

# Promoting the Regional Competitiveness Through Clusters' Approach: Case of the Latvian Information Technology Cluster

Zane Zeibote, Tatjana Muravska

University of Latvia

 <http://dx.doi.org/10.5755/j01.eis.0.12.20846>

The purpose of this research is to contribute to the debate on regional competitiveness concept by evaluating genesis of the studies of concept development, and the impact assessment. This paper also presents the impact of clusters on regional competitiveness through the experience of the Latvian Information Technology (IT) cluster. The methods used in the research are literature analysis, correlation and statistical analysis. The main tasks include: (i) the usage of competitiveness concept to describe main factors of regional competitiveness, (ii) identification of the role of clusters for regional competitiveness by testing the linkage between regional competitiveness and state of cluster development, (iii) presenting the experience of the Latvian Information Technology (IT) cluster and the assessment of advantages companies operating in the cluster environment.

The novelty of the research is testing the relationship between regional competitiveness and state of cluster development, as well as introducing the assessment of the CEOs of the Latvian IT cluster companies on advantages of cluster environment. In addition, synthesis of the cluster's concept has led to findings on mandatory and desirable features of clusters.

The authors conclude that economically more advanced regions have better developed clusters, while regions with higher state of cluster development are more competitive. The experience of Latvian IT companies in the cluster's environment recognize that more can be achieved by working together than if acting alone. However, benefits of belonging to cluster aren't always recognized and exploited.

**KEYWORDS:** clusters; information technology (IT); innovation; regional; competitiveness.

EIS 12/2018

Promoting  
The Regional  
Competitiveness  
Through Clusters'  
Approach: Case  
of the Latvian  
Information  
Technology Cluster

Submitted  
04/2018  
Accepted for  
publication  
08/2018

## Abstract



European Integration Studies  
No. 12 / 2018  
pp. 77-91  
DOI 10.5755/j01.eis.0.12.20846

---

## Introduction

The actuality of research is based on the authors' perception that the regional competitiveness is based on competitive advantages, which has been a subject of research by many scholars serving as a basis for the current scientific methodology to assess competitiveness of regions. The author supports a view of considering regional competitiveness as the capacity of a region to create and support competitive economic environment, which could promote a long-term competitiveness of companies. However, the importance of the state of clusters' development for developing favourable and supportive business environment hasn't been fully recognized by national and regional policy makers, as well as by businesses. Therefore, this is important to build upon the discussion on clusters by showing new perspectives for increasing competitiveness leading to economic development and growth, as well as more profits for companies and welfare for people. The aim of this paper is to contribute to debate on factors influencing the regional competitiveness from the perspective of clusters' development, as well as testing the importance of clusters for businesses by assessing the experience of the Latvian IT cluster based on the survey among the CEOs of the cluster's companies.

The originality of this research is based on testing the linkage between regional competitiveness and state of cluster development by using the World Economic Forum Global Competitiveness Report data (2016-2017), as well as for the first time presenting the results of survey conducted among the CEOs of the Latvian IT cluster member companies on their assessment of benefits provided by the cluster environment.

**Methodology:** This study is based on qualitative and quantitative methods, including the analysis of scientific publications and research papers, correlation analysis, statistical data analysis and other. The correlation analysis is based on data of the Global Competitiveness Report (GCR) for three years – 2015, 2016 and 2017, where the correlation coefficient between the rankings of the competitiveness index and cluster development status indicators were calculated. (Please, see the description of algorithm on page 7.). Furthermore, the results of survey of the Latvian IT sector experts conducted from April to June, 2016 (n = 25) are analysed (pp. 8-11). Survey answers were given in the scale from 1 to 10 in order to obtain data for performing in-depth statistical analysis of survey results. The following methods were used for statistical processing of data and analysis:

- \_ Descriptive statistics methods – central tendencies (arithmetic average, mode, median) and variation indicators (standard deviation, amount of variation, coefficient of variation);
- \_ Grouping according to various characteristics or by various criteria;
- \_ Methods of multidimensional analysis – variance analysis and correlation analysis.

Main limitations of the research are related to a number of survey respondents - 25 of 31 respondents or 80% of the Latvian IT cluster members answered survey questions. Also, a fact that the Latvian IT cluster members are involved in IT software and hardware production could relate conclusions to specifics of the IT sector, which may not be applied for the overall analysis of the impact of clusters on regional competitiveness.

Key results of this study confirm the importance of cluster development for the regional competitiveness and reveal main benefits and shortages of companies participating in the Latvian IT cluster. Therefore, the research is contributing to discussion on the regional competitiveness and strategic decision making on cluster development, as well as participation of companies in cluster organizations, which could provide long term competitive advantage for regions and entrepreneurship. Research results reveal specific issues important for the regional competitiveness and cluster development helping to deal with sustainability challenges through increasing competitiveness through promoting innovation, as well as economic and business efficiency.

## The genesis of regional competitiveness concept

The *concept of competitiveness* is related to the *concept of competition*, which is a special type of economic environment and ability of an economic subject to survive in this environment. Since 1980ies the competitiveness theory has become a new sub-sector of the theory of economy, which examines factors influencing the competitiveness of states and regions and is specifically useful for analysing new economic globalisation processes (Garelli S, 1999).

The World Economic Forum, WEF (2006) defines the *competitiveness* as a combination of institutions, policies and factors, which determine productivity level of a territory, which, in turn, determines the welfare level adequate for the economic development.

The World Competitiveness Research Centre (WCRC) of the Swiss International Management Development Centre (2005) offers the following definition: the *regional competitiveness* is a part of economic theory, which analyses factors and policy instruments, which influence the ability of a region to create and support favourable environment and provide a possibility for companies to create added value, but for inhabitants – to achieve welfare.

The definition of European Commission, EC (2017) is as follows: *regional competitiveness* is the ability of a region to ensure attractive and sustainable life and work environment for companies and inhabitants (European Commission, 2017).

The National Competitiveness Council of Ireland (2005) considers that the *regional competitiveness* is a meaningful concept that includes a wide spectrum of factors, which promotes ability of companies to succeed on international markets and at the same time provide opportunities for people to increase level and quality of life.

According to Markusen (2002): “the *region is competitive* when real income growth occurs faster than its market rivals”.

*Competitiveness* can also be viewed as a new stage of a territorial (regional) development, which depends on competitive advantages of regions. The achievement of the competitiveness stage helps to ensure further efficient and profitable use of attracted competitive resources, which ensures economic efficiency and improvement of economic indicators.

