

A Cluster Approach to Implementation of the Regional Innovation Development Strategy

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Abstract—Currently, innovation development of the Russian economy is one of the crucial issues. Efficient management forms and development strategies play an important role in the regional innovative development. The choice and implementation of the regional innovation development strategy depends on regional potential and involvement in the innovation process. The article discusses various aspects of formation and implementation of the regional innovation strategy, identifies factors affecting regional innovation activities, and identifies the nature and content of the regional innovation strategy. To implement the strategy of regional innovative development, the authors suggest using a cluster approach. The article describes advantages of this approach, highlights implementation principles, classifies economic clusters and develops a scheme for promoting cluster initiatives in the regional economy.

Keywords—region, strategy, cluster, innovative development, management

I. INTRODUCTION

Most economists believe that regions are important for innovative development of the Russian Federation. Perskiy and Kovalyova say that “the shift of the innovation development to the regional level is evident” [1]. Kleiner believes that “mesoeconomic systems are guides for modernization and other strategic initiatives” [2].

The region is a complex phenomenon, a holistic, spatially organized form, an isolated, integral and complex system performing a single goal and connected with the external environment.

The economic development of the region depends on the effective regional policy. The regional policy is diverse and has various problems to be solved. The regional innovation policy is an integral part of the socio-economic regional policy whose goal is innovative development of the region through creation of economic, legal and organizational conditions for effective innovation activities. Regional innovation processes are controlled through strategic management procedures. The strategy of innovative development sets innovation goals, chooses means towards these goals and attracts funds.

The results of regional innovative development strategy implementation are as follows: a new level of resource conservation, productivity growth, reduction of production costs, high competitiveness of products.

To implement the regional innovative development strategy, it is necessary to assess the innovation potential. The innovation potential of the Russian regions is characterized by a high degree of differentiation and uneven innovative development of regional economies. This is due to the large area of Russia, geographical location, climatic conditions, distribution of fuel and raw materials, historical and cultural traditions, regional specialization, etc. The cluster approach used for implementing the regional innovative development strategy can adjust the innovation policy of the region and help achieve innovation development goals.

II. PROBLEM STATEMENT

Currently, innovation development of the Russian economy is one of the crucial issues. Any Russian region has its own characteristics, but all of them have features of the past social economic formation, and are still in their infancy. Russia is one of the largest countries with the richest natural resources and a huge production and economic potential.

In the conditions of inconsistency, uneven development of the regions, transition of regional social economic systems to sustainable development requires refusal of unification of relations with regional economic actors and implementation of structural policies with regard to the specifics of regional social and economic structure.

The main factor of transition to the innovative development of the region is implementation of a development strategy which will guide regional innovation policies.

The problem of innovative development of regions can be divided into two blocks: selection of the regional innovative development strategy; selection of means used to implement this strategy.

The concept “strategy” includes development of long-term goals and strategy implementation methods. Thus, the strategy is an interconnected set of actions, taking into account the external environment and internal potential achieving regional goals. The strategy includes a cognitive problem based on the ability to see a whole picture made up of numerous separate constituent elements [3].

The innovation development strategy is an activity aimed at setting and achieving long-term goals of the regional innovative development. It improves the management system and regional policies. The regional development strategy is implemented

through creative, forward-looking, efficient and sound management decisions taking into account the specifics of innovative activities. The innovation development strategy involves setting long-term innovation goals and choosing the most effective methods for achieving these goals [4].

The regional innovation development strategy opens up new opportunities for achieving goals. The content of the innovation strategy is determined by the factors of regional innovation activities.

In a simplified form, the innovation development strategy is presented in Fig. 1.

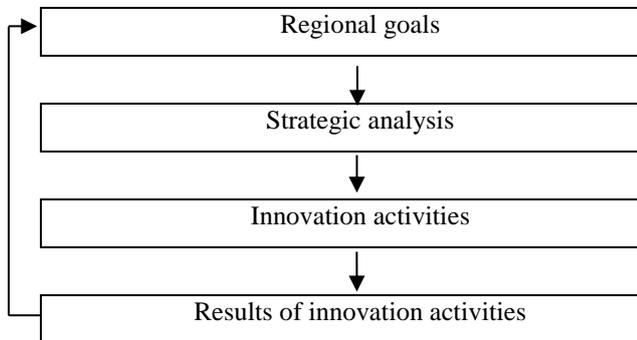


Fig. 1. The content of the innovation development strategy.

