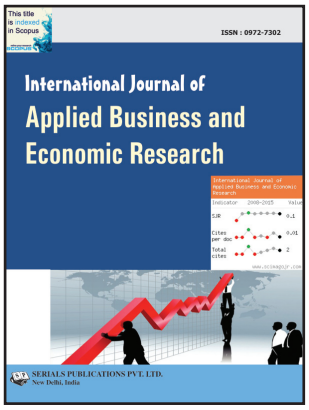

International Journal of Applied Business and Economic Research

ISSN: 0972-7302

available at http: www.serialsjournal.com

Volume 15 • Number 13 • 2017

Regional Economic Clusters in the Context of Management of Technological Leadership

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ABSTRACT

The beginning of the third Millennium is characterized by the transition of society to a new stage of development. This stage is often called post-industrial, informational, post-capitalist, has a number of features reflected in the works of many prominent researchers of the socio-economic transformations of modernity. As its main features, as a rule, the globalization of violating the economic independence of States, changes in information technology environment, resulting in social changes, changes in the production process, and, as their consequence, organizational transformation. The clusters serve as a means of improving the competitiveness of the regional economy, transition to production processes with a higher added value, promote the establishment of constructive relationship between businesses, research, education, financial institutions and governments. The increased interest in the creation of technology parks, business incubators, innovative-technological centers is nothing but a part of the economic policy based on clusters, since the creation of such organizations is designed to provide the necessary production and technological infrastructure for the access of enterprises (particularly small ones) to productive resources. The advantage and novelty of the cluster approach is that it attaches high importance of the microeconomic component and the territorial and social aspects of economic development.

JEL Classifications: P25, P28, R1, R12.

Keywords: Cluster, economic cluster, regional economy, technological leadership.

1. INTRODUCTION

International experience in management of innovation and technological development of the regions shows that at this level, it is an objective process of synthesis of scientific, industrial, economic and social

policy in the form of specific entities, called innovation clusters, with the aim of creating and maintaining an environment conducive to the creation and active use of innovations. The competitiveness of a modern economy, oriented to knowledge depends not only on technical achievements, inventions, knowledge creation, but also on organizational changes that promote the commercialization of scientific and technical developments and marketing innovations.

The methodological basis of the work amounted to methods of comparison, analysis, synthesis, induction and deduction (Dahmen, 1950).

The reliability and validity of scientific statements and conclusions provides an integrated approach to the investigated problem; links to the existing theoretical and methodological works devoted to the study of economic clusters; appropriate methods for the collection and processing of the data characterizing results of activity of high-tech enterprises of the Russian Federation, as well as their contributing factors.

2. THEORY ANALYSIS

As you know, enterprises in a cluster do not function isolated, independently from each other. The implementation processes inside the cluster requires constant communication and interaction between companies and different fields of activity. On this basis, the businesses supply all necessary, sell their products, recycles industrial waste, expand production capacity, etc.

For clusterization of the character of this process, as cooperation, which serves as the basis for clustering.

The cooperation is close and productive ties between the individual enterprises jointly involved in the production of a certain finished product (Gohberg, 2003).

The cooperation promotes the division of labor in the cluster, and specialization, which ultimately leads to a better utilization of productive capabilities of each enterprise, increase their productivity and reduce production costs.

In the manufacture of modern complex machines on the basis of cooperation are tens and even hundreds of enterprises.

The level of development cooperation is determined by the number of enterprises that cooperate among themselves.

There are three types of cooperation:

1. the subject – one enterprise producing finished product has a finished product;
2. exploded – one company receives from other parts or sub-assemblies
3. technology – one company supplies the other semi-finished products or performs a separate operation.

Cooperation is extremely cost effective, especially intra (cooperation within economic regions). Cooperating businesses should be located relatively close to each other (Mattsson, 1987). Otherwise, the inevitable long-distance transport and, in addition, it is difficult to ensure the uninterrupted supply of the enterprises.

Development cooperation creates new opportunities for the rational distribution of production. Some unspecialized large and small firms in these circumstances as would be dispersed, creating clusters of interrelated businesses.

3. DISCUSSION

The process of clusterization of characteristic two mechanisms – outsourcing and subcontracts.

The term "outsourcing" ("outsourcing") is derived from the English words "outside resource using" – "using external resources". In international business practice, this term defines a sequence of organizational decisions.

Outsourcing is the transfer of some previously implemented by the organization of functions or activities to an external organization, or, as they say, a "third party".

Outsourcing is often called the "phenomenon of the XX century" and "the greatest discovery of business of the last decades", as only the end of 80-ies of XX century this concept was included in business practices and have received very widespread (Leamer, 1984).

Robert Monczka from the University of Michigan, believes that there are seven promising trends influencing the strategy of the introduction of outsourcing (Table 1).

