Its main supporter is the company SAMSUNG Electronics Slovakia.
3. Cluster of Tourism Western Slovakia (Klaster cestovného ruchu zapadne Slovensko) was established by the Trnava region in December 2008 jointly with the city of Galanta.
4. Association of the Tourism Cluster Liptov (Zdruzenie cestovného ruchu Klaster Liptov) since April 2008, it is the initiative of seven subjects: there are cities of Liptovsky Mikulas, Liptovsky Hradok, Ruzomberok, Jasna Nizke Tatry, furthermore, the Aquapark Tatralandia, Thermalpark Besenova and Skipark Ruzomberok.
5. Cluster Orava (Klaster Orava) also focusing on the development of tourism was established in March 2009 in the districts Dolny Kubin, Tvrdosin and Namestovo, it is created by nine subjects among which there is an aqua park, skiing centre, hotels, pensions and the village of Zuberec.
6. Cluster Turies (Klaster Turiec) established in July 2009. The founders are the cities Martin and Vrutky, the travel agency Fatra Ski and the skiing centre Snowland in the Valcianska Valley, the Jasenska Valley and the Winterpark Martinky.
7. Cluster Smolenice (Klaster Smolenice) is the initiative established in November 2009. Its members are the entrepreneurs from the village working in the area of tourism, advertisement and information agencies, the village and region of Trnava.
8. Cluster Tatry (Klaster Tatry) since December 2009, was established by the largest providers of touristic services in High Tatras (1. Tatranska, Tatranske lanove drahy but also by the Aquacity Poprad and cities of Vysoke Tatry, Poprad, Svit and the village of Strba).

In the Czech Republic the situation with clusters is comparable. The support for cluster creation was mentioned firstly in 2002 as an initiative of the CzechInvest Company and the Ministry of Industry and Trade of the Czech Republic. For the programme period of 2004 – 2006 it was a part of the Operational Programme Industry, during the following period it continued by the Operational Programme Enterprise and Innovation 2007-2013. In comparison to Slovakia, the most important document - The National Strategy for Cluster Development 2005 – 2008 was adopted by the Czech government. This document defines strategic objectives, measures and resources to support cluster development and embeds clusters among national and regional tools for boosting of competitiveness [23]. The Table 1 summarizes the existing clusters in the Czech Republic.

Table 1: Czech Clusters and their Regional Distribution

Name of the Cluster	Area of Activity	Year of Establishment	Region
CZECH STONE CLUSTER, družstvo	Cutting, shaping and finishing of stone	2007	Hradec Kralove
Hradecký IT klastr	Information technology	2008	
Klastr NUTRIPOL	Food industry	2009	
Klastr výrobců obalů, družstvo	Manufacture of packaging	2005	
CGMC, družstvo	General engineering	2009	South Bohemia
Czech Cloud Cluster	Information technology	2012	
Český IT klastr, z.s.p.o.	Information technology	2009	

