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INDUSTRIAL CLUSTERS: A COEFFICIENT FACTOR FOR INTEGRATED DEVELOPMENT

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Abstract: In economic theory there are two types of business entity integration: horizontal and vertical. Cluster environments may include both types of integration—companies producing the same products are interconnected as well cooperating with the suppliers and supporting entities. One explanation ofLatvia's competitiveness current problems is pure level of business entities co-operation and business integration. The global market could be entered more easily and efficiently when companies and suppliers from a particular sector are interconnected in geographically proximate groups (clusters)—efficiency is heightened, greater opportunities for innovation and export are created, and favorable conditions reached for integrated development. Business entity cooperation and integration is a gateway to integrated development and higher competitiveness in the global markets. Cluster environment is stimulating integrated development of all the business entities within the cluster. The main objective of the paper is to find out the industrial cluster influence to integrated development. To reach this goal different scientific research data and papers were analyzed and experts interviewed.

JEL classification: C38, L1, L5.
Key words: cluster, development, integration, company, competitiveness.
Reikšminiai žodžiai: klasteris, plėtra, bendrovė, konkurencingumas.

1. Introduction

After years of buoyant growth, falling unemployment, and rapidly rising living standards following the country's accession to the European Union in 2004, Latvia has been hit hard by the global economic recession. In 2009, the country's GDP was contracted by 18%—more than most of the countries in Asia or Latin America. (*The Global Competitiveness Report* 2009*)* Rapid integration with the global economy sustained growth in Latvia over recent years but has also made the country more vulnerable to contagion during the economic crisis that is now having dramatic consequences in Latvia. Government, companies and economic experts are trying to analyze mistakes

of the past and find the way out of economic recession and build the foundation for sustainable development in the future. In the year 2010, the country's national economy has been demonstrating weak signs of recovery.

Recent changes in the world's economy stimulated to search new approaches to find the best way out of crisis. The words "competitiveness" and "integration" are mentioned more and more in the context of the economy's recovery. These concepts may be discussed on different levels: countries, regions, industries and companies. In general, the country's level of competitiveness can be measured by the Global competitiveness index—Latvia is only in 70th place between 131 other countries in the year 2010. The index is significantly lower, compared to a major part of other European Union countries, including our neighbor countries—Lithuania (47) and Estonia (33). (*The Global Competitiveness Report* 2010) To analyze reasons for such a pure country's performance it is necessary to dig deeper into the components of the competitiveness index. There are many factors to be analyzed but the one which is most closely related to the topic of the conference and indicates integrated development tendency and cooperation is *state of cluster development* index, which measures how prevalent are well-developed and deep clusters. Unfortunately this is one of the weakest points of the country—only 103th place on the list. (*The Global Competitiveness Report* 2010)

Integration and cooperation level among companies are underdeveloped and in many cases the term "competitor" is similar to "enemy," which must be weakened and destroyed. This is not a good environment for collaboration and development. Companies are isolated into their approaches to develop and enter into new markets and in many cases these approaches could be more successful in proper strategy would be selected. Particularly important it is taking in to account the specific on the national economy of Latvia—all the companies are small or medium sized according to the global market standards. It is essential for the companies to co-operate and integrate to increase export potential and be successful in the global markets.

The research object of the paper is states ranked in the Global Competitiveness Report with special attention paid to the economic problems in Latvia**. The Research subject** is cluster environment and integrated development. **The hypothesis** of the paper is: Cluster environment may enlarge the level of co-operation between different enterprises and induces integrated development of enterprises in diverse industries.

The aim of the paper is to find out how cluster environment can stimulate companies' integrated development and competitiveness. There are several tasks to be done to complete the aim:

- to describe the most important aspects of cluster environment and integration,
- on the basis of successful cluster examples evaluate "lessons learned" for the national economy of Latvia,
- to identify the linkage among cluster environment, integration and competitiveness.

The basis of the research methodology is international and local scientific researches, papers and publications and research of the author. The statistical data from international and local organizations are although used in the paper.

2. Industrial Clusters

Economists have always had an interest in factors that govern economic development. This issue has been addressed at different levels, the firm level (Rumelt, Schendel, Teece 1994), regional level (Berg 1987) and national level (Smith 1776). The economic development of regions receives more and more attention. One particular regional environment, to which a relatively prosperous economic development is often attributed, is a *cluster,* defined as a regional concentration of related economic activities (Krugman 1991). A large variety of clusters, each with different characteristics (Dijk, Sverrison 2003), have been identified. Famous examples include Italian industrial districts (Brusco 1982), high tech clusters such as Silicon Valley (Saxenian 1992), and service clusters, such as the financial service cluster in London (Amin, Thrift 1992).

