

Methodical Framework of Forming Territorial Innovation Clusters Based on Import Substitution Mechanism

Marco metodológico de formación de clusters de innovación territorial basados en el mecanismo de sustitución de importaciones

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Received: 2807/2017 • Approved: 28/08/2017

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ABSTRACT:

The article generalizes methodic framework, concepts and international experience of applying the cluster approach, and reveals peculiarities of forming innovation territorial clusters and characteristics of the import substitution mechanism. The approach and tools of modeling the process of forming innovation territorial clusters based on the import substitution mechanism are shown. The diagram of the developed model of the mechanism related to forming cooperation relations in the territorial innovation clusters focused on import substitution is shown. It is defined that the further development of the organization model and algorithm of forming the territorial innovation cluster will be based on the revealed approaches and principles of organizing cluster structures, generalized experience of developing the cluster theory and practice. It is proved that the typical organizational model of the territorial innovation cluster will show the interrelations between the cluster

RESUMEN:

El artículo generaliza el marco metódica, los conceptos y la experiencia internacional de aplicar el enfoque del cluster, y revela las peculiaridades de formar grupos territoriales de innovación y características del mecanismo de sustitución de importaciones. Se muestra el enfoque y las herramientas de modelar el proceso de formación de clusters territoriales de innovación basados en el mecanismo de sustitución de importaciones. Se muestra el esquema del modelo desarrollado del mecanismo relacionado con la formación de relaciones de cooperación en los clusters de innovación territorial centrados en la sustitución de importaciones. Se define que el desarrollo ulterior de la organización modelo y algoritmo de formación del cluster de innovación territorial se basará en los enfoques y principios revelados de organización de estructuras de cluster, experiencia generalizada de desarrollo de la teoría y práctica de clusters. Se

members and must be focused on the development of the cluster structure.

Keywords: territorial innovation cluster, import substitution mechanism, cooperation interrelations, modeling, mechanism, competitiveness.

demuestra que el típico modelo organizacional del cluster de innovación territorial mostrará las interrelaciones entre los miembros del cluster y debe centrarse en el desarrollo de la estructura del clúster.

Palabras clave: cluster de innovación territorial, mecanismo de sustitución de importaciones, interrelaciones de cooperación, modelización, mecanismo, competitividad.

1. Introduction

Territorial innovation clusters are a group of enterprises and organizations (members of the cluster) located on the limited territory and characterized by the research and production chain in one or several areas (key types of economic activity) uniting the cluster members, mechanism of coordinating the activity and cooperating members of the cluster, synergetic effect expressed in improving the economic efficiency and performance of every enterprise or organization due to a high degree of their concentration and cooperation.

Nowadays governmental authorities and research community pay much attention to problems related to forming and developing territorial innovation clusters because cluster structures allow solving a number of issues on creating new workplaces, import substitution, and social and economic development of the territory as a whole.

However, the terminology, organizational procedures and processes of forming territorial innovation clusters based on import substitution have not yet been entirely worked out, which explains the urgency of this research.

2. Methodology

The role of clusters in developing regions economy in the context of studying regional aspects of the national economy development has been researched by many authors (Strategy of Innovation Development of the Russian Federation for the Period of up to 2020 approved by Order of the Government of the Russian Federation No. 2227-r, 2011; Agamirova, Agamirova, Lebedeva, Lebedev and Ilkevich 2017; Oerlemans, Meeus and Boekema 2001). The regional cluster can be graphically represented as a pyramid consisting of three levels. The first level includes leading companies that export products and services outside the region. The second level is a network of suppliers, a lot of small and medium-sized companies, firms that have separated from parent companies. They make up so called eco-system and deliver components and services for the key company. Finally, the third level is business climate, social and economic infrastructure: various organizations that provide the key company with human, financial resources and infrastructure.

Regional clusters are the main objects of the state cluster policy. In particular, it is related to supporting researches and research organizations that are parts of the cluster. Consequently, the regional cluster is interpreted as an organism, or regional eco-system that provides competitiveness of cluster's key members.

The main thing in forming the cluster is the opportunity of enterprises that work in various areas to support each other by their activity. Enterprises within the cluster do not compete with each other, and get opportunities for developing new types of products and not only for developing the main production. Service for enterprises is well-developed inside the cluster. Setting certain requirements to others, every enterprise strives to comply with the requirements set by other agents of the market.

The most important advantage of the cluster approach is the fact that it focuses attention on the relations between types of activity and economic units, as well as pre-requisites of competitiveness, i.e. on the development of the system of production and competitive factors, decrease in transaction expenses, increase in efficiency, and achievement of additional system benefits from improving the information exchange between firms and types of activity (Karpov

and Aleschenko 2016).