Český pivovarský klastr, z.s.p.o.	Beer production	2008	
ELECTRA-CITY	Urban logistics, e-mobility	2012	
EKOGEN	Environmental construction	2006	
Jihočeský dřevařský klastr. z.s.p.o.	Wood processing, manufacturing	2007	
Klastr aplikovaných biotechnologií a nanotechnologií, z.s.p.o.	Biotechnology	2012	
Regionální potravinářský klastr - Chutná hezky. Jihočesky	Food industry	2009	
Sdružení NIPAS, o.s.	Low-consumption energy equipment and passive house construction	2006	
CREA Hydro&Energy, o.s.	Waterworks, energetics	2008	South Moravia
ENERGOKLASTR	Energetics	2008	
IQ Klastr, z.s.p.o.	Information technology	2010	
Jihomoravský stavební klastr, občanské sdružení	Building contruction	2012	
Klastr českých nábytkářů, družstvo	Manufacture of furniture	2006	
Network Security Monitoring Cluster, družstvo	Information technology	2010	
NutriKlastr o. s.	Food industry	2011	
Klastr ENWIWA	Waste management	2008	Karlovy Vary
Klastr NetPro Group, z.s.p.o.	Development of intelligent control systems	2009	
CLUTEX - klastr technické textilie, o.s.	Textile industry	2006	Liberec
Český řemeslný klastr, o. s.	Production of bijouterie and related articles	2012	
Bezpečnostně technologický klastr, o. s.	Security technology	2010	Moravia-Silesia
Český telekomunikační klastr o.s.	Communication, mobile network	2010	
Družstvo ENVICRACK	Alternative energy sources	2006	
IT Cluster, o.s.	Information technology	2006	
KLACR	Tourism	2008	
Klastr Zelený Horizont,o.s.	Recycling of materials, waste management services	2011	
Knowledge Management Cluster, o.s.	Entrepreneurship	2006	
Moravskoslezský automobilový klastr, o.s.	Automotive industry	2006	
Moravskoslezský dřevařský klastr, občanské sdružení	Wood processing, manufacturing	2005	
Moravskoslezský energetický klastr, občanské sdružení	Energetics	2008	
Moravský lesnický klastr, o. s.	Forestry and logging	2010	
Národní strojírenský klastr, o.s.	Engineering industry	2003	
Český nanotechnologický klastr, družstvo	Nanotechnology	2006	Olomouc
Klastr průmyslu a výzkumu pro aktivní život	Research and experimental development in social science and humanities	2012	
MedChemBio	Biomedicine	2009	
NO DIG Klastr	Trenchless technology	2012	
Olomoucký klastr inovací, družstvo	Information technology	2006	
Klastr povrchové úpravy a.s.	Material surface treatment	2009	Pardubice
Klastr SPIN-ENERGETIKA CZ o.s.	Manufacture of specialised electrical equipment	2008	
Klastr MECHATRONIKA o.s.	Mechatronics	2011	Pilsen
Český vědomostní klastr, o.s.	Cultural heritage	2011	Prague
NANOPROGRES, z.s.p.o.	Nanotechnology	2010	
ATOMEX GROUP, z.s.p.o.	Nuclear energetics	2009	Central Bohemia

CzechBio - asociace biotechnologických společností ČR, z.s.p.o.	Biotechnology	2009	
Česká peleta, z.s.p.o.	Wood processing, manufacturing	2010	
ERGO-MED-KLASTR o.s.	Ergonomics, prosthetics	2011	
KLASTR Bioplyn, z.s.p.o.	Renewable energy	2010	
Klastr obnovitelných zdrojů energie, z.s.p.o.	Production of electricity	2012	
CZECH IT CLUSTER, družstvo	Information technology	2010	Vysocina
Klastr inovativních technologií o.s.	Technology	2011	
Klastr přesného strojírenství Vysočina	Engineering industry	2007	
Klastr výrobců potravinářských technologií, družstvo	Manufacture of machinery for food industry	2009	
ABC WOOD, o.s.	Wood processing, manufacturing	2007	Zlin
ČESKO - SLOVENSKÝ PRŮMYSLOVÝ KLASTR	Education activities	2011	
Moravský letecký klastr, o.s.	Aerospace industry	2010	
Plastikářský klastr	Manufacture of plastic products	2006	
Průmyslový klastr	Manufacturing industry	2009	

Source: processed according to [4]

The precondition for the effective long-term life of clusters and also the creation of new clusters within a region is the correct identification of the potential for creation of such clusters. The analyses with the aim to determine the potential of the individual regions for the creation of clusters have been performed. The results mainly show the existence of large companies in these regions. That is why we decided to analyse the potential of various regions for cluster establishment individually. Within the sectors we considered sectors with potential for creation of clusters and we selected five of these sectors which are suitable for development of individual regions and cities:

1. Agriculture, Forestry and Fishery
2. Industry
3. Building Construction
4. Real Estate
5. Finance and Insurance

In order to be more specific we decided to analyse the potential of the five above mentioned sectors in the 8 regions of Slovakia as it follows. We focused on the observation of these regions: Bratislava (BA), Trnava (TT), Banska Bystrica (BB), Zilina (ZI), Nitra (NR), Trencin (TN), Kosice (KE) and Presov (PP). In the Czech Republic, we analysed the potential in fourteen regions, namely: Prague (PR), Central Bohemia Region (CB), South Bohemia Region (SB), Pilsen Region (PL), South Moravia Region (SM), Karlovy Vary Region (KV), Hradec Kralove Region (HK), Liberec Region (LB), Moravia-Silesia Region (MS), Olomouc Region (OL), Pardubice Region (PA), Usti nad Labem Region (UL), Zlin Region (ZL) and Vysocina Region (VY).