At the present stage of national economy development, it is necessary to develop an innovation development strategy based on the own innovative potential.

The innovative potential of the economic entity (region) is a set of intellectual, infrastructural, material, financial, human resources and organizational skills and motives for implementation of innovative activities.

III. METHODS AND MATERIALS

There are various innovation potential assessment methods due to various interpretations of the concept “innovation potential” [5-7]. Currently, there is no single approach to the definition of the “innovative potential”. Diversity of methods for assessing the innovation potential is due to the lack of a uniform method for choosing the components of the innovation potential.

Based on the analysis of the existing definitions of the “innovation potential”, we propose the following definition: a set of intellectual, infrastructural, material, financial, human resources and organizational capabilities and motives for implementation of innovation activities. Resource capabilities of the region are a basis of the innovation potential.

The innovation potential determines capabilities and readiness of the region to create and implement innovation in order to achieve strategic goals [8].

Depending on the main approaches to the definition of the “innovation potential”, the following innovation potential assessment approaches can be distinguished: resource, result and process ones. Within these approaches, some researchers use the methods of expert assessments, other ones use statistical, quantitative data. In most cases a combined method

should be used, since all the methods for assessing the innovation potential have advantages and disadvantages [9].

IV. RESULTS AND DISCUSSION

In order to assess the innovation potential for the development of an innovation strategy, the resource approach is the most effective one. It represents the regional potential as a set of intellectual, infrastructural, material, financial, human resources whose combination provides a synergistic effect within the region and its rapid adaptation to changing economic conditions. Innovation potential assessment is based on indicators reflecting features of a particular region which are compared with the corresponding indicators for other regions.

The choice and implementation of the development strategy determine innovative activities of the region and make it possible to resolve issues related to economic growth, production efficiency and competitiveness improvement. To achieve the strategic goals, it is necessary to follow the regional development strategy that corresponds to the innovative potential. When increasing the innovation potential, the development strategy has to be adjusted [8].

All this requires new tools for regional development. In this regard, an innovative approach is promising as it contributes to competitive development of companies and solves social and economic problems of the region.

Innovative development of the region involves both economic transformations and development of social facilities. Therefore, the following areas should be taken into account when designing spatial economic forms of development:

- priority of the social orientation of the events;
- accounting for market conditions and strategies; cost minimization should be considered as a part of the system taking into account the social significance of the project;
- the effect of making management decisions should be assessed by individual indicators (an increase in the number of small and medium-size businesses, delivery costs, etc.) and their effect on the change in final results of activities which is assessed by social and public significance and total economic viability.

From this point of view, the use of spatially localized forms of economic development can maximize the regional potential, including regional resource and innovative capabilities. The most promising innovative management form is clusters. Let us analyze the cluster approach.

Many researchers consider a cluster as one of the progressive forms of inter-company interaction which can quickly adapt internal structures and external relationships to a rapidly changing external environment.

World practices show that under market conditions, clusters are highly efficient and flexible structures. They are based on two principles - cooperation and competition. Competitiveness is a result of the regional ability to improve the manufacturing sector, stimulate the exchange of knowledge, develop interaction between enterprises. The clusters can influence the competition using three methods:

a) by increasing the productivity of member companies and their activities;

b) by increasing innovation abilities which increase productivity;

c) by stimulating new businesses that support innovation and expand boundaries of the cluster.

Despite the fact that there are no guarantees for the cluster development, the start of the process is followed by a chain reaction with cause-effect relationships. The process depends on the efficiency of existing links or feedback chains, responses of local educational, legislative and other structures, and potential suppliers to the needs of the cluster.

The success of the cluster approach is largely determined by the extent to which it is possible to involve those who are interested in its results and able to contribute to the development of the region. These are industrialists and entrepreneurs, municipal, regional and federal authorities and public associations. There are complex relations between them. Most relations can be redirected to social partnership aimed at developing the region. The strength of the innovative development strategy is due to the fact that it consolidates disparate actions, gathering them into the framework of general guidelines.

The combination of favorable conditions (prerequisites) for the development of competitive industries and involvement of the region in the territorial labor division contribute to the formation of clusters, groups of interconnected competitive activities which are usually locally united.

