

Innovational clusterization as a principle of sustainable development of a regional economic system

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Abstract — The strategic backgrounds of development of innovational clusters as a principle of sustainable development of regional economic systems are created. The interrelation between an increase in efficiency of innovative cluster development and transformation of the regional market environment is revealed. Basic features of support of innovative clusters development by means of an increase in diffusive processes efficiency are determined. The methodical backgrounds of innovative clusters development with the specified characteristics on the basis of diffusive processes considering simultaneous reorganization of the regional market environment and forming of competitive accounting entities are developed.

Keywords — *sustainable development of a regional economic system, innovational cluster, diffusion of innovational technology processes, regional market environment, integration of regional industrial complexes*

I. INTRODUCTION

Under the conditions of the Russian economic system diversification and its transformation as affected by change of technological way it is reasonable to strengthen integrational processes of the industrial enterprises allowing to use competitive advantages, both separate accounting entities, and integrational education in general. The most important method of integration - is clusterization with participation of industrial enterprises. The cluster covers different geographical units whether one city or the region or several territorial units [1]. The creating of clusters process gain popularity in the Russian economic system and sometimes looks as a panacea for all existing drawbacks of an producing sector development and an opportunity to achieve forming of the effective integrational structures creating basic principles of regional economic system transformation in the shortest possible administrative way. Especially this tendency appeared in artificial forming of innovational clusters without their development strategic bases, methodical aspects of their creation and transformation influenced by changes of environmental conditions which often leads to formation of the "abortive" clusters that don't have the sufficient potential for their development. At the same time initiative emergence

of innovative clusters under the influence of technological way without direct external impact needs further support. Evolvement of new technological way will be followed by transformation of economic agents and transition to continuous innovational process. It is reasonable to consider an innovational cluster as main integrational form for innovational processes reproduction. Organization of innovative clusters introduces a new sense in integrational process at the level of regional economy [2]. The viability of the origin and development of initiative innovational clusters is predetermined by favorable external and internal conditions which may and shall be created with the prescribed direction of innovational cluster development. Innovational clusterization allows purchasing and developing the existing capabilities of economic entities, to counteract the hostile external market environment and to create opportunities for adaptation to changing of technological mode. The base of favorable external conditions forming is support and development of innovational capacity of the region or several subnational entities where the innovational cluster is created. The cornerstone of creation of favorable internal conditions for innovational cluster development is elaboration of the support of particular stages of lifecycle system of a regional innovational cluster by means of updating and upgrading of structural interrelations between participants of an innovational cluster; "implementation" of new structural elements in an innovational cluster; continual reproduction of innovational processes within cluster activity and their usage in manufacturing process.

Updating and upgrade of structural interrelations, "implementation" of new structural elements, reproduction of innovational products and technologies are based on effective diffusion of innovative processes to activities of each participant from innovational cluster. Especial attention needs to be paid to problems of "acceptance" and "rejection" of innovative processes by participants of a cluster; forming of the diffusive processes focused on transformation of a regional innovational cluster for the subsequent development of the "basic" innovative cluster architecture which provides cluster building with defined characteristics.

II. MATERIALS AND METHODS (MODEL)

Benefits and aspects of use of clustering are shown in scientific and practical works of such outstanding foreign scientists as: A. Marshall, W. Isard, I. Hoover, F. Giarratani, J. Jacobs, M. Piorey, Ch. Sable, A. Saxenian, M. Storper, K. Ketels, O. Solvell, J. Cortwright, M. Best, P. Hertog, M. Enright, A. Davis, G. Lingvist, G. Becattini, D. Dosche, T. Andersen, M. Aranguren.

Evolution of the scientific and practical views connected with questions of creation of effective management for clusters emphasized a number of scientific and practical problems. It is possible to highlight main problems of clustering. They are a low efficiency of communication channels forming between a cluster and external environment elements; underpinning and necessity of the choice of basic architecture of creation of clusters; lack of making an effective interaction between participants of a cluster; necessity of forming of scenario approach to prolongation of cluster lifecycle; the inefficient organization of innovative technologies and innovative products diffusion in the course of clusters activities.

The solution of these problems lies in development of scientific and practical idea about creation of basic architecture of an innovational cluster.