5 Methods of Cluster and Cluster Initiative Identification

The methods of cluster and cluster initiative identification are widely discussed by many authors, e.g. [39, 10, 40, 28] The methods can be generally divided into two groups: qualitative and quantitative methods. The first group which requires more sophisticated approach and skilled specialist for the evaluation of results consists of qualitative analysis which is performed via expert examination or by the method of an interview. The second group uses mostly available data about number of employees, added value, revenues according to the sector or the outcome is an input-output matrix. The qualitative methods are mainly used as supplementary methods for quantitative analysis results. Mainly discussions with experts and enterprise representatives, surveys and case studies are used. Selection of quantitative methods depends on the particular type of a cluster and the links among its members. Often used methods are the Input-Output analysis and the Location Quotient. The *Input-output Analysis* does not examine the particular sector concentration in the region but it focuses on the determination of links to other sectors by which it is achieved the link structure of the sector within the region [40]. Frequently, mainly supplies and consumer sectors are tracked; their common links are then quantified. The links among the entry to the inputs and outputs

to the sector are qualitatively described, e.g. the production of the sector. A disadvantage of such a method is an enormous calculation severity and limited data basis, because the entrance information is inaccessible for individual regions and it is mentioned in considerably aggregated version. The *Location Quotient* represents a relatively simple method suitable for statistical investigation of local and regional clusters. Its advantage is the fact that calculations could be done from the accessible statistic resources. The Location Quotient, on the other hand, is not able to express the links among various enterprises. The Location Quotient (*LQ*) shows how many times is the share of a sector on the employment in a region higher than the national average [17], see following formula:

$$LQ = (x/X) / (y/Y)$$

where the *LQ* is the location quotient of employment in a region, *x* is the number of employees in the sector within the examined region, *X* is the total number of employees in a region, *y* is the number of employees in the sector within the country and *Y* is the total number of employees in a country.

In case the *LQ* is greater than 1 it means the region has the concentration higher than the average value. The Location Quotient exceeding the value of 1.2 is consequently perceived as an elementary specialisation in the examined sector. The disadvantages of the Location Quotient are those that it does not offer any deeper view into the mutual dependency between the sectors and therefore it is often considered an unsystematic approach.

Besides mentioned other methods of cluster identification can be used such as e.g. Shift – Share Analysis [21], Gini Coefficient of Localisation, Ellison and Glaeser Agglomeration Index or Maurel and Sedillot Index [35, 47].

6 Location Quotients of Selected Sectors within the Regions of Slovakia and the Czech Republic

The Location Quotient is one of the most used and the simplest tools for determination of regional potential for creation of a cluster in a particular sector [35]. That is the reason why we decided to use this method for the analysis of the individual regions of Slovakia and the Czech Republic and their potential for creation of clusters in the above mentioned five areas (Agriculture, Forestry and Fishery; Industry; Building Construction; Real Estate; Finance and Insurance). Those areas were chosen because they represent the highest potential of employment in both countries together or the perspective of increase, as confirmed by our analysis of statistics of employment in the various sectors in the Czech Republic and Slovakia executed based on the data from ŠUSR [2] and CZSO [5].

Our aim was not just to count the Location Quotient for the specific period of time but also to monitor the development of this quotient during the years. We decided to use the period of last three years for which we obtained the data from Bureau of Statistics of SR (thereafter as ŠU SR) and from the Czech Statistical Office (thereafter as CZSO).

6.1 Results within the Regions of Slovakia

The bellow mentioned Location Quotients for selected sectors of activities within the regions of Slovakia were calculated on the basis of the employment data published by Bureau of Statistic of SR [2]. In our analysis, at first we focused on Agriculture, Forestry and Fishery sectors (Table 2). In the Table 2, we can see that the Location Quotient is higher than 1 in four regions (Trnava, Banska Bystrica, Nitra and Presov). Eventually, in these regions we can speak about regional specialisation upon the LQ > 1.2. We can see, in the table 1 that annually there were no massive modifications in the Location Quotient development in any of the regions. The least suitable region for creation of clusters in this area of activities is the Bratislava Region which achieved the level of Location Quotient lower than 0.3.