Clusters are formed both spontaneously and intentionally. By the role of the government in the economic clustering, experts distinguish between two main models of cluster policy implementation: liberal and dirigiste ones. The liberal cluster policy involves development of the clusters that were originally formed by the market. The dirigiste cluster policy suggest determining clusterization directions for the economy, including areas of location of the clusters. It is believed that it is legitimate to purposefully create the infrastructure for such clusters as university branches, research institutes, airports, roads, etc.

Table I presents the classification of clusters. This classification is used for more accurate identification of clusters in the regional economy.

The classification uses an additional criterion for spatial localization of the cluster. The appropriate level of classification is assessed on the basis of the "core" of the cluster, i.e. the main objects around which the cluster performing the main activity is grouped.

The cluster classification is a simplified version of cluster identification; in reality, it is difficult to unambiguously assign each cluster to a particular type. As a rule, they represent their combinations. During their development and under the influence of internal and external factors, a cluster can move from one state of development to another one acquiring new characteristics and losing old ones. However, in order to explain the diversity of spatial and economic models of development

and to understand the nature of occurring processes, it is necessary to determine the type of a cluster.

TABLE I. CLASSIFICATION OF CLUSTERS IN THE ECONOMY

No	Classification feature	Types of clusters
1	Development level M. Enright	- strong; - stable; - potential; - latent.
2	Integration type M. Porter	- vertically integrated clusters; - horizontally integrated clusters.
3	Cluster lifecycle development stage T. Anderson	- agglomeration; - emerging; - developing; - mature; - decayed.
4	Policy of the government, a participant of the cluster T. Tsikhan	- dirigiste (France, Singapore, Japan, Sweden, Finland, Republic of Korea); - liberal (USA, UK, Canada, Australia, etc.).
5	Type of economic activities S. Özkan	- interindustrial; - intraindustrial; - services.
6	The degree of relationship of cluster members J. Gordon, F. McKenn	- having weak relations; - having stable relations; - having a single management body
7	Size and forms of incoming organizations, Adamova K.Z.	- accumulation of small and medium-size enterprises biased toward a large one ("Hub and spoke"); - complexes of large enterprises; - groups of small and medium-size enterprises ("Marshallian clusters"); - clusters "chained" to the government
8	Spatial cluster localization. The level is based on the cluster nucleus (authors' approach)	- regional clusters; - sub-regional clusters; - local unions.

The success of cluster development is determined by the market. Therefore, taking into account the important role of federal and regional structures in creating conditions for the economic clustering, businesses have to play a decisive role in this process. Clusters create a basis for investing, training a wide range of entrepreneurs, developing small and medium-sized businesses, increasing flexibility and mobility of companies, creating a wide range of network structures. In their structure, it is possible to optimize inter-company contacts, establish effective cooperation, coordinate plans of businesses - various organizations involved in a particular activity. In addition, within the cluster, there is a dialogue between businesses, government and academia on how to develop competitive advantages of the region and the country. These foundations of cluster formation make it possible to see the untapped potential of the regions used to implement an innovative development strategy. The cluster approach provides regional authorities with the tools for effective interaction with businesses, a deeper understanding of its features and tactical objectives, and implementation of the regional innovative development strategy.

The economic relations which are a basis for cluster development are based on long-term contracts and vertical and

horizontal interactions between various businesses. They are based on their symbiotic dependence determined by the principles of synergy. There are close relations between the companies belonging to different owners [10]. However, each company preserves its autonomy.

Taking into account all the above, one can formulate a general scheme for promoting cluster initiatives in the regional economy (Fig. 2).

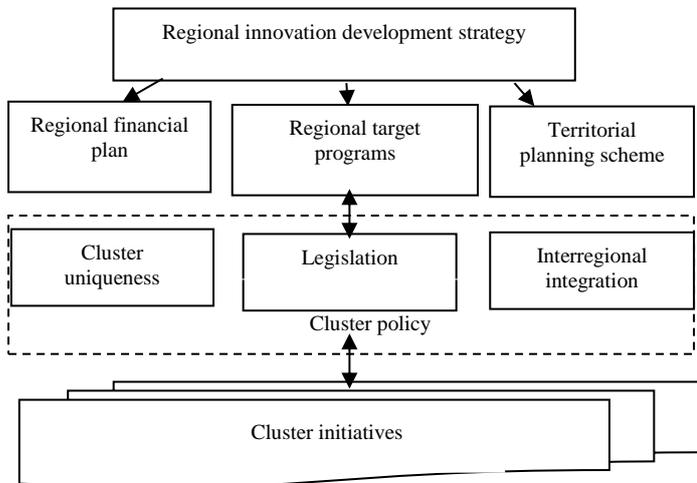


Fig. 2. The scheme of strategy development and support of cluster initiatives in the regional economy

This scheme for promoting cluster initiatives differs from the existing ones as it takes into account interaction with direct participants (suppliers and consumers of cluster group products) and other participants of regional and municipal development (public organizations, local people). In addition, the implemented cluster policy is built into the overall policy of regional development through the strategy of innovative development.

