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Concept of Cluster Management in the System of Innovative Development of Regional Economy

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ABSTRACT

The paper is dedicated to the relevant issue of regional development – designing a new paradigm of managing region's economy – cluster management. The growth pole theory is viewed as a precursor of economy clustering. "Cluster" and the adjacent concepts are studied and the author's view on their meaning is justified. Existing foreign approaches to assess the economic growth pole theory as a precursor of cluster management have been analyzed and the use of the approach developed in the given research has been justified. The necessity of implementation of cluster management as a combination of sectorial and territorial management in order to create conditions suitable for effective functioning of a certain region and national economic in general has been proved. The role of knowledge in creating innovative industry clusters (IIC) has been defined. Suggested methodological approach feature is taking into account not only sectorial indicators of regional economy, submitted in statistical reports of Russian Federal State Statistics Service, but also organizational, scientific, technical and technological evaluation of the development, which brings into focus consideration of choosing priorities among lines of international and national development to identify region's determinants and create competitive advantages for them allowing to ensure economic growth through the development of the real sector of Russian economy.

JEL Classifications: R11, L69, O49, R10.

Keywords: Growth pole theory, clusters, cluster management, innovative industry clusters (IIC), cluster chain reaction, cluster regions, institutions of cluster development.

1. INTRODUCTION

At the core of the stable development of modern Russian economy lie determined actions of business and state, which assist integrational process growth and stimulation of innovative activity of economic entities. Achievement of these goals is directly linked to the development of innovative industry clusters (IIC) as the points of growth, localizing interaction of science and education, business, development institutions and authorities (federal and local). Effects of the cluster systems are widening of cooperation relations between economic entities; completing the production chains of cost creation; developing of import-substituting competences and manufactures; raising investment attractiveness and competitiveness of companies and regions, where they are based.

Framework of the cluster policy in Russia is set by the Concept of a long-term socio-economic development of Russian Federation till 2020 (adopted by the order of the Government of the Russian Federation of 17 November 2008, No. 1662-p). It sees creation of industrial clusters in urbanized regions, aimed at high-tech manufacturing in high-priority sectors of economy and in poorly developed regions, aimed at deep processing of raw material and energy production using modern technologies as one of the key conditions required to modernize economy and fulfill competitive potential of the regions (“Order of the Government of the Russian Federation”, 2008). According to the Strategy of innovation development of Russian Federation till 2020 (adopted by the order of the Government of the Russian Federation of 8 December 2011, No. 2227-p), creation and development of clusters in the constituent entities of the Russian Federation should lead to the growth of business competitiveness through effective interaction between cluster members, caused by their geographical nearness, improved access to innovations, technologies, know-how, special services and highly qualified personnel, decrease of transaction costs and implementation of cooperation projects (“Order of the Government of the Russian Federation”, 2011). Escalation and acceleration of global economy changes in combination with the increase of turbulence (uncertainty, risk, chaos) and other threats to future development defines urgency of solving problems with spatial development of national economy. Focusing on these problems during the global crisis is essential for survival of the domestic enterprises in the real sector of economy. In this aspect it is important to design and prove new models of development, aimed at solving tasks of regional strategic management. This design concerns solving problems in several directions – creation of dataware, software, hardware, new determinative rules of establishing and maintaining decision-making process based on new management methodology in the external environment as well as in the internal sectorial and territorial environment. In other words, complex of regional destabilizing factors should be taken into account. It is in this aspect that the cluster impact on economy development should be studied.

Cluster requires a long-term partnership of interrelated economic entities to benefit from the synergetic effect as a result of efficient interaction of partners’ abilities based on cooperation. Cluster management of economy is a new institution, formalization of the complex of methods and techniques contributory to the use of new approaches to managing development of a certain region. All clusters are built according to the sole scheme: interaction of various activities maintaining regularity of the final product manufacturing on the certain territory.

2. THEORETICAL APPROACHES TO CLUSTER DIVERSIFICATION RESEARCH

The foundation of global policy of clustering economy is considered to be the theory of “industrial districts” by the English economist Alfred Marshall (1920). In his book “Principles of Economics” (chapter

“Concentration of specialized industries in separates districts”) (Marshall, 1983) he reviewed specifics of geographical regions in which people having the same working skills unite into insular industry formations (Marshall’s units) created by “cooperation and competition”. Development of industrial regions depends on, first of all, the growth of economic activity of a certain area, or in presently used terms, regions.