However, there are several differences between territorial *competitiveness* and *advantages*: the competitiveness is related to efficient and optimal use of resources, while the advantages mean the ability to attract, keep and sustain resources on a particular territory. The competitiveness is more oriented to acknowledgement of development perspectives, while the advantages are focused on efficient and open business perspectives (Pellegrini, 2006). The main difference between competitiveness and advantage is hidden on the level of active participation of the government in economy. The factors of attractiveness are based on the level of government support and they are almost fully under the influence and control of the government. At the same time, the factors of competitiveness are outside of the direct government influence (Serrano, 2003).

According to the literature analysis the authors have described the nature of the concept of *regional competitiveness* as the *ability* to create and support the competitive economic environment by:

- \_ Managing the set of own advantages to achieve prosperity;
- \_ Creating and supporting the environment, where companies can create added value;
- \_ Increasing real income under conditions of the free trade;
- \_ Supporting ability of companies to achieve success in international markets;
- \_ Satisfying increasing demand and support export;
- \_ Successfully competing with other countries/regions in international markets.

The authors consider that competitive advantage of regional stakeholders is a desired result of competitiveness, not a factor. This approach is based on the statement of Michael Porter (1998)

on developing new guidelines of a new Regional Competitiveness concept: “The new theory must give answers to the following questions: why some companies working in certain countries are able to innovate more than others and why some countries provide a business environment that gives companies the opportunity to improve and develop their activities faster than their foreign competitors?”

Moreover, Michael Porter (1990) underline four main determinants, which serve as a basis of regional competitive advantages or environment, which are created and sustained by each region:

- \_ *Production factors* – determine the position of the region in relation to such production factors as qualified labour force and infrastructure, which is necessary to stand against forces of competition in a particular sector;
- \_ *Demand factors* of regional market are related to products and services of a particular sector;
- \_ *Related and supportive industries* – competitive sectors (companies) on a global market and presence of suppliers or related industries in the region – includes also presence of *business clusters*, which is in a greater detail in the next part of this study;
- \_ *Strategy, structure and competition* – regional conditions for the emergence of stakeholders, stakeholders’ organizations and management, as well as internal competition.

These factors determine the creation of a business environment for regional stakeholders. Each of the aforementioned determinants is typical for a particular region and their combination provides important preconditions for global competitiveness of regional companies.

The genesis of regional competitiveness concept was in the focus of attention of many scholars since late 1980ies and determines the importance of competitiveness and competitive advantages are important concepts for the regional economic advance and growth through strategic regional cluster development.

The authors analysis is based on theories related to factors influencing regional competitiveness developed by M. Porter (1998), H. Hernesniemi (Hernasniemi et al, 1996) and J. Dunning (1993).

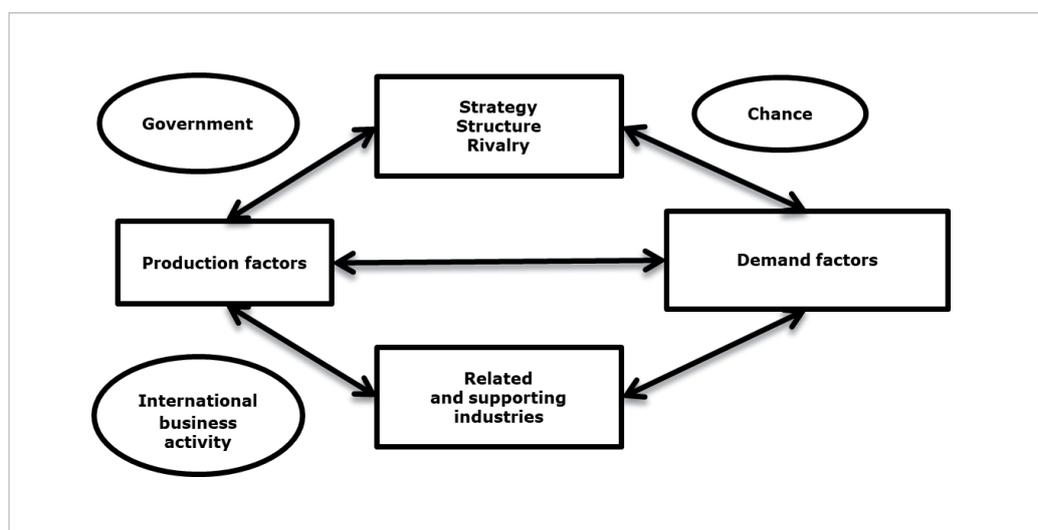
M. Porter (1998) was the first, who created the system of factors influencing the regional competitiveness, which is called the *Diamond Model*. The Diamond Model identifies the four forces of competitiveness based on the above mentioned four determinants: 1) Production factor (volume, quality and specialization of production factors); 2) Demand factor (experienced and demanding local consumer; requirements of consumers; untypical local demand in specific segments); 3) structure and competition (local situation, which support investment and continuous development; strong competition between local companies); 4) Related and supporting industries (presence of competitive local suppliers and competitive local industries, Figure 1).

The Figure 1 shows the classical Diamond Model of Michael Porter (1998) amended with three newly added components important for the creation of a favourable business environment. These three new features were added by the Finnish researchers in their fundamental industrial research „*Advantage Finland – The Future of Finnish Industries*” (Hernesniemi et al, 1996) and include: 1) Government; 2) Chance; 3) International business activity.

The government has an important role in several aspects, such as: 1) providing guaranty for sufficient supply of resources, which are necessary for the development, especially, factors for creating advantages; 2) creating basis for the economic development and innovation – measures for protecting environment, safety standards etc.; 3) ensuring functioning of the market system; and 4) stimulating the development of human capital.

The factor of chance has been recognized as having an important role in many industrial undertakings. And the International business activity was added to the Diamond model later in a result

## Factors influencing regional competitiveness



**Figure 1**  
Amended M. Porter's  
Diamond Model –  
regional competitiveness  
sources

Source: Hernesniemi H., Lammi M., Yla-Anttila P. (1996) Advantage Finland – The Future of Finnish Industries: ETLA [the Research Institute of the Finnish Economy] report of the Finnish clusters' study. Helsinki: Taloustieto Oy.

of discussion with J. Dunning (1993). According to M. Porter's views multinational economic subjects are external elements with respect to the Diamond Model. He also considers that global economic subjects aren't meaningful in the presence of already established competitive advantages, because, there are such global economic subjects with their own corporative culture, which doesn't influence separate nations.