Another famous economist and one of the cluster theory pioneers, M. Porter developed a framework of competitiveness analysis (Diamond) which was based on the cluster approach. There are four interrelated areas in the *Diamond*: factor conditions, firm strategy and rivalry, local demand conditions and presence of related and supporting industries. (Porter 1990)

An industrial cluster is an agglomeration of companies, suppliers, service providers, and associated institutions in a particular field. Often included are financial providers, educational institutions, and various levels of government. These entities are linked by complementarities of different types and are usually located near each other. (*Cluster Policy in Europe* 2008)

Clusters can create tangible economic benefits:

- Companies can operate with a higher level of efficiency, drawing on more specialized assets and suppliers with shorter reaction times than they would be able to in isolation.
- Companies and research institutions can achieve higher levels of innovation. Close interaction with customers and other companies create more new ideas and create pressure to innovate while the cluster environment lowers the cost of experimenting.
- The level of business formation tends to be higher in clusters. Level of trust is increasing within the cluster at same time reducing the costs of failure, as entrepreneurs can fall back on local employment opportunities in the many other companies in the same field.

A cluster initiative offers a comprehensive assessment of a cluster's markets, products, linkages, externalities, and synergies to help identify regulatory and business constraints, find new and wider market opportunities. Strategic initiatives may vary in different cases, but often focus on improving market information, workforce development, supply chain improvements, common quality standards, branding, integration and process improvements.

Cluster initiatives around the world show the crucial element of initiative development is the creation of a platform for meaningful dialogue within the cluster, to develop business strategies, and with the public sector, to discuss policy changes and possibly

financial support. (*Cluster Policy in Europe* 2008) "Co-operation" and "competition" are the key words to describe cluster environment.

Generally, there are four cluster development stages (*Clusters for Competitiveness* 2009):

- Cluster mapping and initial engagement. In this stage the main objectives are to establish cluster-economy embeddedness, bring key companies together around shared interests and test appropriateness of long-term projects. Therefore it is important to identify key stakeholders/cluster leaders who will actively manage the cluster initiative in the future.
- Diagnostics and strategy formulation. Some main goals are to build co-operation among companies and raise common strategic sights. Although it is important to apply industry diagnostics and produce strategy. Applying diagnostic tools to assess the market trends, value chains and analysis of competitive positioning of the cluster are extremely important in developing a reasonable cluster strategy. It would be very useful to study and analyze other successful cluster examples.
- Implementation of strategic policy, institutional initiatives. Process objectives are to implement strategic projects, mobilize investment, and improve the business environment. Mobilizing cluster leaders to initiate productive public-private dialogues for implementation of policy and strategic initiatives is also important part of this stage. Cluster companies must work together with governmental institutions to release immediate policy constraints and formulate long-term strategies and policy reform.
- Post-project sustainability. The process can be characterized by continuation of long-term investments and undertaking post-initiative projects. Due diligence and formalization of the institutional structure of the cluster are essential for project sustainability. Social networking beyond the formal life of cluster initiative is necessary to ensure the cluster continuity.

However, cluster efficiency may depend on various external factors: local demand, development of related and supporting industries, production factors (capital and infrastructure). (Porter 1990) Those are indicators which characterize economic development stage of the region. Thus cluster efficiency is dependent on economic development of the region.

According to The World Economic Forum methodology (The Global Competitiveness Report 2009) it is possible to evaluate economic development of the region by the level of the *GDP per capita.* In the regions, which are at the factor-driven and efficiency-driven stages, including Latvian regions, competitiveness is a condition for successful cluster development. Clusters are indicators of region competitiveness. For the regions, which are at the innovation-driven stage, clusters are one of the factors increasing the competitiveness level of the region. (Boronenko, Vilcina 2009) Economic development in the different regions of Latvia is very diverse and it must be borne in mind when evaluating potential or existing cluster performance. However, successful cluster examples are possible to find in the different economic development stages,

although in the factor-driven stage economy (see Mongolia's example, Fig. 3). Regions economic development stage is not an invincible barrier for cluster development.