III. RESULTS AND DISCUSSION

A. Identification of the factors influencing sustainable development of a regional economic system

Forming of an unified economic paradigm of national economy should be build on the possibility of sustainable development of particular regional economic systems caused by use of the existing and potential competitive advantages of each system under the conditions of diversified evolvement of the external environment and reproduction.

Competitive edges of regional economic systems are underpinned by synthesis of use of the system strategic capacity, its resource opportunities, effective forecasting of development of the external environment and inclusion in this process of integrational formations of the knowledge-intensive industrial enterprises and economic entities. The main obstacles in development of the Russian productive-economic systems are:

- the complicated independent reproduction of economic, manufacturing, labor and financial potentials of an enterprise;
- dependence of development on general macroeconomic tendencies and efficiency of a regional economic system;
- low extent of integration processes of industrial enterprises among themselves and with developers of innovative products and technologies;
- low developed infrastructure for creating of competitive industrial plants;

- lack of strategic vision of development of regional economic systems and the internal industrial items;
- inefficient resource allocation in the terms of the restrictions connected with appearing crisis activities.

Overcoming these barriers shall be involved in forming of system approach to development of industrial complexes which can give additional preconditions for transformation of separate regional economic systems and national economy in general. System approach is based on the most effective use of potentials of the existing regional industrial complexes and on a possibility of reproduction of the new plants due to the forecast of market conditions transformation.

Determination of factors of system approach to development of industrial complexes creation in a regional economic system allows to make progressive elaboration of manufacturing systems which will provide them with immunity as a result of the external environment turbulence and emergence of the crisis activities. Incremental upgrowth of industrial complexes and their effective integration in reproduction of innovative technologies and products, should become a supposition for sustainable development of regional economic systems and forming of new model of economic growth.

The factors predetermining progressive and evolutionary development of regional economic systems can be divided into two groups:

- results of external environment elements impact on development of a regional economic system;
- creation of the most regional economic system of terms for sustainable development and adaptation to turbulent changes of the external environment.

Making of conditions for sustainable development by a regional economic system should be based on structural changes of scientific and technical, producing, economical, investment, labor and social potentials. Successful implementation of structural changes requires reproduction of innovational potential of the economic entities acting on the a regional economic system territory.

Making of innovational potential is one of the most important indicators of competitiveness of economic entities. Due to the development of innovational potential there is a high-quality updating of production capacities and release of new high-technology types of products.

Forming of innovational potential is predetermined by:

- a possibility of business entities to independently produce innovative developments or to use innovative developments of specialized third parties;
- a capability of innovations producers to commercialize innovative developments and to adapt them for market realities and to be able for creating preventive consumer preferences.

Therefore the main strategic task of regional innovative development is the harmonious and coordinated development of innovative system providing a complete cycle of innovations from development of an innovation before its implementation. It is provided within optimal structure of regional innovative system.

In connection with this infrastructure development, increase in innovative activity of the plants, improvement of the investment climate, forming of a regulatory framework of innovative activities, increase in costs for Research and Development and creation of potential for activation of integration process between enterprises will be the main priorities of innovative development.

B. Innovativonal clusterization as fundamet of sustainable development of a regional economic system

The base of sustainable development of a regional economic system is an integration of manufactories for the most effective usage of resource potential and development of innovative products. The examples of such integration associations are innovative clusters.

Formation of new technological mode will be followed by producing intellectualization, transition to continuous innovative process. According to this it is reasonable to consider an innovative cluster as basic integrational form for reproduction of innovative technologies. Organization of innovative clusters brings new ideas to integrational process at the level of regional economy and make a place for the economic growth after usage of industrial capacity of regions [3].

Using of basic architecture of innovative clusterization with the high level of centralization consists of effective differentiation of zones of responsibility between structural elements of an industrial cluster; forming of a transparent management system business processes of separate elements and cluster in general; forming of system of strategic planning of development of a cluster; unified management system for all structural elements; efficiency growth of innovative technologies implementation; centralized upgrade of manufacturing capacities; forming of the general marketing concept of cluster development; creation of the financial responsibility centers within an industry cluster.

Reallocation of resources within a regional economic system or systems should be happened only after the forecast of further development of an innovative cluster and its potential efficiency.

The efficiency and viability evaluation for an innovative cluster should be made over identification of the expected results from its development.

The innovative cluster can be effective only in case of high connection of integrational processes, at the same time it is necessary to depart the identification of an innovative cluster from the economic agent limited to territorial borders.