Table 1
Trends influencing the strategy of the introduction of outsourcing (Monczka, 1994)

No.	*Trend*	*Strategy*
1	Globalization	– Integration strategies/customer service – Joint with key suppliers maintaining competitiveness in quality, cost, delivery, time, etc. – Modification of channels/structure of the supply base
2	Information technology	– Global strategic chain – Relationship with key suppliers through electronic means of communication
3	Requirements of the external customer	– Integration of logistics in the supply chain external customer
4	Technology process/ manufacturing	– Unions strategic suppliers with industry-leading suppliers of technology
5	Increasing complexity of the work	– The need to create a vast database search source and precise criteria for evaluating the effectiveness relative to the strategic objectives
6	Legal issues/protecting the environment	– Addressing issues of environmental protection, along with supply issues
7	Revision/modification	– Reviewing external processes – Modification of outdated models of for the use of external sources of supply

The processes of economic globalization, which has affected all, without exception, the national economy, largely determine the solution to the problem "produce or buy?" with respect to the choice of source of supply (Bryce & Useem, 1998). When used correctly, international, or global sources of supply (international sourcing, or global sourcing) have become a powerful weapon in competitive struggle.

Laura Birou and Stanley Fawcett in the study of 149 firms revealed the reasons for the use of foreign sources of supply (Table 2).

Table 2
Reasons for using foreign sources of supply (Birou & Fawcett, 1993)

No.	*Reason*	*Share of firms,%*
1	Lower prices of foreign sources	74
2	The presence of foreign products missing in the country	49
3	Orientation of the company on global markets	28
4	Advanced technologies from foreign sources	26
5	High-quality products from foreign sources	25
6	The aggravation of global competition	19
7	The development of foreign investment (precedes global production or marketing)	17
8	Satisfaction countertrade or local requirements	17
9	The opportunity of the best service or delivery	8

Following the import/export of resources step is import/export industrial technology and know-how, the making of the production to regions with cheaper labor, the creation of an international network of production structures. The efficiency of the production system built on the network principle, so obvious that the global economic practice has many examples of creating so-called virtual corporations where the basic, auxiliary and service processes are entirely "outside" of the organization – media trademark (brand).

The company focus on the use of resources of external organizations without reference to their ethnic or territorial affiliation, implemented in practice, the methodology of global outsourcing.

Global outsourcing is a form of organization of the company's activities on an international scale, a direct reflection of the processes of economic globalization.

The liberalization of trade and services, freer flow of technology, know-how and the products of labor of people involved in the production process of products and services regardless of national borders, form a new environment of modern business.

A typical example of global outsourcing is offshore (off-shore) programming which constitutes a significant part of the total IT outsourcing market.

Major manufacturers of hardware and software create special units specialized in the provision of IT outsourcing services. Thus, the practical outsourcing develops together with the development of information technologies in business.

Thus, outsourcing is a broad concept, which unites various forms of mutually beneficial cooperation. Outsourcing, in particular, include:

- using the services of specialized organizations to solve the internal problems of the company (e.g., project development, staffing, staff training);
- the acquisition from third parties of services for the implementation of individual business processes (e.g. logistics, information and financial services, etc.);
- the imposition of production (partially or completely) to regions with cheaper labor;
- projects (partially or fully) by external organizations with the necessary resources, including qualified staff;

- the imposition of the assets beyond the enterprise, creation of subsidiaries and joint ventures to perform certain types of activities (production or services).
- outsourcing is the process beneficial for both the service provider and customer organization.

4. RESULTS

In contrast, widespread in the Russian theory and practice are diametrically opposed, erroneous opinions about what clusters are, on the one hand, identical with the well-established concepts (e.g., domestic territorial- industrial complexes) and, on the other hand, are fundamentally new, universal theory, applicable to any kind of economic problems as a panacea for all economic problems, in the present work it is shown that the clusters represent only one possible model of territorial organization of industrial production, often serving as a synthesis of form relative to others, and at the same time characterized by certain peculiarities and restrictions.

Clusters of information technology: Currently in political and economic circles of Russia are increasingly aware of the need for innovative development of domestic economy, increasing its competitiveness. With this as a possible mechanism of realization of new industrial and scientific-technical policy refers to economic clusters as a means of transition to the knowledge economy as a means of establishing dialogue between business and science.

Consider one of several clusters on the territory of Novosibirsk and determine the factors affecting its functioning – the cluster of information technology (IT cluster).

The absence among IT companies clearly defined process chain along with the geographic concentration allows us to characterize the considered cluster as a regional. It is formed mainly by small businesses, mostly gravitating to the Novosibirsk AkademGorodok. It is based on the intellectual capital of Novosibirsk universities and research institutes and infrastructure NNTS.