According to the growth pole theory, the reason for uneven development of the regions is the level of agglomeration of the industrial activities, which means territorially compact placement of population centers, united by intense economical, labor, domestic and cultural relations (“Regional agglomeration”). In other words, it was emphasized that exchange operations could not be considered as the only panacea for economic growth. Albeit exchange operations are vital for a market economy, they do not create added value. This is a feature of industrial activity, which results in returns on production increase.

Methodologically speaking, this is an important moment of understanding the practical meaning of the growth pole theory in terms of “cumulative conditionality” of the factors of economic development (Rosenstein-Rodan, 1958). This aspect is especially evident in the work of François Perroux “Economic Space: Theory and Applications” (1950) (Perru, 2007). It focuses on the analyses of the role of space in economic development. In this regard in the concept of “growth poles” the growth factor aspect shifted in the direction of spacial domination effect, which points out that to ensure economic growth of the certain area, the certain “moving sectors” should be defined. In the 1980’s research of industrial regions of the so-called “Third Italy” (Becattini, G., Brusco, S., Bellandi, M., etc.) led to the resurgence of interest to spacial agglomeration of economic activities (Nosova, Mackulyak et al., 2016). Practice proved that while global economy demonstrated stagnation and recession, regions of the north-east and central Italy showed steadiness and even growth. These regions succeeded in taking strong positions on the global market of such traditional goods as shoes, furniture, ceramic tiles, musical instruments, etc.

Formation of the cluster theory began in the last quarter of the twentieth century and is related to the research of Michael E. Porter. Cluster began to be seen as an important factor of the region’s economic growth. Porter defines cluster as a geographic concentration of interconnected companies, suppliers of specialized inputs, providers of specialized infrastructure, companies in related industries and institutions linked to their activities (such as universities, standards-setting agencies, trade associations) in a particular field bound by commonalities and externalities (Porter, 1993). In his opinion, clusters represent economic tendency to integration and generalization. This is the base of modern evolutionary theory of economic reformation, related to moving from industrial society to global knowledge economy. Porter’s theory was also developed in the works of many western economists (Porter, 2001).

The modern growth pole theory recreates research on the interconnection of sectorial economic agents, regional space and innovations. The growth pole theory with the emphasis on spacial development, in the end, has led to creation and further development of the concept of cluster management system.

3. PARADIGM OF THE CLUSTER MANAGEMENT SYSTEM

Based on the spacial aspect, i.e. establishing activities on the certain territory, the reboot of sectorial approach to management takes place. It is becoming a thing of the past. *Cluster approach being a method of combining sectorial and territorial management of economical entities development is replacing it. As rightly pointed out, cluster management is a complex of actions (united, targeted, documented) of business, authorities, educational and research institutions and other cluster elements to create advantageous conditions for business environment to*

develop clusters and raise efficiency of all their elements. Use of a cluster approach to economic management is clearly caused by the necessity of resolving contradictions between capabilities and needs of society development under globalization (Nosova, Novichkov et al., 2016). Cluster management is *a new form of regional management*. Objectively there is a need for new methods of regional management based on modern strategic planning of the spacial development of the country.

Cluster system of management consists of active elements, participating in a complex of processes. In practice, active elements of a system have functions, resources, strategies and goals, which can evolve over time adapting to the environmental conditions changes.

In this aspect, *cluster management system* has a feature of the *synergetic integrity* and *synergetic potential* related to it – the ability for a cluster system to confront challenges and conflicts in the outer environment (Roberts, 2002). By our definition, *synergetic potential* of the cluster management system is what makes the system steadfast to shocks and changes of the outer environment. It also has an *additional synergetic effect* – an effect of corporate interaction of *the active elements*.

Cluster strategic management is a method of management, allowing to reconcile the objectives and capacities of the company with interests of all sides concerned by its activities, so-called stakeholders.

It consists of:

- prognosis of the ways to see the future;
- construction of alternative actions and directions potentially possible in the future;
- estimating the risk of economic obstacles and chaos for these directions;
- assessing the impact, which made decisions can have in perspective.

The time factor in cluster strategic management should be considered across the board, which leads to inevitability of making decisions in conditions of uncertainty, risk and instability of cluster diversification development. Considering irreversibility of changes in reality, where chaos and economic obstacles exist, the time factor becomes crucial. Promptness of cluster management reaction to these changes depends on it. That is why there is a pressing need to find new *approaches and methodology* for solving so-called nonlinear tasks. A new type of tasks is put on the agenda of the modern theory of optimal management – the tasks of optimal programming and management of the stochastic processes, which regard time factor and feedback. In conditions of rapid changes of the outer environment, the cluster management response to upcoming threats should be *not only quick but also precise*. That is why it is necessary to design a model of optimal programming, which considers destabilizing factors and can be targeted to any goal on the “goals and objectives tree”.