The cluster system is an important notion related to specifying the cluster location in the space. It is also possible to consider a territorially localized social and economic system formed by a group of economic subjects that sustainably interrelate with each other by exchanging services, people, ideas, information, and, as a result of this interrelation, obtain certain competitive advantages as compared to similar "nonsystem organized" economic subjects as a cluster system.

As a rule, the cluster system is characterized by a complex hierarchical structure and relations of mutual dependence and mutual stipulation between its elements. Thus, the cluster system is considered as a structural component of certain regional space, and characteristics of cluster system are considered similarly to characteristics of social and economic systems.

Process of strategic planning becomes a core of efficient functioning of the cluster as a system. Strategy of determining (forming) and developing regional cluster systems (regional cluster strategy) is a plan of actions on re-organizing the region's space. In their works the authors (Novitskiy 2014; Reference Materials on Creating Industrial Cluster. Letter of MIT No. 7979/02, 2016; Liu 2017) offered a concept of strategic planning in social and economic systems, where the strategy was defined as a combination of ways to solve problems of their development.

The formation of congruent (adequate) cluster structures is an efficient tool to solve problems on social and economic development. At the same time national researchers of cluster processes have not yet started solving an issue on the principles of forming cluster structures in macro-regions and the country as a whole.

However, the national level of the spatial organization uses the notion of cluster policy related to the efforts of the state in forming the desired clusters in regional spaces. The majority of researchers agree that the cluster policy must be defined as actions of state bodies of the national and regional levels focused on supporting processes of the economy clustering.

The national strategic task is to stimulate and support processes of clustering the country economy because clusters implement competitive advantages of regions. The authors of the article define the cluster police as a system of state measures and mechanisms of stimulating and supporting clusters that provide sustainable, balanced economic development of regions and the country as a whole, implementation of innovations, implementation of comparative (competitive) advantages of these territories.

It is important to emphasize that the cluster policy of the federal government must support the growth of the existing or arising regional clusters. At the same time it must not go about creating new clusters. It is necessary to note that the cluster policy shifts emphasis from supporting separate firms to supporting regional systems of firms.

Thus, it goes about stimulating really strong or potentially promising types of activity, above all, regional industrial production, and social processes related to forming long-term interrelations that provide the structural coherence of the regional space.

This is the emphasis on developing interrelations with the aid of the cluster approach that is a promising area of the regional cluster policy. Another advantage of the cluster way to organize the regional space is the role of cluster systems in the social development of the region.

The authors' position is that any cluster is not only an element but also a way to organize the space that is related to a number of spatial effects - "involvement effect" (interdependence of all economic units) that in its turn includes "size effect" (high demand for products of the economic unit stimulates the growth of its production), "efficiency effect" (it decreases prices for its goods), and "innovation effect".

Today the attention is focused on the innovation cluster that is considered as a modification of the industrial cluster. The innovation cluster is represented as "... a system of interrelations between the research laboratory, innovation company and infrastructural objects of the region that have their impact on the whole territory as a result of creating and using newer and newer

technologies, occurring of new investment companies, and accelerating the technological diffusion between them" (Boyko 2008). The emphasis on the import substitution demands to single out the relevant structures of the cluster system (mainly related to production) as key components.

3. Results

The analysis of concepts and international experience of applying the cluster approach made it possible to reveal peculiarities of forming the territorial innovation cluster and characteristics of the import substitution mechanism. The latter include limiting of import by the state, lobbying interests of entrepreneurs, participation of the state in the companies' capital, decrease in the administrative loading for entrepreneurs, etc.

These characteristics show the specificity of requirements to forming the territorial innovation cluster in Russia based on import substitution. In accordance with the existing theoretical and methodological and research and practical approaches, the authors researched pre-requisites of forming the territorial innovation cluster, analyzed the practice of creating them on the basis of import substitution mechanism, and estimated opportunities and prospects of developing sectoral clusters of the regional economy.

Through the example of territorial clusters, the authors studied problems and prospects of top priority clusters – agro-bio-chemical, oil and chemical, forest, high-tech, and system – that allowed revealing the factors preventing the implementation of the relevant area of the industrial policy of the Russian Federation in regions.

Thus, a low level of members' cooperation or focused specialization of the high-tech cluster and systems of the Omsk Region did not make it possible to form the cluster itself. The clusters lack real joint investment projects required by the legislation because the clusters' members do not have relevant specialists.

Under the modern conditions there are risks of under-supply of equipment and components for production, and risks of uncompensated deficit of goods for end consumers. In order to solve the task on import substitution, state governmental bodies must create terms and conditions for clusters' development. The cluster can perform various types of activity including innovations and import substitution. For the cluster to become innovation, its structure requires a subdivision that will be focused on innovations. Certain projects become a basis for innovations and import substitution.