The phase of the life cycle of this cluster can be attributed to developing – in the power of education, both formal and informal alliances among firms and involvement in these alliances new members.

Participants in the IT cluster are mainly involved in the production of software, automation, telecommunications and information protection. The predominant activities are the production of IT-products and provision of IT services, they are 92 and 69% of the surveyed firms. Moreover, IT companies also provide other related to the main production process of business services, conduct research and development. Slightly fewer firms in the cluster involved in such activities as the distribution of high-tech products and service.

The average lifetime of cluster's firms is 8 years. Firms are mainly represented by two organizational-legal forms are limited liability companies and closed joint stock companies. About 31% of firms consider themselves to be members of the cluster, 23% - no. Managers of other companies for one reason or another found it difficult to answer the question of the ownership of his company to him.

Some clusters eventually begin to play a local role in the region, and regional. They form the whole corridors. This is the Corridor of innovation development "Tomsk-Novosibirsk-Biysk".

Innovative-technological cluster – based regional economy. Biysk cluster of high-tech enterprises: "Altai" has traditionally been a leading developer and manufacturer of defense products. From 1988 to

1993 as a result of minimizing the defensive order of the enterprise is almost completely suspended its activities, but it belongs to the defense industry has played a positive role, allowing you to create dual-use technologies, new technologies of civilian areas at the level of world standards. In the difficult reform period of the military-industrial complex on the basis of "Altai" and with his participation as a founding member was established more than 100 small and medium-sized enterprises of various organizational-legal forms in several areas of activity. Originated integrated research and production complex (IRPC) "Altai" (Ragulina, Lebedev & Popov, 2013). To this day "Altai" acts as a regional leader, contributing to the creation of innovative infrastructure in the region. In accordance with the strategy of development of Altai territory till 2025 the city of Biysk is defined as a center of innovation in the region, and "Altai" is a basic research center of the science city.

Cluster of innovative companies: Another way of formation of clusters close to the liberal idea, it is possible to observe in the Novosibirsk region, where a cursory analysis draws attention to the high-tech sector of the economy, occupying a number of areas leading position in the country. The high concentration of knowledge-intensive companies along with the existence of the scientific educational center of international significance suggests the presence on the territory of the Novosibirsk agglomeration innovation cluster. This cluster was formed mainly by small businesses, mostly gravitating to the Novosibirsk AkademGorodok. The Foundation of the cluster is the intellectual capital of Novosibirsk universities and research institutes and infrastructure. Originating mostly in the 90-ies in the conditions of crisis the funding of science on the basis of units of SB RAS institutes and the efforts of individual researchers, to date, the cluster companies have become independent, both economically and legally. Thanks to its innovative component they are able to produce unique products. And it allows them to create their own specific niche in demand product. Coordination and cooperation of the companies in the cluster are carried out through participation in business associations, leading of which are non-commercial partnership "SibAcademSoft" and the Association SibAkademInnovatsiya.

Comparative characteristics of the two clusters are given in Table 3.

Table 3
Comparative characteristics of Biysk and Novosibirsk innovation clusters

Indicators	*Biysk cluster*	*Novosibirsk cluster*
Dominant type of relationships	Vertical	Horizontal
Presence of the backbone of the company (asymmetry)	+	-
Presence of state enterprises	+	-
Source of induction	Artificially stimulated	Evolutionary
Organizational form of coordination relations in the cluster	Integrated research and production complex	Non-commercial partnership, Association
Degree of diversity	Composite	Composite
Internal dynamics	Potential	Latent
Stage of the life cycle	Developing	Developing
Geographical coverage	Urban	Urban

In the degree of diversity both in the cluster can be attributed to the composite, which is a concentration of innovative companies, operating in different, quite distant from each other regions. Such clusters should be considered as a set of smaller sub-clusters, incorporating elements of one sphere of activity. In the case

"Altai" is the following areas: instrument and equipment manufacturing; new materials; biotechnology, pharmaceuticals and cosmetics. In the Novosibirsk cluster specified field is in addition to the IT sector, in contrast to other fields of activity more accurately allocated in a separate sub-cluster, as evidenced by the presence of the formal feature – profile professional associations (non-profit partnership of assistance to development of information technologies "SibAcademSoft").

Both cluster geographical coverage is attributed to urban, and the phase and life cycle – developing the strength of observed formation of formal and informal alliances among firms and involvement in these alliances new members. They are similar in internal dynamics and lack of interactions and identity peculiar to the developed clusters. However, the contrast of the Biysk cluster, which is the backbone of the company, Novosibirsk cluster is clearly symmetric and has evolutionary sources of origin (Feldman & Audretsch, 1999; Avdasheva, 2000). Analysis of the intra-cluster linkages allows us to conclude a predominance of horizontal connections in the absence of a value chain between Novosibirsk companies, while in the Altai cluster is dominated by vertical communication.