In the region the “cluster force” can be united and build long cause-effect relationships. This will lead to the structural realignment of the region and creation of the so-called overcluster forces (or meta-factors). Using it as a basis and considering modern view on chaos it can be said that clusters are both a sphere where high level of chaotic instability of a system manifests itself and an algorithm or rules by which factors (working forces) change the structure of regional system and the “reality” of its functioning by building long cause-effect relationships.

Since in cluster region, where *rules of conduct have changed*, a system starts to act as when cluster forces *can unite and almost instantly change the state of the system*. This means that this region can be stable again and

play a role of *strategic order parameters*, which allows to use it as *strategic instruments* – prognostication and strategic choice.

4. POINTS OF DISCUSSION IN CLUSTER MANAGEMENT RESEARCH

In world practice, there are various established forms of stimulation of the cluster initiatives, assuming use of institutional mechanics providing a direct state support of cluster forming as well as an indirect one, i.e. budget preferences promoting development of new, strategically significant technologies. Institutionalization of cluster processes allows to ensure timeliness of the access to necessary resources, determine real, perspective ways and necessary actions to enter the market and then expand this presence. Specifics of methodological approach lies in the opportunity of interaction and reconciling interests of technology developers, industrial production, institution of development and authorities.

Despite the in-depth studies of patterns of economical space development in the Russian Federation, including the ones based on the cluster principles, there is no unified conception of the special region development in modern conditions, allowing to create and efficiently use competitive advantages of regions in networked economy.

Methodological issues in the need of detailed consideration in terms of Russian and regional peculiarities includes also rationale for strategy (conceptual view) of creation and development of a certain cluster; designing methods of cluster initiative implementation and arranging the interaction among cluster members; rationale for measures and method of state support of cluster development.

A list of high-priority directions and technologies currently in force while creating an IIC does not, in the authors' opinion, correspond enough to state's priorities and needs of the innovative development of Russian economic system, which leads to inefficient use of state budget. This results in a violation of principles of efficiency and effectiveness of the strategy, based on the necessity of reaching a desired goal with minimal resources according to the documents on strategic planning, made throughout planning and programming.

5. DETERMINATION OF INNOVATIVE INDUSTRY CLUSTERS (IIC) IN RUSSIAN ECONOMY

Strategy of innovation development of Russian Federation till 2020 emphasizes the creation of innovative industry clusters (“Innovative Development Strategy till 2020”, 2014). This means that on a specially designated area special conditions have to be created for research and development, proposing competitiveness growth of a certain territory, the so-called regional economy. That is why building of economy based mostly on spreading and use of intellectual capital, as an accelerator of innovations in all industrial sectors is a feature of modern spacial development of Russia. Therefore, it is necessary to create conditions for energization of innovation activities in mechanical engineering, building construction, aircraft, space, radio electronic, nuclear and other industries and complexes. It makes it possible to speak about economic development in the coming decades, based on the new system of companies' management and establishment of modern economic methods of public and private partnership, lease, long-term lease and project finance for efficient use of the large investments, diversification of clusters' sources of financing.

The main features of IIC are:

- innovations – the main cluster factor;
- certain area – the cluster foundation;
- certain sectorial directivity – the cluster specialty.

It leads to the concept of the innovative industry cluster (IIC).

The choice of IIC as a new tool of economy management has required in-depth study of cooperation between research and development, sectors of business, institutions of development and authorities. In this aspect IIC should be seen as a driver determining modern socio-economic development.

IIC acts as a “core” in the scenario of the socio-economic development of a country. For IIS to be developed it is necessary to use *breakthrough (radical) innovations as well as supporting (refining) ones*. It is known that IIC development is based on *business development, key competences, innovative infrastructure*. They provide a *balance within three types of activities – investment, innovative and financial* (the methodology of practical implementation of the development process).

The choice (rationale) of the optimal way of IIS development now, considering limited resources, is possible using the concept of network planning, design of methods and instruments for development – *outsourcing, franchising, benchmarking, etc.* In the long run, it is a new management technology of competitiveness growth in the system of socio-economic development not only of a certain region, but also of the whole country in general.

Among the preconditions of cluster creation the following can be emphasized:

- possibility to cooperate with the companies situated in the area;
- economies of scale;
- full access to the information;
- availability of special natural resources;
- provision of special labor;
- proximity to consumer markets;
- work of the several companies in a region for a single client.