One of the four main determinants serving as a basis of regional competitive advantages or environment, which is also reflected as one of tops of the Diamond model is *Related and supporting industries*, which are represented by competitive sectors (companies) on a global market and presence of suppliers or related industries in the region and also includes also the presence of *business clusters*. This indicates that cluster is one of determinants influencing regional competitiveness.

The idea about business networking started already more than 120 years ago in the beginning of industrial revolution. The economist Alfred Marshall (1890) wrote about concentration of specialized industries in particular territories. He also, noted the effects of specialization in new industrial areas of England, which served as basis for his famous comment – *industry secrets are in the air*. During 1990ies, when deeper discussion on the nature of clusters was started, researchers Jacob and De Man (1996) made an argument that the concept of clusters is not defined and, thus, they were using the main dimensions of the cluster definition of Porter to further define the cluster. They were the following: 1) geographical or spatial cluster is a notion of economic activity; 2) horizontal and vertical relationships between cluster participants; 3) use of similar technologies; 4) the presence of the central *player* (e.g. large company, research centre, etc.); 5) quality of business cooperation or network. However, in the theory developed by Jacob and De Man (1996) the role of a central *player* was determined as the most crucial.

The determining criteria of a cluster were further extended by Rosenfeld (1997) including the size of the cluster, the economic or strategic significance of the cluster, the range of products or services, and similar investments (technology, labour, etc.). However, this scientist does not encourage the definition of the cluster to take into account the size or employment factor of the related industries, stressing that many efficient clusters are located in small interconnected industries where there may be no significant concentration of labour. According to Rosenfeld's definition

**The role of  
clusters for  
promoting  
regional  
competitiveness**

(1997) the cluster is “concentration of geographically related, similar, related or complementary undertakings with assets for business transaction, communication and dialogue channels that jointly use specialized infrastructure, labor market and services, and are exposed to similar threats and benefit from the use of similar opportunities. Therefore, this definition clearly indicates that cooperation and social relations between companies are essential for the identification of clusters. This definition stresses the joint use of specialized infrastructure as a precondition for clusters’ development.

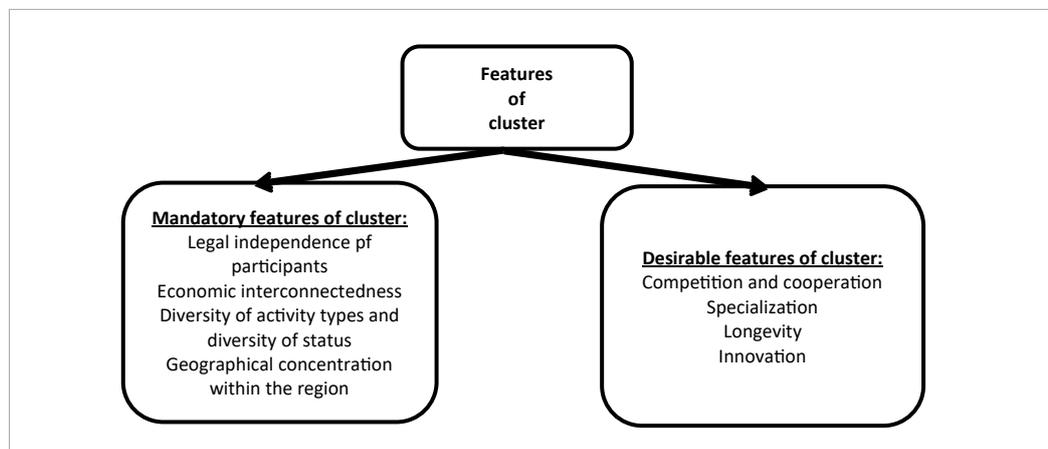
Discussing the concept of cluster authors suggest to apply the form of definition offered by the Swedish project – *The Cluster Policies Whitebook* (Andersson et al, 2004). The research done by the project recognises the objective multiplicity of the concept and specifies the key elements of the concept of *cluster* that have to be identified. Opposite to Porter (1998), they offer a broader list of such elements, adding the desired signs of the cluster: 1) specialisation – the type of core activity that defines cluster formation; 2) competition and co-operation – this combination describes the link between cluster members; 3) clusters’ lifecycle – clusters and cluster initiatives are not temporary phenomena; 4) innovation – cluster participants are involved in the process of technological, commercial and knowledge sharing.

The concept of a cluster life cycle has evolved in the context of the life cycle and industrial life cycle of the product. Individual researchers (Brenner, 2008) have tried to draw parallels between a cluster life cycle and an industry life cycle, arguing that there are relationships between a certain industry business cycle and a cluster of this industry. Usually, the cluster is created at the beginning of the industrial life cycle and is developed simultaneously with the development of the related product market. Clearly, if the industry has reached a maturity stage, markets are saturated and highly competitive then the cluster typically stabilizes and shows only a small dynamic. At the same time, it should be taken into account that the life cycles of clusters and industries are evolving differently during their periods of life, and therefore only individual relationships can be identified and cannot be fully compared (Menzel&Fornahl, 2007).

In synthesizing the development of Porter (1998) and other researchers, and based on comparative analysis of economic interaction forms, the concept of “cluster” in the form of a schematic model maybe established (Figure 2).

The characteristics of the cluster life cycle are closely linked to regional policy and competitiveness. For example, clusters include related industries that are important for the rise of regional

**Figure 2**  
Amended M. Porter’s  
Diamond Model –  
regional competitiveness  
sources



Source: Authors’ design based on Anderson (Andersson et al, 2004), Brenner (Brenner T., 2008), Jacob and De Man (Jacobs D., De Man A.P., 1996), Menzel and Fornahl (Menzel M., Fornahl D., 2007), Porter (Porter M., 1998) Rosenfeld (Rosenfeld S.A. (1997).

competitiveness. These may include specialised suppliers of manufacturing ingredients, production facilities, services and providers of specific infrastructure services. Clusters typically consist of products of certain channels and consumer by-products and complementary products, as well as similar skills, technology or other related to total investments or raw materials. Many cluster organisations also include public administration - government institutions, as well as higher education and research institutions, agencies, "brain centres", vocational education training institutions, business support organisations, etc. that provide vocational training, education, information, research opportunities and technical support. Companies creating such synergies, not only in competition but also cooperating in the name of common interest, each represent clusters' life-development cycles in their activities. Cooperation may exist even in the context of strong competition, as these interrelated companies will, in turn, be linked to a different target group on the customer market and will cooperate with other partners in developing the product. According to researcher OECD report (2005) the most appropriate method for analyzing and identifying clusters in the Central and Eastern European countries (Slovenia, Slovakia, Poland, Hungary, the Czech Republic) has been the *Location Quotient* (LQ). The LQ is calculated by using the available NACE data for capturing regional concentration of companies or labour. Their research also includes qualitative research methods, such as analysis, surveys, expert interviews, etc. This should be recognized that the LQ method also has some shortages. For example, in Europe it mostly uses the NACE data on 2-digit level, while in USA the 4-digit level data are available. Also, the LQ doesn't take into account such important factors as the export and innovation capacity of companies, product life cycle, etc. Therefore, we can conclude that the cluster analysis methodology is still underdeveloped.