Table 2: Agriculture, Forestry and Fishery

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
BA	0.28	0.24	0.24	-0.04	0.00
TT	**1.69**	**1.55**	**1.66**	-0.14	0.11
TN	0.84	0.87	0.82	0.03	-0.05
NR	**1.93**	**1.69**	**1.79**	-0.25	0.10
ZI	0.92	0.81	0.96	-0.12	0.15
BB	**1.32**	**1.23**	**1.49**	-0.09	0.25
PP	**1.37**	**1.29**	**1.44**	-0.08	0.15
KE	0.70	0.90	0.88	0.20	-0.02

Source: Own calculation

In the analysis in the Industry area, shown in the Table 3, the Location Quotient is higher than 1 in five regions (Trnava, Trencin, Nitria, Zilina and Banska Bystrica). In the Trencin Region, where the level of this quotient is significantly higher (LQ > 1.2) it is possible to speak about regional specialisation. Observing the Table 3, it can be said that in this sector as well as in the first analysed sector, there were no remarkable annual differences noticed in the development of the Location Quotient

or in any region of the country. The least suitable region for the cluster creation in this area is again the Bratislava Region which achieved the level of the Location Quotient lower than 0.6 for a long period of time (in spite of the fact that in comparison with the Agricultural, Forestry and Fishery sector this number is slightly higher).

Table 3: Industry

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
BA	0.59	0.58	0.59	-0.01	0.01
TT	**1.22**	**1.12**	**1.25**	-0.10	0.13
TN	**1.47**	**1.40**	**1.49**	-0.06	0.09
NR	**1.21**	**1.10**	**1.19**	-0.12	0.09
ZI	**1.16**	**1.10**	**1.13**	-0.06	0.03
BB	**1.05**	**1.01**	**1.07**	-0.04	0.06
PP	0.99	0.97	1.03	-0.02	0.07
KE	0.95	0.95	0.99	0.00	0.04

Source: Own calculation

The Building Construction sector was the following analysed sector. The Table 4 specifically shows the preconditions for cluster creation in the Bratislava, Nitra, Zilina and Presov Regions. From these regions, Presov is the region in which there were showed tendencies of regional specialisation during two periods (the years 2011 and 2013). The Trnava and Banska Bystrica Regions achieved, during the years 2011 and 2012 the value of the LQ > 1 but, in 2013 the quotient decreased under the level 1, the opposite trend occurred in the Kosice Region which had the Location Quotient higher than 1 in 2013. The Construction Industry is the sector in which it is possible to speak about a relative "equality" of the individual regions. Only in one region (Trencin) the situation seems to be not suitable for clusters in this area due to the fact that merely in this region the Location Quotient was lower than 0.8. In comparison to the rest of the analysed sectors we can assume that the most evident „turbulence" in the development of the Location Quotient is mainly in the mentioned regions (Trnava, Banska Bystrica, Kosice).

Table 4: Building Construction

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
BA	**1.04**	**1.07**	**1.07**	0.03	0.01
TT	**1.10**	**1.02**	0.95	-0.08	-0.07
TN	0.71	0.73	0.65	0.02	-0.08
NR	**1.13**	**1.09**	**1.29**	-0.04	0.20
ZI	**1.13**	**1.23**	**1.15**	0.11	-0.08
BB	**1.10**	**1.04**	0.96	-0.06	-0.08
PP	**1.32**	**1.17**	**1.28**	-0.15	0.11
KE	0.97	0.68	**1.02**	-0.29	0.33

Source: Own calculation

Table 5: Real Estate

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
BA	**1.79**	**1.87**	**1.60**	0.08	-0.27
TT	0.97	0.90	**1.09**	-0.07	0.19
TN	0.77	0.69	0.66	-0.09	-0.03
NR	0.73	0.67	**1.28**	-0.05	0.60
ZI	0.96	0.95	0.74	-0.02	-0.21
BB	0.58	0.65	0.68	0.08	0.03
PP	**1.27**	0.77	**1.02**	-0.50	0.25
KE	0.94	0.94	0.95	0.00	0.01

Source: Own calculation

Regarding the Real Estate sector, we can see in the Table 5 that the Location Quotient is higher than 1 in four regions (Bratislava, Trnava, Nitra and Presov). In addition, we can speak about regional specialisation with the LQ > 1.2 in the Bratislava Region. It is possible to see very clearly that in this sector the annual growth shows remarkable differences in the Location Quotient, mainly in the Presov and Nitra Regions. The least suitable in this area for the cluster creation is the Region of Banska Bystrica and Trencin which both show the level o the Location Quotient lower than 0.8 for a long period of time.