3. Integration

As was mentioned in the introduction part the *state of cluster development* index characterizes the lack of sustainable and well-performing clusters in the country's economy, which highlighting the pure level of business entities co-operation and business integration in the national economy of Latvia. Regrettable is the fact that the country's state of cluster development index has scaled down since 2006 (45th place in 2006, 86th place in 2007, 112th place in 2008, 113th place in 2009), but in the year 2010 there had been positive development tendency—103rd place. It is clearly an indicator that entrepreneurship environment in Latvia is unfavorable. To find a clear and trusty explanation for this fact is not an easy task. Explanation might be the fact that mainly clusters in the Latvia are concentrated in the industrial economic sectors. Since year 1990 industries proportion gradually decreasing in the national economy of Latvia and service sector share has become more significant. (Sprogis J. 2009) Thus industrial activity stagnation is reducing opportunities for industrial cluster development. Main factors are lack of innovative products, out-of-date production equipment, significant start-up investments, poor experience in the global markets and other.

Companies which are working in the cluster environment are tended to collaborate more deeply comparing to companies outside the cluster. In this chapter is described the influence of the cluster environment to the integrated development of the companies and the interaction among the companies are shown in the figure No. 1.

In economic theory there are two types of business entities integration: horizontal and vertical. **Horizontal integration** strategy is a set of coherent, long-term objectives and action programs aimed at identifying and exploiting interrelationships across distinct but related business units. (Hax, Majluf 1996) Therefore, a crucial first step in the definition of horizontal strategy is to identify the sources of possible interrelationships. Porter proposes three types:

- Tangible interrelationships, arising from opportunities to share activities in the value chain.
- Intangible interrelationships, involving the transference of management know-how among separate value chains.
- Competitor interrelationships, stemming from the existence of rivals that actually or potentially compete with the firm in more than one business year.

Collaboration between buyer and supplier has increased in recent years to become a natural part of the operations of any company that develops complex products. The direction of **vertical integration** recognizes two different ways of adding value to the inputs and outputs of the firm, respectively: backward, which means getting closer to suppliers by incorporating into the firm a given input to the current core; and forward, which involves a greater proximity to customers by putting a given output of the core under the firm's umbrella. These two forms of vertical in-

tegration are sometimes referred to as upstream and downstream extensions. (Hax, Majluf 1996).

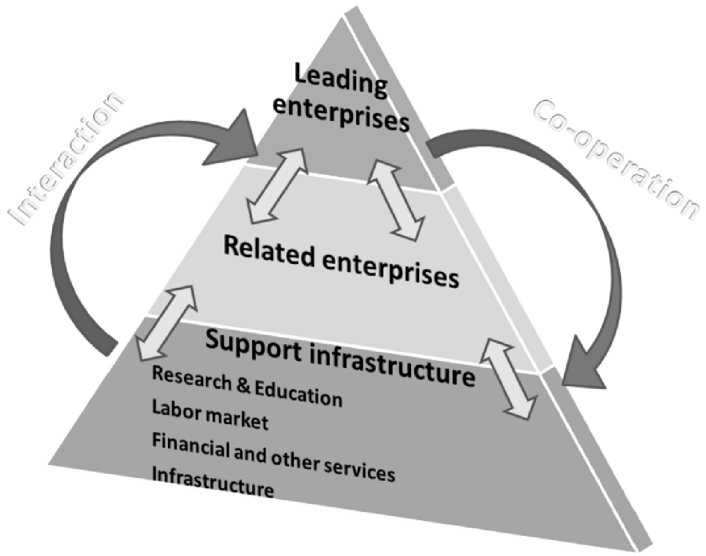


Fig. 1. Integration within the cluster**.** (*Forming of Business Clusters* 2007)

The major benefits of vertical integration are: cost reduction (cost to internalize economies of scale and scope, and avoid transaction costs from imperfect markets), defensive market power (provides autonomy of supply or demand, as well as protection of valuables assets and services), offensive market power (allows access to new business opportunities, new forms of technology, and differentiation strategies), administratitive and managerial advantages (arising from a more simplified managerial infrastructure when basic tasks are brought inside as opposed to left outside the firm. (Lindquist, Berglund 2008)

The pyramid structure illustrates the co-operation and integration within the cluster environment. There are three levels in the pyramid and they are interconnected. Leading enterprises are on the top of the pyramid and are the key factors and driving force in the cluster. Related enterprises and support infrastructure main task is to support business of leading enterprises. Leading companies usually generate income from customers which are not included within the cluster. "Co-operation" and "competition" are the key words to describe cluster environment—leading companies are not only competing among themselves but also co-operating. There could be different kind of co-operation forms—networking, research realizing, product development and other shapes. The different co-operation forms are motive why leading enterprises are developing more coordinated comparing to companies outside the cluster. Leading companies within the cluster are an example of horizontal integration process and integrated development.