According to the LQ method used by the OECD (2005) the LQ is defined according to the formula:

$$LQ = (E_{ij} / E_i) / (E_{kj} / E_s) \quad (1)$$

$E_{ij}$  – number of companies or employed in the industry  $j$  and the region  $i$ ;  $E_i$  – total number of companies or employed of the region  $i$ ;  $E_{kj}$  – total number of companies or employed in the industry of the country;  $E_s$  – total number of companies of employed in the country.

As regards cluster formation in the region, according to  $LQ > 1.25$ , but in order to assess whether the business/workforce localization in a given region is indeed a cluster, additional analysis of different indicators, such as growth and wages, etc., should be carried out, which should be proportionally higher in the cluster than in the industry as a whole, as well as analysis of the commitments between cluster participants. Nevertheless, the LQ method is the most widely used approach for identifying clusters in Europe and also in the Northern America.

According to the mapping done by the European Cluster Observatory (ECO) there were 17 statistical clusters located on the territory of Latvia, of which 9 clusters are significant on the European level. However, there are also other sectors in Latvia, which has shown cluster development potential and, which have been supported by the European Regional Development Fund (EC, 2016).

According to the views of scholars (Lindqvist *et al.*, 2003; Karlsson, 2008; Solvell *et al.*, 2009, Cortright, 2006) the basis for national and regional level cluster mapping is statistical significance of clusters evaluated in accordance to labour or companies' concentration across industries. Therefore, the cluster mapping methodology could allow policy makers to define, which industries are particularly important for the successful economic development of state and its regions, as well as use this methodology as a basis for adjusting policy documents related to SMEs and entrepreneurship support, promotion of investment and innovation, etc.

The WEF Global Competitiveness Report applies the empirical indicator - *State of Cluster Development* – to award regions with cluster development rankings on the scale 1 – 7, i.e. from the stage «no clusters» to «clusters are created in numerous sectors».

For evaluation the relation between regional competitiveness and cluster development the authors follow the defined algorithm:

- 1 It is necessary to define the shape, mathematical direction and strength of the correlation between cluster development and competitiveness of regions' which are included in the global competitiveness ratings in 2015, 2016 and 2017, by calculating the correlation coefficient between the rankings of the competitiveness index and cluster development status indicators.
- 2 The correlation force referred to in paragraph 1 must be analysed according to groups of regions located at different stages of competitiveness – the stage of production factors, the stage of efficiency and the innovation stage, with an objective to identify at which stage of competitiveness the relationship is stronger and more significant. The calculation is based on the correlation coefficient of rankings, previously dividing the array of data into three groups corresponding to the regional development stages.
- 3 The correlation referred to p.1 above must be evaluated according to groups of regions of the European Union divided according to their stages of competitiveness, with an objective to understand significance and strengths of the relationship between competitiveness and cluster development.

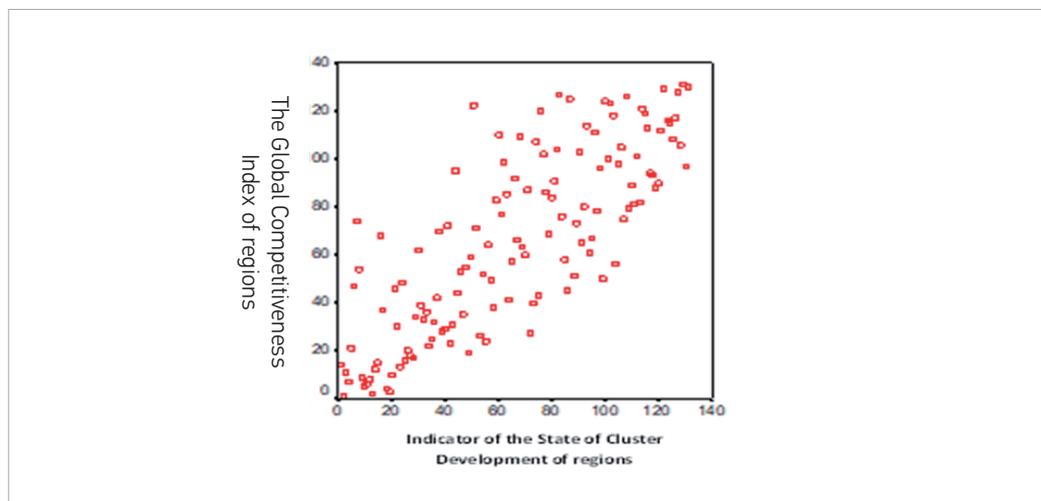
The implementation of the above algorithm allows demonstrating the impact of clusters on regional competitiveness. For this purpose, each region's rankings by cluster development status indicator and after the competitiveness index, as well as the competitiveness stage and affiliation of each region, were analysed using the SPSS program.

To capture the interaction between the regional competitiveness and cluster development the correlation analysis was performed by using the Global Competitiveness Index rankings of the regions and rankings of the cluster development status of the same regions.

The correlation diagram in Figure 3 shows the Global Competitiveness Index rankings of the regions on the vertical axis and rankings of the cluster development status on the horizontal axis (Figure 3).

**Figure 3**

Example: correlation diagram of rankings, 2017, n=137



Source: authors' design according to The Global Competitiveness Report 2017–2018 (Schwab K, 2017).