The last examined area was the sector of Finance and Insurance (see Tab. 6). The Location Quotient is higher than 1 just in one region (Bratislava). In this region, as a consequence of the higher level of this quotient (LQ > 1.2) we can speak about regional specialisation. Observing the Table 6 it is possible to say that in this sector, annually there were noticed no remarkable differences in the development of the Location Quotient in any of the examined regions. The least suitable regions for the creation of clusters are, on the contrary with the previous sectors, all examined regions except the Bratislava Region. From this group of regions the least suitable for creation of clusters is the Trencin Region where the Location Quotient is lower than 0.4 during a long period of time.

Table 6: Finance and Insurance

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
BA	**3.35**	**3.18**	**3.09**	-0.17	-0.09
TT	0.52	0.45	0.52	-0.07	0.07
TN	0.33	0.32	0.33	-0.01	0.00
NR	0.52	0.44	0.49	-0.07	0.05
ZI	0.56	0.47	0.48	-0.09	0.01
BB	0.65	0.64	0.70	0.00	0.06
PP	0.62	0.60	0.67	-0.03	0.07
KE	0.63	0.56	0.57	-0.08	0.02

Source: Own calculation

6.2 Results within the Regions of the Czech Republic

The Location Quotients for selected sectors of activities within the regions of the Czech Republic were calculated on the basis of the employment data published by the Czech Statistical Office [5]. The table 7 indicates the results within the individual regions in the Agriculture, Forestry and Fishery sector in the Czech Republic. In this table, we can see the Location Quotient higher than 1 in six Czech regions during the monitored years. In these regions we can speak about regional specialisation in cases where the LQ > 1.2. The most suitable for the creation of clusters in this area of activity are the Vysocina Region and the South Bohemia Region which have the highest coefficients, and moreover, we can also observe an annual increase of the LQ. The Praque Region which achieved the level of the Location Quotient lower than 0.3 belongs to the least suitable regions for creation of clusters in this area of activity.

Table 7: Agriculture, Forestry and Fishery

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
PR	0.09	0.13	0.11	0.04	-0.02
CB	0.96	0.85	0.93	-0.11	0.08
SB	**1.81**	**1.83**	**1.90**	0.02	0.07
PL	**1.65**	**1.45**	**1.18**	-0.20	-0.28
KV	0.87	0.78	0.58	-0.09	-0.20
UL	0.84	0.70	0.98	-0.14	0.28
LB	0.71	0.78	0.45	0.07	-0.33
HK	**1.43**	**1.33**	**1.40**	-0.10	0.07
PA	**1.56**	**1.69**	**1.70**	0.13	0.01
VY	**1.89**	**2.23**	**2.35**	0.34	0.12
SM	0.97	0.96	0.95	-0.01	-0.01
OL	**1.18**	**1.51**	**1.47**	0.33	-0.04
ZL	**1.03**	0.90	0.86	-0.13	-0.04
MS	0.68	0.70	0.68	0.02	-0.02

Source: Own calculation

The data about the situation in the Industry sector are summarized in Table 8. Ten regions of the Czech Republic has the Location Quotient larger than 1 with regard to the Industry sector. In regions where the level of this quotient exceeds the value enormously (LQ > 1.2) is possible to speak about regional specialisation. Four regions (Liberec Region, Pardubice Region, Vysocina Region and Zlin Region) the LQ reached values higher than 1.2 during the monitored period. Plzen Region joined these regions in 2013 (LQ = 1.27). Observing the Table 8, we can say that the Vysocina Region and the Plzen Region showed the largest increase. The least suitable region for cluster creation in this area is the Prague region which achieved the level of the Location Quotient lower than 0.4 for a long period of time (in spite of the fact that in comparison to the Agricultural, Forestry and Fishery sectors this number is slightly higher).