"Best practice" learning is extremely important in developing a successful cluster. *(Clusters for Competitiveness 2009)* Different cluster "success stories" can inspire new

ideas and motivate cluster participants. Good example of horizontal integration within the cluster is Australian wine cluster (Fig.2). The analysis of the Australian wine cluster with its rich set of institutions provides an important backdrop to understanding its remarkable success.

While the cluster has long historical roots—some dating to the 1930s—the development of modern institutional structures began largely in the 1990s, when a mix of private, semi-private, and public organizations started to emerge. The new institution provided overall orientation for the cluster's export strategy and created platforms for co-operation among cluster participants on issues such as quality standards, research, training and export promotion. Soon after, the growth rate of Australian wine exports increased significantly. It is important to note that the new institutions worked because they drew efficiently on the capital that had been built through old institutions over decades. (*Clusters for Competitiveness* 2009) In this case business targets and strategy of the cluster were changed and results were surprising good—export potential and global competitiveness of the whole industry increased.

"Lessons learned" from this example are that not any kind of co-operation is effective, cluster participants had previously long co-operation experience but without significant outcome. The turning point was the creation of clear cluster vision and strategy accepted by every cluster member. In many industries in Latvia enterprises are united by local associations and therefore have particular co-operation history. Industry associations are a good starting point to develop closer integration forms (cluster), create a common vision and the industry's long-term development strategy. Professional cluster managers and engagement of every participant are necessary conditions for development.

In the middle part of the pyramid (Fig. 1) are the related enterprises—suppliers and those who are ensuring leading companies with industrial technology, equipment, components, raw materials and different kind of services. Related enterprises have a high level of specialization of production and are located geographically close to the leading companies. The focus customers for related enterprises are leading companies. Both types of enterprises are interdependent and tightly integrated in the vertical level. For example, in the mining industry the industrial technology manufacturer (dealer) might provide equipment which is appropriate for the specific demands of the leading company and is useless for others. This is a true model of vertical integration—companies have integrated development and the success or failure of the leading companies will directly influence the related company.

Another cluster development "best practice" example and model of the vertical integration is possible to find in the Mongolian Meat industry (Fig.2), which has traditionally exported animal carcasses to Siberia. Through work with the Mongolian Competitiveness Initiative, plans were made to integrate value-added operations such as quality checks, packaging and marketing into the meat industry value chain. (*Clusters for Competitiveness* 2009) These upgrades were necessary to re-orient firms toward more demanding and lucrative export markets. Project experts identified transportation options and completed cost studies to confirm feasibility of exporting to five Asian and two Middle Eastern markets. With assistance of various associations, gov-

ernment agencies, the project worked with industry to streamline government policies and standards related to agricultural exports.

As a result, value chains in the Mongolian Meat industry were deepened and new stages were added. In this instance, the addition of veterinary services, meat inspection, processing, packaging, labeling and marketing operations to the Mongolian value chain provides gains of nearly 40 percent in meat industry earnings. (*Clusters for Competitiveness* 2009)

Involvement of new production stages, process upgrade and standardization were key factors to increase efficiency and export potential within the cluster. Initiative and co-operation were the most important things for successful outcome of the project. The project had positive influence of the whole meat industry—new quality standards were defined and industry became more competitive in the global market.

This is an enlightening situation for Latvia, where one of the country's exports drivers, the timber industry, is exporting unprocessed or partly processed timber products to European countries and later importing finished timber products from the same countries. From the economic point of view it is bad that export of more deeply processed timber products is not increasing. (Sprogis A. 2009) Deepening production value chains and export of high value added timber products are essential factors to increase profitability in the industry.