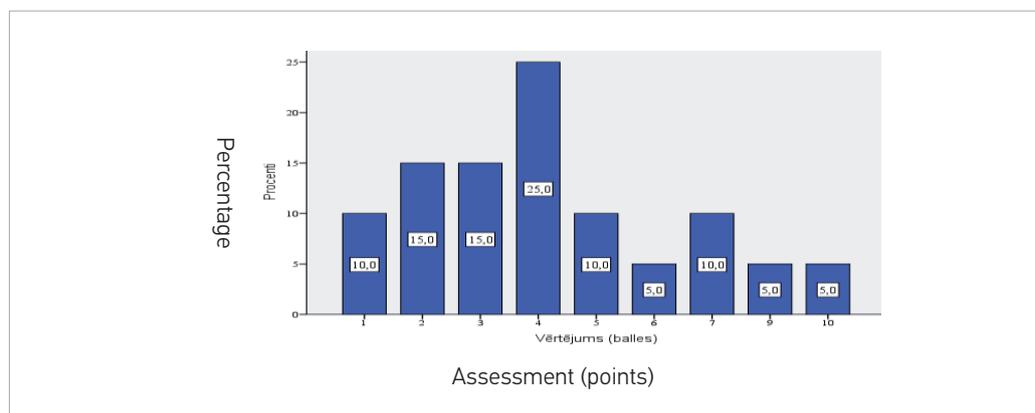
Similar correlation analysis was performed for three years (2015, 2016 and 2017), which results revealed similar results. The Figure 3 provides an example of the correlation analysis for 2017 showing that regional competitiveness and cluster development were intertwined with linear direct correlation, i.e. clusters were better developed in regions with higher competitiveness, or vice versa, regions with better developed clusters were also more competitive. The linear nature of the relationship means that by increasing competitiveness of the region, the development level of clusters, increased arithmetically proportionally (Krastins, 2003). Conversely, as a result of the development of regional clusters, their competitiveness increased proportionally.

The analysis conducted in the previous chapter has shown that cluster is an important factor for regional development and that more advanced regions have better developed clusters. Therefore, in this chapter the assessment of the Latvian Information Technology (IT) cluster will be provided taking into account that this is the first cluster initiative in Latvia, which was identified by the scientific research in 2000 (Vanags *et al.*, 2002). The Latvian IT cluster was started with the support of the Latvian Information and Communication Technology Association in 2005 with 10 member companies. It had become an officially established entity in 2007 with 19 leading Latvian IT companies as cluster's members. In 2016, the Latvian IT cluster already had more than 30 member companies, as well as academic cooperation partners.

This analysis is based on the survey of the IT cluster companies with a purpose to identify main benefits and shortages of companies participating in the cluster organization, as well as investigate the impact of cluster on the regional competitiveness.

The results of the survey are the following:

- More than half of respondents consider that the impact of belonging to the IT cluster on their economic performance is weak. Only 10% consider that the impact is great. On the other hand, all companies acknowledge their membership in the cluster and its benefits. (Arithmetic average = 4.3; Median=4; Mode=4; Standard-deviation=2.47, Figure 4).



Source: authors' calculations using data of the Latvian IT cluster survey.

- Possibilities to attract highly qualified labour force by IT cluster's companies are assessed as average. However, most of cluster's companies (25%-75%) have employees with the Masters' degree. (Arithmetic average = 4.5; Median=5; Mode=5; Standard-deviation=2.53, Figure 5)

## Case of the Latvian Information Technology Cluster

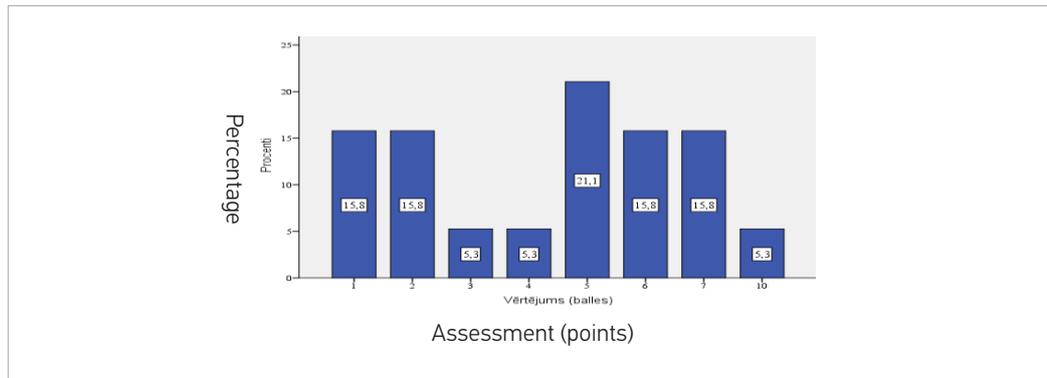
### Figure 4

Assessment of the impact of the IT cluster on the economic performance of its member companies, April – June 2016, n = 25<sup>1</sup>

1 Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent.

### Figure 5

Assessment of the possibilities to attract highly qualified labour force, April – June 2016, n = 25<sup>2</sup>

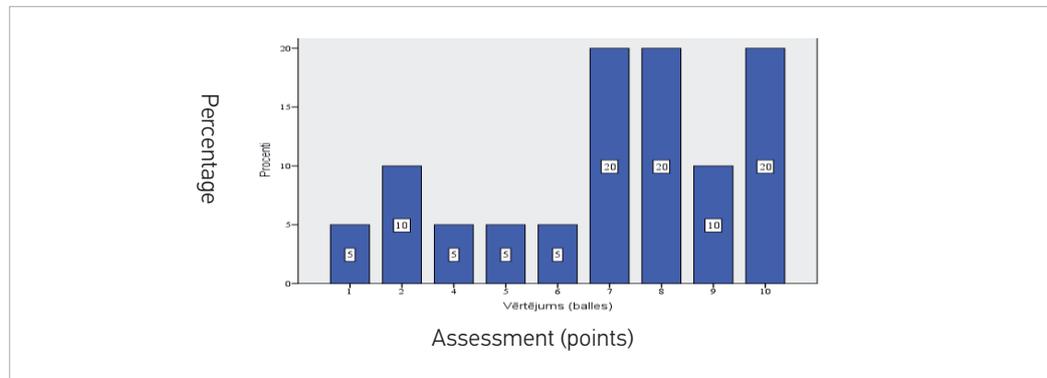


Source: authors' calculations using data of the Latvian IT cluster survey

- Only 10% of members think that competition in the IT cluster is severe (10 points). Despite competitiveness among the IT cluster's companies around 10% of respondents have indicated that during 2008–2016 their company greatly cooperated with other IT cluster companies on R&D and innovation (Figure 6).

### Figure 6

Assessment of the possibilities to attract highly qualified labour force, April – June 2016, n = 25<sup>3</sup>



Source: authors' calculations using data of the Latvian IT cluster survey.