Table 8: Industry

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
PR	0.30	0.34	0.37	0.04	0.03
CB	0.94	0.94	0.92	0.00	-0.02
SB	**1.07**	**1.06**	**1.04**	-0.01	-0.02
PL	**1.12**	**1.12**	**1.27**	0.00	0.15
KV	0.92	0.97	0.95	0.05	-0.02
UL	**1.02**	**1.01**	**1.00**	-0.01	-0.01
LB	**1.43**	**1.35**	**1.45**	-0.08	0.10
HK	**1.14**	**1.17**	**1.20**	0.03	0.03
PA	**1.28**	**1.25**	**1.24**	-0.03	-0.01
VY	**1.27**	**1.22**	**1.37**	-0.05	0.15
SM	0.94	0.98	0.93	0.04	-0.05
OL	**1.15**	**1.16**	**1.11**	0.01	-0.05
ZL	**1.39**	**1.36**	**1.36**	-0.03	0.00
MS	**1.15**	**1.11**	**1.02**	-0.04	-0.09

Source: Own calculation

The next observed area was the Building Construction sector (see Table 9). This table shows the preconditions for cluster creation in the South Bohemia Region and the Usti nad Labem Region. From these regions, the South Bohemia is the region in which tendencies of regional specialisation were marked. Usti nad Labem Region achieved, during the years 2011 and 2012 the LQ > 1.2 but, in 2013 the quotient decreased below the level 1. The Construction Industry is the sector in which it is possible to speak about a relative "equality" of the individual regions which reflects the situation in Slovakia.

Table 9: Building Construction

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
PR	0.87	0.98	**1.01**	0.11	0.03
CB	0.98	1.00	0.97	0.02	-0.03
SB	**1.19**	**1.25**	**1.26**	0.06	0.01
PL	**1.08**	**1.03**	0.93	-0.05	-0.10
KV	0.97	0.91	0.91	-0.06	0.00
UL	**1.28**	**1.21**	**1.10**	-0.07	-0.11
LB	**1.01**	**1.01**	0.97	0.00	-0.04
HK	**1.00**	0.84	0.79	-0.16	-0.05
PA	**1.01**	**1.06**	0.96	0.05	-0.10
VY	0.96	0.98	0.96	0.02	-0.02
SM	0.99	0.99	0.99	0.00	0.00
OL	**1.00**	0.98	**1.11**	-0.02	0.13
ZL	**1.08**	0.98	**1.12**	-0.10	0.14
MS	0.83	0.83	0.89	0.00	0.06

Source: Own calculation

Regarding the Real Estate sector we can see in the Table 10 that the Location Quotient is higher than 1 in four regions (Prague, Central Bohemia

Region, Usti nad Labem Region and since 2012 the Karlovy Vary Region). Clearly, we can speak about regional specialisation with the LQ > 1.2 in the Praque Region, in the selected years in the other mentioned regions. The least suitable for cluster creation in this area are the Olomouc Region, Vysocina Region, South Bohemia Region and Liberec Region which show the level of the Location Quotient lower than 0.8 for a long period of time, as well as the Plzen Region recorded a large decline in 2013. We can observe higher annual change of the LQ in this sector.

Table 10: Real Estate

Region	LQ2011	LQ2012	LQ2013	Δ 2011-2012	Δ 2012-2013
PR	**2.22**	**2.35**	**2.62**	0.13	0.27
CB	**1.28**	**1.06**	**1.28**	-0.22	0.22
SB	0.54	0.36	0.65	-0.18	0.29
PL	0.84	0.66	0.40	-0.18	-0.26
KV	0.97	**1.24**	**1.08**	0.27	-0.16
UL	**1.14**	**1.30**	**1.45**	0.16	0.15
LB	0.53	0.44	0.77	-0.09	0.33
HK	0.55	0.97	0.76	0.42	-0.21
PA	0.54	0.63	0.63	0.09	0.00
VY	0.30	0.55	0.26	0.25	-0.29
SM	0.92	0.82	0.53	-0.10	-0.29
OL	0.74	0.48	0.25	-0.26	-0.23
ZL	0.56	0.80	0.70	0.24	-0.10
MS	0.79	0.73	0.61	-0.06	-0.12