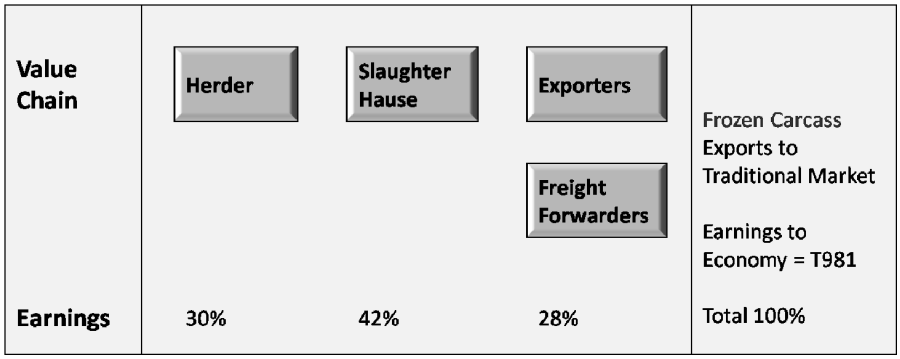
The pyramid foundation (Fig.1) is support infrastructure, the main task of which is to provide the conditions necessary for the development of the leading enterprises. It is possible to mark out two types of infrastructure: physical and institutional. Physical infrastructure includes roads, ports, communication sets and ensure a base for industry development. Institutional infrastructure includes different service providers (banks, venture capitals, law and marketing services), research and education institutions (providing cluster companies with qualified labor force and innovations), and other support institutions (agencies, municipalities, professional associations).

After summarizing benefits for cluster participants it is easy to answer the question "why is a cluster necessary?" The most observable benefits for cluster enterprises are:

1. Resource consolidation and interconnected supplementation are reasons why:
   - is possible to fulfill higher quality standards and get large scale orders,
   - is possible to receive necessary raw materials on more favorable conditions,
   - labor force training is more efficient,
   - common marketing campaigns and product development process are developed,
   - total expenses and risk level are reduced.
2. Constant networking, knowledge exchange, co-operation (including research institutions) are motivated factors to:
   - create new ideas, strategy, technology transfer,
   - increase innovation potential,
   - establish unique knowledge and skills for the specific cluster.
3. Development of the supporting infrastructure and related enterprises.
4. Increased productivity and competitiveness in the local and global markets.

5. Cluster is powerful tool of industry's interest lobbying in the governmental level.
6. Higher stability to unexpected changes in the market.

Scenario 1. Exporting unprocessed carcasses to traditional markets



Scenario 2. Exporting processed meat to specific markets

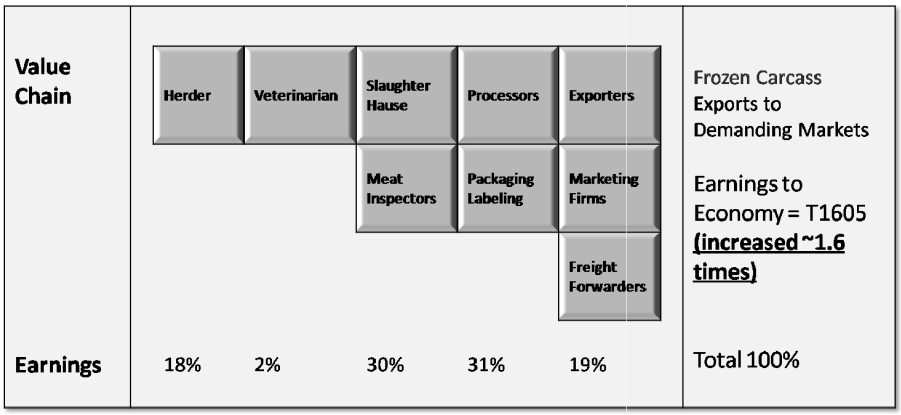


Fig. 3. Mongolian meat industry (*Clusters for Competitiveness* 2009)

Networking, knowledge exchange, co-operation and other forms of interaction stimulates development not only for a single company but for all companies within the cluster. If leading companies are doing well, than it will be extra incentive for development of the related enterprises and support infrastructure. Probably, development of the cluster might has much wider effect—it can positively influence competitiveness of the all industry and although boost growth of the region (as it was described in the case studies about Mongolian Meat industry and Australian Wine industry). Many successful cluster examples are possible to find all around the world.

The significance of cluster approach is emphasized by the European Union (EU). The Council of the European Union has set the formation of clusters as one of the top priorities to support innovations and competitiveness. (*Council of the EU*, 2006) Latvia has followed

EU initiatives and cluster development is included in the national level economy strategy. Cluster support program was developed involving government support and EU funds but unfortunately due to budget shortage it was canceled. Experts from Ministry of Economics has an opinion that canceled cluster program partly can be substituted by Competence Centre Development program (total volume 42 MM LVL) which is planned to launch in the first quarter of 2010. (Burka A., 2009) Indeed the goal of this program is very close to the cluster support initiative to support research institution and business entities co-operation thus increasing competitiveness level of the companies by stimulating collaboration within the scope of industrial researches, new product and technology development. This initiative might be an opportunity for new cluster development in the future.