Within the research the organization and economic mechanism of establishing cooperation relations in the territorial innovation cluster focused on import substitution is formed by modeling the relevant processes. In order to make the comprehensive analysis and model the process of forming the territorial innovation cluster based on the import substitution mechanism, the system approach is the most applicable. It considers the object area of the research as a system.

In spite of the variety of interpretations of the notion "system", there is a generally acknowledged interpretation of it as an aggregate of interrelated and interacting elements that form a unity, integrity. Statistical (structural) and dynamic (processual) state of the system are inseparably related to each other, which defines the use of the processual approach along with the system one. It considers the activity and management as a process, and unlike the functional approach it focuses on the result rather than on the function.

The processual approach controls over the "entry" (resources) and the "output" (results) at the boundaries of functions and business processes. The process itself is interpreted as an aggregate of interrelated and interacting types of activity that transform entries into outputs. The research applies the system approach or a system structural analysis.

In our case the most convenient language for modeling the system in the SADT (Structured analysis and design technique) subset is the IDEF0 methodology (Methodology of

functional modelling). It supposes the graphic and textual description of the model. The IDEF0 model shows the functions (actions) fulfilled by the system and relations between these functions. The created graphic model with all elements, functions, interrelations will be the mechanism of forming the innovation territorial cluster.

he practice showed that when modeling the organization and economic mechanism of forming the cooperation relations in territorial innovation clusters taking into account the task on import substitution and regional industrial and financial policy "as is", it was necessary to be based on the provisions set in federal and regional statutory documents. Modeling starts with studying references of the Ministry of Industry and Trading of the Russian Federation on creating an industrial cluster (Fig. 1).

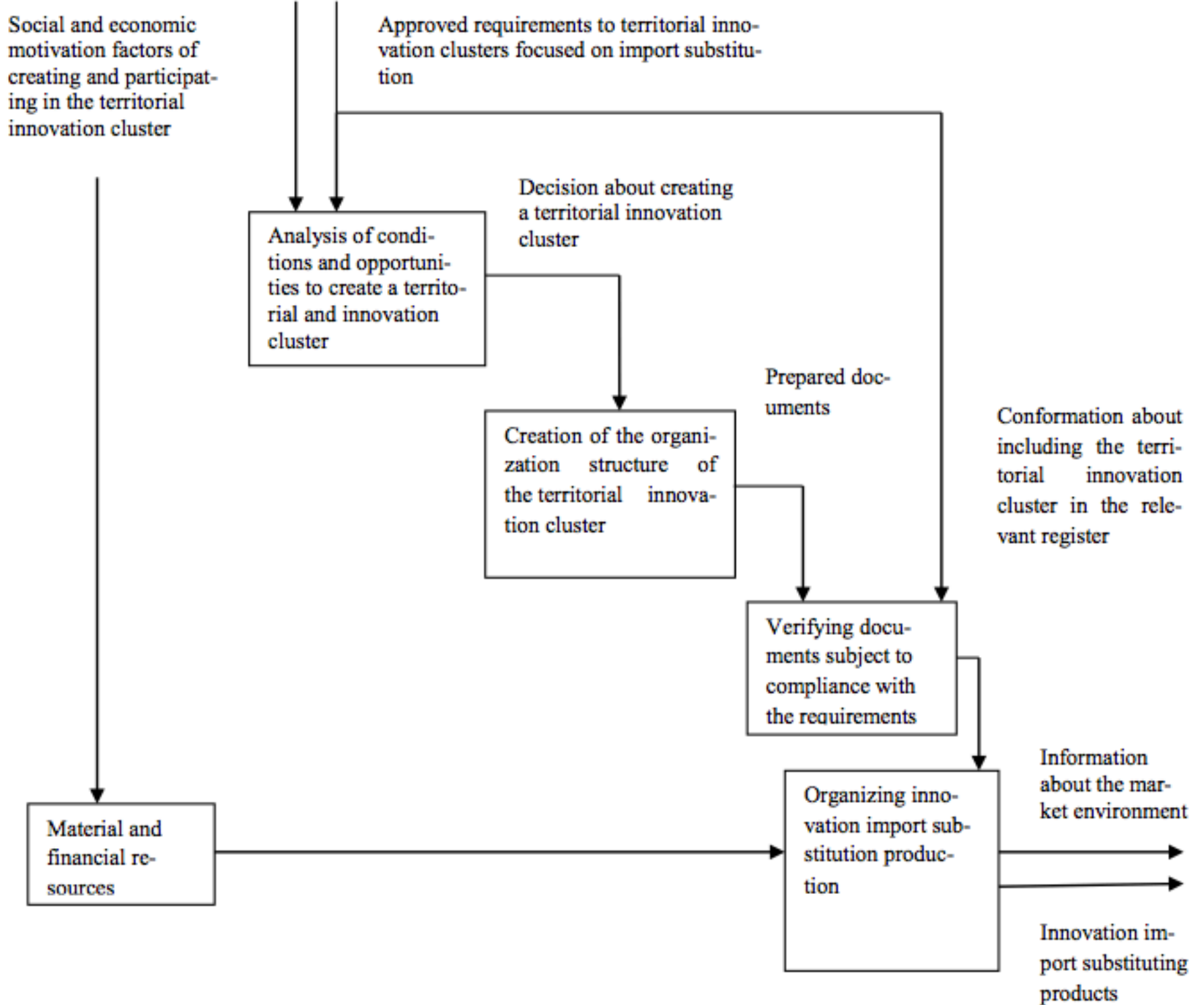
Social and economic stimulating factors have an impact on taking the decision about creating or participating of entrepreneurs, organizations in territorial innovation clusters. Members of the future territorial innovation cluster must understand advantages of work in the cluster and their possible benefits.