In current conditions, the prerequisites for formation of several well-developed clusters, especially of similar specialization, are rare. Accounting for inter-regional interaction would make it possible to carry out a comparative analysis, evaluation, and share experience.

By combining information on the activities of clusters in various regions, one can contribute to the awareness of clustering processes, similarities and differences of specific clusters, and improve their management system.

An important feature of the cluster is its innovative orientation. Regional clusters are based on the existing sustainable system of distribution of new technologies, knowledge, products. It is a so-called technological network which relies on a joint scientific base. Cluster enterprises have additional competitive advantages due to their specialization and standardization abilities and their ability to minimize the cost of innovation. Their important feature is the presence of flexible business structures - small enterprises - in their structure. These enterprises form innovative points of economic growth in the region [11].

The cluster approach should be based on the following principles:

- a systematic approach involving consideration of all elements of the logistics system of the regional consumer market as interrelated and interacting in order to achieve the unified management goal;

- social orientation and social significance of the measures aimed at improving the regional economic climate;

- total costs, i.e. accounting for the total costs of material flow management for all the cluster members;

- coordination and integration: improvement of the regional economic climate, coordinated, integrated involvement of all project participants in the implementation of the target function;

- modeling and information software support when using mathematical, economic and mathematical, simulation and other models;

- development of the required complex of subsystems that ensure effective management. These are technical, economic, organizational, legal, personnel, and others subsystems;

- TQM - total quality management - ensuring the reliability and high quality of operation of each element of the cluster system to ensure the overall quality of consumer goods and services that are provided to end users;

- sustainability and adaptability: the logistics system created for improving the regional consumer market is stable at permissible deviations of parameters and the external environment.

An important problem of cluster formation is identification and assessment of the cluster. The existing identification technologies along with quantitative indicators cannot be used for simultaneous collection of equally important qualitative characteristics of cluster members. The problem of cluster identification is due to the lacking information base and required meters [12].

At the regional level, the problem of cluster identification is associated with some objective problems:

- identification methods assume the existence of meters that allow for exhaustive assessment of the cluster;

- the spatial boundaries of the cluster do not always coincide with the boundaries of the administrative entities for which statistical data are collected;

- the lack of a standard form for collecting and processing statistical information in the regions to establish product flows, since the inter-sectoral balance method requires calculations at the regional level based on the fractional sectoral classification;

- clusters have a dynamic nature of development and require regular monitoring of their internal qualitative relations [13].

V. CONCLUSION

General approaches to cluster approach development may be typical, but their implementation should take into account peculiarities of the regional development. Thus, detailed

consideration and determination of the order and significance of the procedures performed at the initial stages of implementation of an innovation development strategy should be coordinated with the general course of development of the Russian regions. In implementing the innovation strategy aimed at improving the economic development of the region, it is proposed to use the top-down economic forecasting method.

A special feature of this method is its ability to decentralize the regional distribution system. The use of this method is advisable both when developing strategic plans for creation of spatially localized economic systems and for mesologic zoning of the territory. This procedure will provide an opportunity to make an independent forecast of strategic development for each of the zones allocated within the cluster taking into account their specific features.

When developing an innovation development strategy, it is necessary to assess economic efficiency in the region. The efficiency criterion used in this approach to the implementation of an innovation development strategy is an optimal minimum of the total costs for managing financial, material, informational, service and other flows, while ensuring the required level of service quality.

The integral implementation effect can be calculated using a consistent comprehensive approach to assessing strategy efficiency which takes into account possible structural changes in the regional economy, consequences of the scientific and technical progress and increase in labor productivity, as well as the expected changes in prices and cost indicators. It is especially important to evaluate the efficiency based on the definition of the integral economic effect in the regions of Siberia and the Far East due to the specifics of their economic development. This variant of implementation of the regional innovative development strategy can be used in the regions with specific climatic, infrastructural and social and economic conditions.

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