Within the scope of cluster development strategy, involving the Ministry of Economy of Latvia, in 2007 the ‚Metal-working cluster, Bio-fuel cluster, Food cluster, Information System cluster, Wood cluster, Furniture cluster, Textile cluster, Pharmacy cluster and Electronics cluster was formed. Unfortunately only some of the clusters were able to develop sustainably. Hardly had the project funding expired, activities within the cluster fell down and as a motive was low initiative level demonstrated by the participants of the cluster.

Indeed there are also some examples of sustainable clusters—the Latvian wood cluster, which is one of the oldest in the country and demonstrates positive dynamics of development. The leading enterprise within the cluster is *Latvijas Finieris*—one of the significant timber product exporters in the country. Different forms on entrepreneurship are presented in the cluster—business entities, public institutions, industry's associations and other. The wood cluster geographically is mainly located in Riga and is continuing to develop, in the year 2006 there were 19 participants within the cluster but in 2009 there were 22. (Boronenko 2009)

Another example of collaboration is Latvian IT Cluster. There are more than 35 business entities and organization within the cluster. The leading enterprises are *Lattelecom Technology, DEAC, Exigen Services* and other. Research and development institutions are also presented: University of Latvia, RTU, Latvia Agriculture University and other, as well as professional associations and state institutions. In the year 2007 export potential of the IT Cluster was more than 43 million EUR and it increased by 7% compared to the previous year. (*Latvian IT Cluster home page* 2010*)*

From one side, entrepreneurs have to focus more on the co-operation and integration with competitors, related enterprises and support enterprises to be successful in the global market. From other side the main task for the governmental institutions is to create favorable conditions for cluster development and encourage entrepreneurs to higher level of integration. Successful development of the cluster support programs may lead to increased export potential and overall competitiveness growth in the future.

Conclusion

Summarizing the cluster environment influence to the integrated development and competitiveness level of the companies, some conclusions can be drawn to un-

derstand how collaboration within the cluster may help. The cluster environment increases competitiveness of companies within the cluster by stimulating collaboration, interaction, competition, innovation and increasing efficiency. Favorable conditions for the companies' integrated development are created within the cluster and examples of companies' horizontal and vertical integration can be found in the cluster models. Integrated cooperation among leading enterprises, related enterprises and support enterprises, deepening value chains to produce more value added production are the key factors to be competitive in the global markets. The economic power of the company can increase in the cluster environment.

Latvia's ranking in *state of cluster development index* is poor in the regional and although in the global context. It is the signal that collaboration level among entrepreneurs are rather low in Latvia, companies are isolated, vulnerable and in general not competitive in the global market. However there are some successful cluster examples in the Latvia: IT cluster and Forest cluster. A significant part of the country's export is low processed production which decreases industry profitability. Cluster environmet may help to deepen production value chains and export value added production. Cluster based national economy is on of the opportunities to increase overall competitiveness level, export potential and enter into global market. The role of the governmental institutions is mainly to initiate dialogue among entrepreneurs and inform about benefits from the clusters. Financial support, including European Union funds, is essential to stimulate creation and development of clusters. Taking into account "lessons learned" from other successful cluster examples it is important to focus not only on the creation part of the clusters, but also to daily cluster managing process. Smart cluster administration, participants' engagement and motivation, powerful cluster manager or facilitator is the key factors to successful and sustainable cluster development.

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PRAMONĖS KLASTERIAI: INTEGRUOTOS PLĖTROS KOEFICIENTO ĮTAKA

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Santrauka. Verslo klasterių aplinkoje skirtina horizontalioji ir vertikalioji verslo vienetų integracija. Tai nagrinėjama Latvijos verslo konkurencingumo pavyzdžiu, nušviečiant kooperavimo bei integravimo procesus. Į pasaulines rinkas galima lengviau ir veiksmingiau įsilieti, jei tam tikro sektoriaus tiekėjai ar bendrovės susiejami į geografiškai artimas grupes, turinčias didesnes inovacijų bei eksporto galimybes. Pagrindinis straipsnio tikslas buvo nustatyti pramonės klasterio įtaką integruotai plėtrai apžvelgiant į statistiką, publikacijas ir ekspertinės apklausos duomenis.

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