The detailed analysis and modeling activities of the clusters showed that the factors that determine the competitiveness of small innovative business, in both clusters include:

- positive effect of regional bodies of state power;
- regular contacts with the research institutions and commercialization of the developments created in the science budget;
- the share of personnel engaged in R&D;
- share of the means of production (raw materials, materials and components, equipment and software), engage with a regional market;
- the quality and diversity of locally available resources and production.

The multivariate statistical method of factor analysis of competitive advantage, were able to identify three sustainable combinations observed in both clusters.

In the first place is the competitive advantages associated with production processes in enterprises (access to cheap factors of production, competent management). However, the company Biysk cluster consider them in conjunction with the promotion of products on the market, and the company of the Novosibirsk cluster service and after-sales service of its products.

The second group of competitive advantages combines the strategy of innovative companies. For the Novosibirsk companies is a combination of competitive advantages, in fact, reflects two main marketing strategies of cost minimization or differentiation strategies in any market niche (Marshalova & Novoselov, 2007). As we know from numerous textbooks, these strategies are antagonists, and confirmed that research. In Biysk cluster this group of competitive advantage boils down to the pricing strategy of the company: either the products are of high quality and in demand regardless of its price or product cheaper than its counterparts, which stimulates demand. These strategies according to the results of the analysis also proved himself as an alternative.

From an institutional point of view, of particular interest is the third sustainable combination of competitive advantages, observed in both clusters, close contacts with contractors, supported personal

relationships. It stresses the importance of informal contacts and communication, increasing as a result of territorial proximity.

As a result we can draw the following conclusions:

- for successful functioning and development of meso-economic systems is critical to the favorable economic conditions generated by the regional authorities;
- important factor of the competitiveness of innovative meso-systems are social networks and ongoing interpersonal contacts, promoting networking, building trust and information exchange;
- for companies in an asymmetric cluster, which are at different stages of the life cycle, an important different source of origin of the institutional environment.

Therefore, based on the fact that one of the goals of development policy clusters (regardless of the type of the object of regulation) should be the formation of networks of small and medium business, today we can speak of fundamentally different models of clusterization.

In some cases, the emergence and development of clusters becomes possible thanks to the cooperation of large companies with medium and small enterprises through the above-mentioned techniques of outsourcing and subcontracts. While large enterprises, with the exception of the production chain a range of business processes and transferring them to small, have the opportunity to focus on your core business, simplify the management structure, reduce costs. Small and medium businesses taking on these orders, began to cooperate with large enterprises on an ongoing basis. This allows him to reduce certain risks and transaction costs, increase the volume of produced goods or services, accordingly reducing the size of fixed costs per unit of output. The role of the backbone enterprises in this model is crucial, especially in the initial stages of cluster development.

The above considerations do not exclude other ways of formation of the cluster through cooperation and competition, albeit not proportionate, but still relatively influential companies operating in the region. This way, in contrast to the previous model requires more interaction between the cluster enterprises and regional authorities as a critical mass of capacity and willingness on the part of business may not be sufficient for successful initial launch. Therefore, the mechanisms of public-private partnership and activity of public associations in such a scheme could be decisive for the successful development of a regional cluster.

In recent times the importance of the three local innovation clusters (the city of Tomsk, Novosibirsk, Biysk) has become so great that the clusters began to merge into a corridor of innovation development. The priority direction of diffusion of innovation of this corridor is the access to foreign Asia.

5. CONCLUSION

The main goal of the clusterization is set and the complexation in the territory, that is, the formation of the complex of interrelated enterprises, cooperate among themselves to more profitable produce the final product.

In the result of carried out researches it is possible to do the main conclusion: the cluster approach is much more pluses than minuses. The cons consist of several problems faced by the emerging clusters. These include: difficulties in the creation of a network of small enterprises; failure to fulfil contractual

obligations; the impossibility to calculate in advance the demand for products; the complexity of the processes determining the efficiency of the clusters due to the lack of statistics; the gap between theory and practice.

The importance of clusters in the economy of the region and the country as a whole on the contrary a huge. Among the main advantages of clusterization of: increase of tax payers and the tax base in the region; forming a convenient mechanism of interaction with the business; display of reasons for diversification economic development of the territory; improvement of the HR infrastructure for the business; reducing costs; increasing opportunities for more successful entry into international markets; minimizing the cost of innovation; a deepening of the social division of labor; increased competition; organization of production without the need to purchase equipment, etc.

International experience teaches us that a country succeeds if the economy is developing clusters.

Acknowledgement

The article was implemented within the framework of the grant of the President of the Russian Federation for state support of young Russian scientists - doctors of sciences (MD-651.2017.6).

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