The approved requirements to the territorial innovation cluster must help the initiative group to define whether it is possible to refer the created or operating organizations to this category of clusters. At the entry of the mechanism, informational, material and financial resources are specified. Based on the information about the market environment, the decision about creating the territorial innovation cluster is made.

Using material and financial resources, including subsidies, production is launched. As a result of fulfilling all tasks set for the territorial innovation cluster, the innovation import substituting products, and information about its financial and economic efficiency occur.

Figure 1.

Diagram of Organization and Economic Mechanism of Forming Cooperation Relations in Territorial and Innovation Clusters Taking into Account Import Substitution Tasks



Initially subjects of modeling processes include the initiative group on creating the territorial innovation cluster, members of the created cluster, and federal and regional governmental bodies.

The detalization of the general function allows determining basic stages of forming the territorial innovation cluster focused on import substitution. Based on the decision about creating a territorial innovation cluster, its organization structure is formed, key documents that define the development are approved, and the request to include it in the relevant register is formed.

In order not to overload Figure 1 with information, it does not show the key statutory documents, including the ones adopted when creating the territorial innovation cluster. However, it shows the general logic and succession of actions when forming cooperation relations. In the future this mechanism will be supplemented and shown in detail.

In addition, it is necessary to show and in the future to show in detail the task on forming favorable conditions to create territorial innovation clusters focused on import substitution. This task is within the competence of federal and regional bodies of government in terms of financial, legal and informational provision.

It is possible to specify such other conditions as the required classification preparation of members from the initiative group on creating the cluster because the existing level of

organization and economic preparation of such members is not sufficient at all. To train personnel, a relevant structure is required. That is why it is planned to add a task on prospects of developing the territorial innovation cluster with the aid of the developed forecasting tools.

4. Discussion

The reliability of the above approaches to forming territorial innovation clusters based on the import substitution mechanism is confirmed by the fact that this mechanism eliminates unnecessary, uncontrollable and doubling functions, removes inefficient documents flow that prevents the delivery of a document where and when it is required.

The final goal of the above approaches is to create the TO-BE model that will show offers on improving the mechanism of forming a territorial innovation cluster focused on the import substitution.

At the entry such model has materials or information that must be used or transformed by the block into a result (output). The entry arrows are not obligatory because far from all actions can transform or change something. When solving this task, the model entry may include monetary finds – the resource that provides the mechanism efficiency (model output). It is necessary to refer normative legal documents to managing elements of the model.

The mechanism must be managed by goals of a higher level – goals related to developing the country economy, separate areas and types of activity, and pursuing the social and economic policy (Hyland, Gieskes and Sloan 2001; Silverberg and Verspagen 2003). This model is practically implemented by ministries, departments, and other governmental bodies and subdivisions participating in the formation of cluster structures, software, and other tools.

5. Conclusions

The further development of the organization model and algorithm of forming the territorial innovation cluster will be based on the revealed approaches and principles of organizing cluster structures, generalized experience of developing the cluster theory and practice documented in statutory acts providing the requirements to cluster structures, analyzed perspectives of creating territorial innovation clusters, and developed system of management in the cluster union.

The typical organization model of the territorial innovation cluster will show the interrelations between members of the cluster and must be focused on developing the cluster structure. The organization and economic mechanism of forming cooperation relations in territorial innovation clusters will be an interrelated aggregate of subjects of the cluster structure, and processes that unite them, and tools in the form of the graphic model.

Acknowledgements

The article was prepared according to the results of the researches made at the expense of budgetary funds for the state task of “Financial University under the Government of the Russian Federation” Federal State Budgetary Educational Institution of Higher Education for 2017.

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Revista ESPACIOS. ISSN 0798 1015
Vol. 38 (Nº 58) Year 2017

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