Realization of the above mentioned preconditions of cluster creation in the regions aims to address the following issues of cluster management:

- enhancing the competitiveness of enterprises and organizations, industry in general, improving the quality of life in cluster regions;
- development of innovative, industrial, transport, energy, engineering, housing and social infrastructure;
- attracting investments and skilled labor in regions;
- providing effective support for enterprises, organizations and industry in general from funds of the consolidated budget of the Russian Federation and institutions of development, extrabudgetary sources;

- creation and development of efficient methods of public-private partnership in nuclear energetics;
- development of international cooperation and integration.

In Russia during the current economic crisis, it is necessary to determine the priority of cluster creation more attentively. The first clusters to be made must be the ones targeted at innovative development, leading to the faster transition to modern technological structure.

Existing methods of cluster creation are different in their economic value, but the algorithm of cluster creation is similar for most of them.

The government's organizational and economic method of managing cluster creation and maintaining provides a targeted, interconnected and functionally organized management – a complex of institutions, rules and regulations for creation of certain phenomena under certain conditions.

Improving the management in cluster system to correspond to the strategic vision, interaction between sectorial and territorial management, innovative prognostication is vital for solving tasks of competitiveness growth not only of a certain region, but also of the economy in general.

6. CONCLUSION

1. In the present circumstances for studying clusterization processes general scientific methods of researching economic and social phenomena should be used to the maximum degree. For instance, our analysis of the “growth pole” concept allows to emphasize the special economic development using clusters, in which with progress of the market principles and economic institutions interconnection of enterprises and organizations is implemented via creation of stable vertical and horizontal relations, which determine efficiency of all its components, provide the high level of competitiveness and stimulate innovative processes within the whole area.
2. Cluster requires a long-term partnership of interrelated economic entities to benefit from the synergetic effect as a result of efficient interaction of partners' abilities based on cooperation. Cluster management of economy is a new institution that is formalization of the complex of methods and techniques contributory to the use of new approaches to managing development of a certain region. All clusters are built according to the sole scheme: interaction of various activities maintaining regularity of the final product manufacturing on the certain territory.
3. Cluster is both a sphere where high level of chaotic instability of a system manifests itself and an algorithm or rules by which factors (working forces) change the structure of regional system and the “reality” of its functioning by building long cause-effect relationships. This means that cluster forces *can unite and almost instantly change the state of the system* and also be used as *strategic instruments* – prognostication and strategic choice.
4. Based on the spacial aspect, i.e. establishing activities on the certain territory, the reboot of sectorial approach to management takes place. Cluster approach being a method of combining sectorial and territorial management of economical entities development is replacing it. Cluster management (in the broad sense) is a complex of actions (united, targeted, documented) of business, authorities, educational and research institutions and other cluster elements to create advantageous conditions for business environment to develop clusters and raise efficiency of

all their elements. Cluster management system has a feature of the synergetic integrity. It has a synergetic effect – an effect of corporate interaction of the active elements. The regional authorities play the crucial role in the creation of cluster management.

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References

- Innovative Development Strategy till 2020*. (2017). *Nosova SS concept of innovation clusters: theoretical and methodological aspects*. Retrieved 9 February 2017, from <http://www.economy.gov.ru/wps/wcm/connect/>
- Marshall, A. (1983). *Principles of Political Economy, (1)*. Moscow: Progress.
- Nosova, S., Mackulyak, I., Lyubimtseva, S., Askerov, P. & Shkalaberda, L. (2016). Ul'vi Takhiroglly Aliev. New Management Model of Modern Russian Economy: Regional Aspect. *International Review of Management and Marketing, 6(S6)*, 21-26.
- Nosova, S., Novichkov, A., Novichkov, V., Askerov, P. & Rabadanov, A. (2016) Turbulence in the Russian Economy Management System. *International Journal of Economics and Financial Issues (IJEFI)*, 6(S1), 233-238.
- Perru, F. (2007). Economic Space: Theory and Applications. *Spatial Economics, 2*.
- Porter, M. (2001). *Competition*. Moscow: Publishing House Williams.
- Porter, M. (1993). *International competition*. Moscow: International Relations.
- Regional agglomeration*. (2017). *Wikipedia*. Retrieved 9 February 2017, from https://ru.wikipedia.org/wiki/regional_agglomeration
- Roberts, B. (2002). National and regional corporate spatial structure. *The Annals of Regional Science, 36*, 347-368.
- Rosenstein-Rodan, P. (1958). The Notes of the Theory of the “Big Push” in “Economic Development for Latin America”. *The Strategy Of Economic Development*, 25-31.