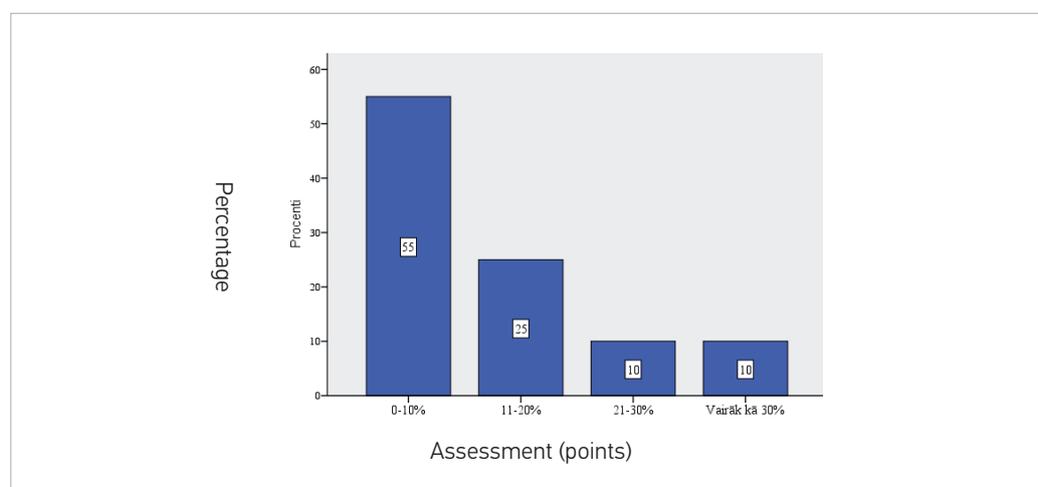
- Statistical indicators on competition of IT cluster's members with other IT companies in the Baltic Sea Region indicate that the neighbouring countries – Estonia and Lithuania are perceived as the greatest competitors. However, the competition is not perceived as strong (Table 1).
- While 45% of respondents assess their innovation success as good or very good, 55% of cluster members think that this is weak. However, all respondents answered that their companies are innovative and indicated that they had performed innovation related activities during the last two years. (Arithmetic average = 6.1; Median=6; Mode=6; Standard-deviation=2.06, Figure 7).
- Assessment of IT cluster members' activities related to implementing organizational innovation, process innovation, product innovation and social innovation have statistically significant difference which is demonstrated by the Kruskal Wallis test ( $\chi^2 = 8,760$ ,  $p = 0,033$ ) results (Table 2). The results show that IT cluster companies are more active in process innovation and product innovation.

<sup>2</sup> Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent.

<sup>3</sup> Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent.

Countries	Arithmetic average	Median	Mode	Standard deviation	The lowest assessment	The highest assessment
Denmark	2.9	1	1	2.996	1	10
Estonia	4.3	4	1	3.124	1	10
Russia	3.3	1	1	3.074	1	10
Lithuania	4.0	3	1	3.180	1	10
Poland	2.9	1	1	2.826	1	10
Finland	3.8	2	1	3.242	1	10
Germany	3.1	2	1	2.885	1	10
Sweden	3.7	2	1	3.142	1	10

Source: authors' calculations using data of the Latvian IT cluster survey.



Source: authors' calculations using data of the Latvian IT cluster survey.

Innovation	Arithmetic average	Median	Mode	Standard deviation	The lowest assessment	The highest assessment
Organizational innovation	5.5	5	3;5;8	2.735	1	10
Process innovation	6.9	7	7;10	2.626	1	10
Product innovation	7.5	8	10	2.303	3	10
Social innovation	5.5	5.5	9	3.050	1	10

Source: : authors' calculations using data of the Latvian IT cluster survey.

**Table 1**

Assessment of Latvian IT cluster's companies competition with other IT companies in the Baltic Sea Region, April – June 2016, n = 25<sup>4</sup>

**Figure 7**

Assessment of the own innovation success by the IT cluster's member companies, April – June 2016, n = 25<sup>5</sup>

**Table 2**

Assessment of the innovation level of IT cluster's member companies, April – June 2016, n = 25<sup>6</sup>

4 Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent

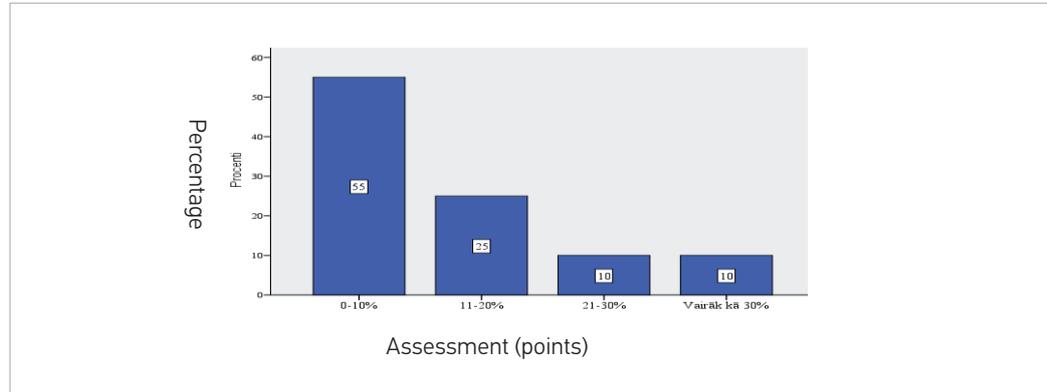
5 Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent.

6 Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent

- The assessment of IT cluster companies' investment in R&D reveals that more than half of companies (55%) invest around 10% of their annual turnover in R&D, one fourth of companies (25%) invest in R&D from 10% to 20% of their annual turnover and 10% of all cluster's companies invest from invest more than 30% of their annual turnover, which is quite significant (Figure 7).