Source: Own calculation

Table 11: Finance and Insurance

Region	LQ 2011	LQ 2012	LQ 2013	Δ 2011-2012	Δ 2012-2013
PR	**2.08**	**2.24**	**2.10**	0.16	-0.14
CB	**1.24**	**1.28**	**1.25**	0.04	-0.03
SB	0.62	0.92	0.89	0.30	-0.03
PL	0.92	0.72	0.73	-0.20	0.01
KV	0.53	0.57	0.48	0.04	-0.09
UL	0.69	0.62	0.61	-0.07	-0.01
LB	0.56	0.89	0.82	0.33	-0.07
HK	0.69	0.73	0.92	0.04	0.19
PA	0.99	0.72	0.83	-0.27	0.11
VY	0.69	0.62	0.61	-0.07	-0.01
SM	**1.04**	0.93	**1.08**	-0.11	0.15
OL	0.82	0.53	0.45	-0.29	-0.08
ZL	0.47	0.56	0.73	0.09	0.17
MS	0.86	0.74	0.65	-0.12	-0.09

Source: Own calculation

The sector of Finance and Insurance was the last examined area. The results of the research follow in the Table 11. The Location Quotient is higher than 1 only in three regions, in the Praque and Central Bohemia Region during the whole period of time and in the South Moravia Region with the exception of 2012. In the first two regions, as the consequence of the higher level of the quotient (LQ > 1.2), we can speak about regional specialisation. The least suitable regions for creation of clusters are, on the contrary to the previous sectors the Karlovy Vary Region, the Usti nad Labem Region or the Vysocina Region.

7 Conclusions

Developing countries cannot follow the direction of creating high competitiveness to the development of clusters but national competitiveness can be improved significantly by the development of clusters and by encouraging of innovation and productivity within the framework of the cluster-directed economy [14]. Clustering has many advantages for enterprises and cities joined in a cluster – it is mainly the elimination of their entrepreneurial limits stemming from their size. Apart from this fact, a cluster contributes to increase of regional or village specialisation and stimulates the government to invest into the sector and particular region at the same time. From this, of course, positive effects originate, such as development of regions and municipalities. Clusters are therefore considered an important microeconomic factor by various professionals. One precondition for cluster creation is also the fact that small and medium-sized enterprises are not, in comparison to large companies, able to use economies of scale; they do not have sufficient capacity for research, education of their employees, information acquisition, etc. Due to this fact, creation of clusters is advantageous for them as it provides sources of own development within the region.

In our research we calculated the Location Quotient for individual regions of the Slovakian and Czech Republic within several selected areas/sectors of activity. As the final outcome of our investigation we tried to compare the existing clusters in those regions based on the main activity they provide with the preconditions of regions we gained as a result of our own calculations. The results obtained for Slovakia shows that one region only completely corresponds to the research outcome; it is the Trnava Region and the Industrial area of activity (I). This is supported by the fact that in this region there are three clusters performing their activities in the sector of Industry. Due to the focus of Slovakia on automotive and IT industry and the dominance of tourism clusters we can say that this condition was fulfilled also in the area of industrial regions of Zilina and Banska Bystrica. The Kosice Region also has a cluster in the area of Industry; nevertheless, it was not considered a region with potential for such

a type of a cluster. In Slovakia, there are no official clusters active in the area of Agriculture, Forestry and Fishery (A, FO, FI), so that we consider this situation as a perspective for initiatives in supporting establishment of clusters in those areas. Also other sectors demonstrate identical results. The Presov Region could be suitable for support in Building Construction (BC), the Bratislava Region is ideal for clusters in the area of Real Estate sector (RE) and Finance and Insurance activities (FN, IS).