Transition from territorial borders of clustering which complicate innovative clusters development (because the region cannot always have some accounting entities who are

most corresponding to conditions of cluster development) to producing, logistic, scientific and technical borders which predetermine existing of the plants with the potential for production of innovative products regardless of their location, is necessary but if it's taken into account economic feasibility of use in a cluster of these accounting entities.[4]

The economic feasibility of entry into a cluster of business entities is highlighted by use of entrance "filter" which acts as a barrier to elimination of enterprises with the inefficient internal environment and regulations of the innovative cluster size.

Filtering of plants predetermines their selection which can give a basis for innovative clusters development and to raise competitiveness of a regional economic system by means of toughening of requirements to origin within a regional economic environment of high-technology accounting entities. The mechanism of "filter" can be presented in the form of the special matrix form correlating the potential of accounting entities that want or can be included in structure of an innovative cluster. The strategy of filtering accounting entities in entry into a cluster are provided to Fig. 1.

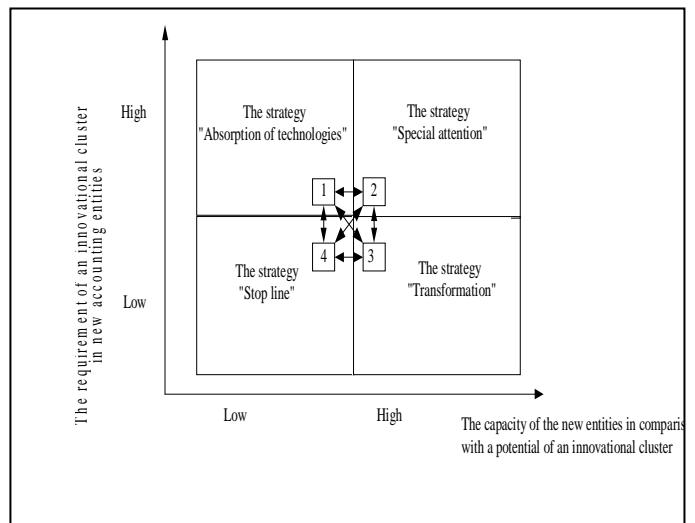


Fig. 1. The strategy of filtering accounting entities in entry into a cluster.

The strategy of "Special attention" provides development within a cluster of the new innovative entities in the form of independent business units.

The strategy of "Transformation" provides change of an innovative cluster structure by means of transformation of potentials of the plants entering a cluster with strengthening of their susceptibility to innovative processes and technologies.

The strategy called "Stop line" attracts change of a profile of economic entities on more demanded, distribution of team of specialists between operating plants of a cluster or complete refusal of services of the accounting entity within the created innovative cluster when it entrances to a cluster.

The strategy of "Absorption of technologies" assumes usage of potential of the subjects entering a cluster for an

efficiency increase acting within integration merging of the entities.

By means of "filter" there is not only an elimination of undesirable enterprises, but also their distribution by the potential within an innovative cluster.

Selection of economic entities in every direction of a matrix form allows to manage lifecycle of an innovative cluster, "implanting" those accounting entities who can introduce positive effect in activities of a cluster at the moment. Thus there is a regulation of concentration of participants within an innovative cluster to preserving economic feasibility of its existence and forming of the "reproductive" function directed to reconstruction within a cluster of new effective economic entities.

If "filtering" business entities performs "function of a conscious barrier" to entry into an innovative cluster, and influences development of a regional economic environment by imposing of rationing arrangements, then the creative function directed to resuscitation of economic entities with their subsequent transformation and reincarnation within a cluster is carried out by diffusion of innovative technologies. It is possible to manage development of innovative activities, influencing the speed of diffusion of innovations. The strategy of "Absorption of technologies" assumes usage by a cluster of the entering plants for upgrade of the existing production capacities of a cluster. In this case technologies of the entering companies are used by the large industrial enterprises constituting a basis of an innovative cluster.

Development of innovative clusters creates prerequisites for goal-setting of the regional market environment transformation and creation of competitive high-technology business entities [5]. It is possible to carry to strategic bases of innovative clusters development forming of "filter" for creation of handling capacity of a cluster; enhancement of diffusive processes within implementation of innovative developments in activities of a cluster of Fig.2.