**Figure 7**

Assessment of the own annual R&D investment, April – June 2016, n = 25<sup>7</sup>

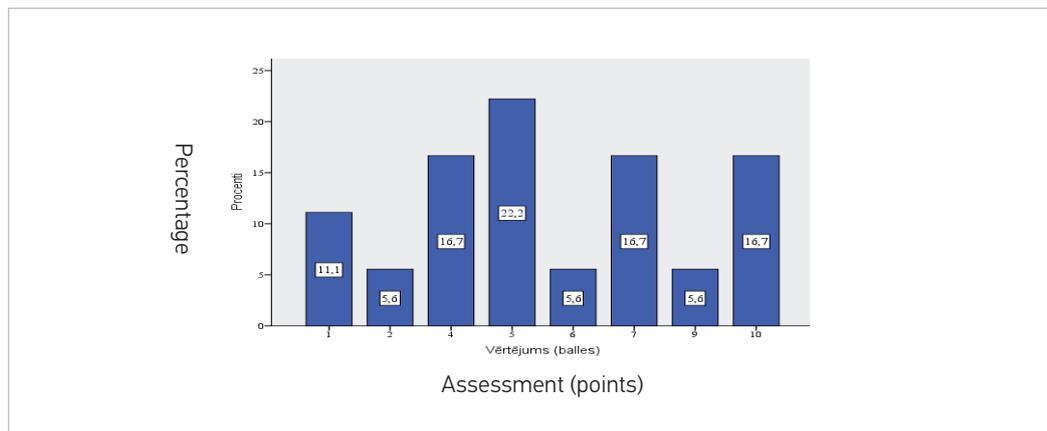


Source: : authors' calculations using data of the Latvian IT cluster survey.

- Almost half (39%) of the IT cluster companies assess that cooperation with R&D institutions is average, while 11% consider it as insufficient and 6% as weak. This indicates that the innovation level in IT companies would be higher if the cooperation with research institutions could be better. (Arithmetic average = 5.7; Median=5; Mode=5; Standard-deviation=2.87, Figure 8).

**Figure 8**

Assessment of the cooperation with the R&D institutions, April – June 2016, n = 25<sup>8</sup>

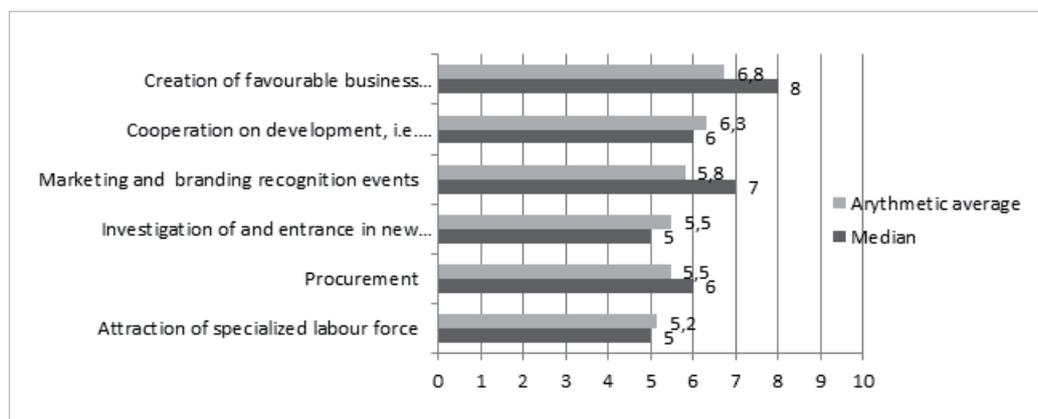


Source: authors' calculations using data of the Latvian IT cluster survey.

- In relation to cooperation on activities related to marketing and branding around 14% of respondents indicated that they very actively cooperate and around 28% indicated that they actively cooperate (Figure 9).

7 Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent.

8 Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent.



Source: authors' calculations using data of the Latvian IT cluster survey.

- The research results reveal that the most active cooperation taking place in the framework of the IT cluster is in the following areas: creation of favourable business environment, business development, marketing and branding, etc. Another important cooperation area is development cooperation, i.e. subcontracting, creation of new possibilities for business logistics, etc., where around 24% of IT cluster companies have indicated that they very actively participate with other IT cluster companies and another 24% answered that they active cooperate (Figure 9). Therefore, the experience of IT cluster shows that it is an important regional player and companies working in the cluster can achieve more than if acting alone. The development of the cluster is making an impact on the development and competitiveness of the whole country (region).
- The genesis of regional competitiveness concept was in the focus of attention of many scholars since late 1980ies and determines the importance of competitiveness and competitive advantages are important concepts for the regional economic advance and growth through strategic regional cluster development.
- The authors assessing factors influencing regional competitiveness conclude that the main determinants serving as a basis of regional competitive advantages or business environment include the related and supporting industries in the region, which relates to the presence of business clusters. This indicates that cluster is one of determinants influencing regional competitiveness.
- Based on the authors' research synthesis for promoting regional competitiveness, the mandatory and desirable features of clusters were identified, which are the following:
  1. Mandatory features: legal independence of participants; economic interconnectedness; diversity of activity types and diversity of status; geographical concentration within the region;
  2. Desirable features: competition and cooperation, specialization; longevity; innovation.
- As a result of authors' research on relationship between the regional competitiveness and cluster development, it has been empirically approved by applying the correlation analysis with more than 100 regions included in the World Economic Forum that more competitive regions have more developed clusters and regions with more developed clusters are more competitive.

**Figure 9**

Assessment of the collaboration activities between the IT cluster members, April – June 2016, n = 25<sup>9</sup>

## Conclusions

<sup>9</sup> Assessment scale 1–10, where 1 – not influenced; 10 – influenced by a great extent.

- The Latvian IT cluster research reveals that its members attribute the most of importance to product innovation (29%) and also process innovation (25%), which is also important for the regional competitiveness. Moreover, the Latvian IT cluster companies are investing in R&D (45%) more than the whole IT sector of Latvia, which is especially important for the regional economic development;
- The research reveals that the Latvian IT cluster is an important regional player and companies working in the cluster can achieve more than if acting alone. The efficiency of the cluster is making a positive impact of the development and competitiveness of the regional development and competitiveness of the country region.