Table 12: Comparison of Cluster Preconditions with Existing Clusters within Slovak Regions

Regions in CZ	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No
Bratislava region (BA)					BC	No	**RE**	No	**FN,IS**	No
Trnava Region (TT)	A,FO,FI	No	**I**	**Yes**	BC	No				
Trencin Region (TN)			**I**							
Nitra Region (NR)	A,FO,FI	No	I		BC	No				
Zilina Region) ZI			I	Yes	BC	No				
Banska Bystrica Region (BB)	A,FO,FI	No	I	Yes						
Presov Region (PP)	A,FO,FI	No		Yes	B**C**	No	RE	No		
Kosice Region (KE)				**Yes**						

Note: CP = Cluster Precondition, CE = Cluster Existence; Source: own

Slightly different is the situation in the Czech Republic. There are more regions (14) with more officially existing clusters and higher diversity of their activities. That is why the Industry (I) is represented three times in the regions with high perspective of clustering. That means that the Liberec, Zlin and Vysocina Regions have more than one active cluster in this sector. The area of Industry is represented by one cluster also in the South Bohemia, Plzen, Hradec Kralove, Moravia-Silesia, Olomouc and Usti nad Labem Regions. Additionally, there are two clusters in the South Moravia and the Karlovy Vary Regions, although these regions have potential for other types of clusters. Concerning Agriculture, Forestry and Fishery (A, FO, FI) only the South Bohemia and the Central Bohemia Regions have one cluster in this category. In our opinion, the cluster creation activities should be focused mainly on the Vysocina Region and Plzen, Olomouc, Hradec Kralove Regions. For the Usti nad Labem and the South Bohemia Region, the perspective could be mainly in Building Construction cluster creation. The other regions with perspective of such types of clusters are Plzen, Liberec, Olomouc, Pardubice and Zlin. The Prague Region has the same position as the Bratislava Region in Slovakia. It has a perspective mainly for Real Estate (RE) and Financial and Insurance (FN, IS) cluster activities. The RE is suitable also for the Usti nad Labem and Karlovy Vary Regions. Finance and Insurance are advised for the Central Bohemia and the South Moravia Regions, except of the already mentioned Prague Region.

Table 13: Comparison of Cluster Preconditions with Existing Clusters within Czech Regions

Regions in CZ	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No	**CP**	**CE** Yes/ No
Prague (PR)							**RE**	No	**FN,IS**	No
Central Bohemia Region (CB)	A,FO,FI	Yes							**FN,IS**	No
South Bohemia Region (SB)	**A,FO,FI**	Yes	I	Yes	**BC**	No				
Plzen Region (PL)	A,FO,FI	No	I	Yes	BC	No				
South Moravia Region (SM)		Yes		Yes		**Yes**			FN,IS	No
Karlovy Vary Region (KV)				Yes			RE	No		
Hradec Kralove Region (HK)	A,FO,FI	No	I	**Yes**						
Liberec Region (LB)			**I**	**Yes**	BC	No				
Moravia-Silesia Region (MS)		Yes	I	Yes						
Olomouc Region (OL)	A,FO,FI	No	I	**Yes**	BC	No				
Pardubice Region (PA)			**I**	Yes	BC	No				
Usti nad Labem Region (UL)			I	No	**BC**	No	**RE**	No		
Zlin Region (ZL)		Yes	**I**	**Yes**	BC	No				
Vysocina Region (VY)	**A,FO,FI**	No	**I**	**Yes**						

Note: CP = Cluster Precondition, CE = Cluster Existence; Source: own

The adequacy and possible usage of regions for the creation and existence of clusters is the subject of various studies and analyses. We have decided, in our study, to focus on the observation of the sectors of Agriculture, Forestry and Fishery, Building Construction, Real Estate, Finance and Insurance and Industry. The Location Quotient we decided to use is a simple instrument for precise identification of potential of a region by comparing employment values in the particular sector. We observed not only the quotient for the examined sector itself but we also tried to compare the development of this quotient within the period of three years with the aim to eliminate „coincidence evidence". The results gained by our research expressly show the potential of Slovakia and the Czech Republic regions for the cluster creation in those areas. At the end, this survey is concluded by the comparison of the already existing clusters in the examined areas and the regions of both countries. We understand that the real perspective of cluster creation depends not only on the amount of employees within the selected area of activity but also on the number and structure of the companies providing this activity, their willingness to cooperate or perform activities via a cluster, etc. Nevertheless, this study could be a beginning for cluster facilitators' work, governments on the local or national level and universities or research institutions in their effort to support innovation and development of particular regions. Moreover, in many cases, it is important to create clusters as a connection of various sectors which are able to support and influence each other. This also forms a significant reason for further research in this area.

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