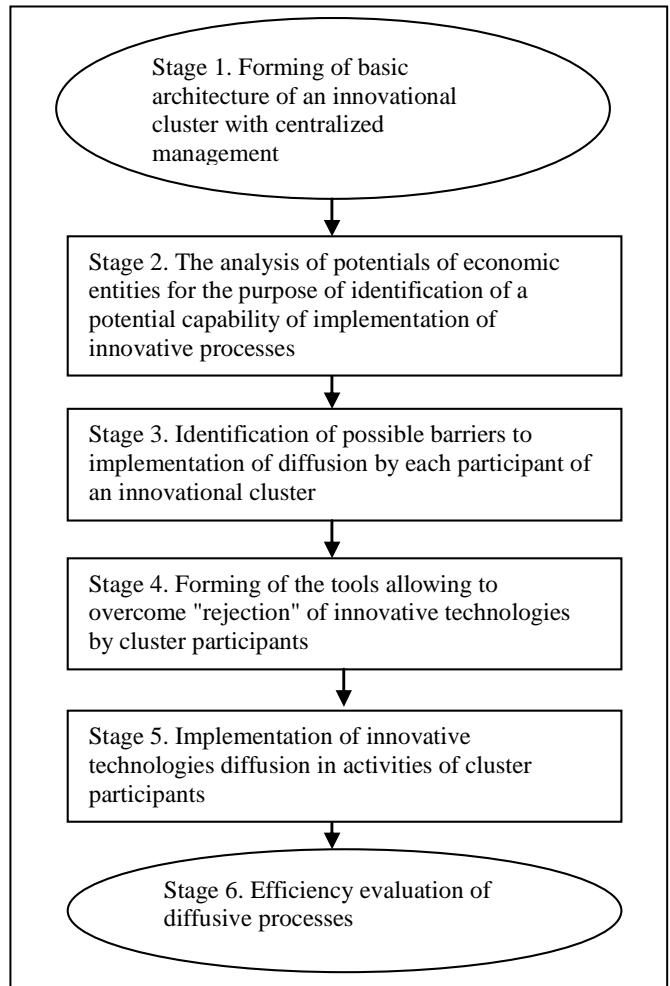


Fig. 2. An algorithm of implementation of diffusive processes in a cluster.

Within activities of innovative clusters is offered to understand diffusion as a process of effective mutual penetration of the innovations produced within activities and out of its limits in technical, technological, productive, logistic, marketing and organizational activity of economic entities of an innovative cluster. Implementation of diffusion within an innovative cluster assumes implementation of the methodical bases including a number of stages: forming of basic architecture of an innovative cluster with centralized management; diagnostics of susceptibility of participants of a cluster to diffusion of innovations; identification of the barriers interfering diffusive processes; creation of effective communication channels for implementation of diffusive processes.

Identification of potential susceptibility of a regional innovative cluster participants to diffusion of innovative processes.

It is necessary to reveal resource base and degree of readiness of economic entities to implementation of innovations for forecasting of the expected result from diffusion of processes in participants activities of an innovative cluster. For this reason it is necessary to determine

scientific and technical, economic, investment, personnel, production potentials of each economic entity that is a part of an innovative cluster. The susceptibility of diffusive processes by participants of an innovative cluster can whether accelerate penetration of results of scientific and technical progress into activities of participants of a cluster or also can create barriers to implementation of innovative processes that will slow development of the cluster. It is possible to carry the following to the factors increasing the speed of diffusive processes: availability of allowances of material and financial resources, progressive processes, required scientific and technical and economic infrastructure, flexibility of an organizational structure of the company, prevalence of horizontal information flows.

Determination of potential susceptibility of participants of a regional innovative cluster to diffusive processes should be performed by means of a technique, the innovative potential assuming identification of quantitative and high-quality parameters, each participant of a cluster and also the main barriers to the implementation of diffusion of innovative processes allowing to reveal. Acceleration and stimulation of diffusive processes within an innovative cluster allows to create basis for development of potentials of participants of a cluster.

IV. CONCLUSION

Development of a regional economic system on the basis of innovative clusterization of economic entities allows to achieve the following results:

- to create steady external competitive advantage of a regional economic system;
- to make the efficient mechanism of production capacities upgrade of accounting entities;
- to organize the system of reproduction of innovative technologies within a cluster;
- to reach balance between the potential of a regional economic system and effect of its transformation;
- to develop an algorithm of evolution of a regional economic system as a result of scientific and technical progress.

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