## References

- Anderson, R. (1999). *Attractive Cities: An Economic Analysis*. Stockholm: The Swedish council for building research, p.13.
- Andersson T., Schwaag-Serger S., Sorvik J., Hansson E. (2004). *The Cluster Policies Whitebook*. Sweden: IKED, p. 13.
- Brenner T. (2008). Cluster dynamics and policy implications. *Zeitschrift für Wirtschaftsgeographie* Vol. 53, No. 2-3. pp. 146-162 <https://doi.org/10.1515/zfw.2008.0012>
- Cortright J. (2006) *Marking Sense of Clusters: Regional Competitiveness and Economic Development*. A Discussion Paper prepared for the Metropolitan Policy Program. Retrieved from: [http://www.brookings.edu/metro/pubs/20060313\\_Clusters.pdf](http://www.brookings.edu/metro/pubs/20060313_Clusters.pdf).
- Dunning J. (1993). Internationalizing Porter's diamond. *Management International Review: special issue*, Vol. 33, No. 2, pp. 47-62.
- European Commission. (2017). *The EU Regional Competitiveness Index 2016*. Working Papers, Eds.: Paola Annoni, Lewis Dijkstra, Nadia Gargano, 02/2017, Brussels.
- Garelli S. (1999) *Competitiveness of Nations: The Fundamentals*. Retrieved from: <http://members.shaw.ca/compilerpress1/Anno%20Garelli%20CN%20Fundamentals.htm>
- Hernesniemi H., Lammi M., Ylä-Anttila P. (1996). *Advantage Finland – The Future of Finnish Industries: ETLA [the Research Institute of the Finnish Economy] report of the Finnish clusters' study*. Helsinki: Taloustieto Oy.
- Indiana's Workforce and Economy. (2006). *Location Quotients: A Tool for Comparing Regional Industry Compositions*. Retrieved from: <http://www.incon-text.indiana.edu/2006/march/1.asp>.
- Jacobs D., De Man A.P. (1996). *Clusters, industrial policy and firm strategy: a menu approach*. Technology Analysis and Strategic Management, Vol. 8, No. 4, pp. 425-437. <https://doi.org/10.1080/09537329608522461>
- Karlsson C. (Ed.). (2008). *Handbook of Research on Innovation and Clusters: Cases and Policies*. Retrieved from: [http://www.amazon.com/Handbook-Research-Innovation-Cluster-Policies/dp/1847208428#reader\\_1847208428](http://www.amazon.com/Handbook-Research-Innovation-Cluster-Policies/dp/1847208428#reader_1847208428)
- Krastins O. (2003). *Ekonometrija. Rīga: Latvijas Republikas Centrālā statistikas pārvalde*, pp. 218-225.
- Lindqvist G., Malmberg A., Sölvell O. (2003). *Svenska Klusterkartor*. Uppsala: NUTEK. Retrieved from: [http://www.ivorytower.se/documents/Svenska\\_klusterkartor.pdf](http://www.ivorytower.se/documents/Svenska_klusterkartor.pdf);
- Markusen J. (2002). *Productivity, Competitiveness, Trade Performance and Real Incomes: The Nexus Among Four Concepts*. Ottawa: Supply and Services Canada, p. 7.
- Marshall A. (1890). *Principles of economics: An introductory volume*. In: *General Books*, Chapter 10 "Concentration of Industries in Particular Localities". London: Macmillan.
- Menzel M., Fornahl D. (2007). *Cluster Life Cycles – Dimensions and Rationales of Cluster Development*. Jena Economic Research Papers Number 2007-076, Friedrich-Schiller-University and Max Planck Institute of Economics, Jena. <https://doi.org/10.2139/ssrn.1025970>
- National Competitiveness Council. (2005). *The Competitiveness Challenge 2005*. Dublin: Wilton Park House, p. 5.
- OECD. (2005). *Business Clusters. Promoting Company in Central and Eastern Europe*. Paris: OECD. <https://doi.org/10.1787/9789264007116-en>
- Pellegrini, G. (2006). *Measures of competitiveness and attractiveness: a critical appraisal focused on Italy*, *Proceedings of the Scientific Meeting of the Italian Statistical Society*, vol. 1, pp. 355-364. Retrieved

from: [http://www.sis-statistica.it/files/pdf/atti/sessione%20plenarie%202006\\_355-364.pdf](http://www.sis-statistica.it/files/pdf/atti/sessione%20plenarie%202006_355-364.pdf)

Porter M. (1998a). *On Competition*. USA: Boston. pp. 171, 220.

Porter, M.E. (1990). *The Competitive Advantage of Nations*. New York: The Free Press, p.8. <https://doi.org/10.1007/978-1-349-11336-1>

Rosenfeld S.A. (1997). Bringing business clusters into the mainstream of economic development. *European Planning Studies*, Vol. 5, No. 1, pp. 3-23. <https://doi.org/10.1080/09654319708720381>

Schwab K. (Ed.) (2017). *The Global Competitiveness Report 2017–2018*. Geneva: World Economic Forum, pp. 42-315.

Serrano, A. (2003). *City competitiveness and attractiveness: a new approach to evaluate economic development in Mexican cities*. PhD Thesis, Department of Urban Studies, University of Glasgow.

Solvell O., Lindqvist G., Ketels C. (2009). *The European Cluster Observatory: EU Cluster Mapping and Strengthening Clusters in Europe*. Luxembourg, LU: Publications Office of the European Union;

Vanags, A., Basarova, J., Titova, N. (2002) *Industrial and Intellectual Capital Clusters in the Baltic States*. In: *European Regional Science Association ERSA conference papers*, No ersa02, 62 p., Vienna, Austria

World Competitiveness Center – IMD. (2005) *World Competitiveness Yearbook 2005*. Lausanne: WCC, p.34.

World Economic Forum. (2006). *The Global Competitiveness Report 2005–2006*. Geneva: WEF, p.36.

World Economic Forum. (2006). *The Global Competitiveness Report 2005–2006*. Geneva: WEF, p.36.

Internet access:

European Commission. (2016) *European Cluster Observatory*. Retrieved March 15, 2018, from [http://ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services/mapping-tool\\_lv](http://ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services/mapping-tool_lv)

Vanags, A., Basarova, J., Titova, N. (2002) *Industrial and Intellectual Capital Clusters in the Baltic States*. In: *European Regional Science Association ERSA conference papers*, No ersa02, 62 p., Vienna, Austria, accessible: [http://www.sre.wu-wien.ac.at/ersa/ersaconfs/ersa 02/cd-rom/papers/248.pdf](http://www.sre.wu-wien.ac.at/ersa/ersaconfs/ersa%2002/cd-rom/papers/248.pdf)

## **ZEIBOTE ZANE**

**Scientific degree: M.A.**

University of Latvia

### **Fields of research interests**

Regional policy, clusters, competitiveness

### **Address**

Bergenes Street 11, Riga, Latvia

Phone: +371 29417214

E-mail: [zane.zeibote@lu.lv](mailto:zane.zeibote@lu.lv)

## **MURAVSKA TATJANA**

**Scientific degree: Dr. oec.**

University of Latvia

### **Fields of research interests**

Regional and cohesion policies, productivity, competitiveness

### **Address**

Kalpaka Boulevard 4, Riga, Latvia

E-mail: [tatjana.muravska@lu.lv](mailto:tatjana.muravska@lu.lv)

## About the authors