Cluster's innovaton development through the territory of the regions

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Abstract

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The influence of factors is considered in the work: the capital costs financed from funds of the federal budget and the organizations involved in the sphere of research and development activities for increase in a share of innovative products in a total amount of manufactured goods in the territory of innovative clusters. The considered clusters are located in the territory of the following federal districts: Northwestern, Siberian, Volga - region, Central and Ural Districts in the Russian Federation. Relevance of research is caused by the fact that development of regional economy within clusters are considered as the main condition of economic growth now. A consequence of network interaction of the anchor production enterprises and the organizations which are a part of a cluster in the sphere of Research and Development is acceleration of innovative process that leads to increasing in a share of innovative products in a total amount of manufactured goods in the territory of innovative clusters.

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1. Introduction

In the conditions of globalization of competitive and cooperation communications of accounting entities, the increasing value is purchased by cluster strategy of development of region's economy. Within a cluster, forming of model of economic growth of region economy happens with the smallest transactional expenses. Economic growth of systems in the conditions of globalization is considered in the works of Alesin, Roubini, Swagel, Kaldor, and Solow. Modern researches in the field of cluster

policy have rather fully proved the theoretical importance of this process in development of regions. Further it is necessary to create and implement the systematized groups of indicators of an assessment of cluster activities. According to the author, as a basis of an assessment of activities of a cluster in post-industrial economy it shall become the system of the economic indicators reflecting social and economic effect of interaction of the participating entities of a cluster in the course of cooperation and the competition. Combination of two opposite processes perhaps thanks to the fact that they happen in the different planes and between different participants. Porter M. (Porter, 2007) determines the regional innovative (or industrial) cluster in the works as geographical concentration of the separated business units, service providers, raw materials and materials, the coordinating centers, associations of institutes of the specialized directions and areas.

As features of reasons and implementation of cluster policy, the following fundamental prerequisites in the territory of the Russian Federation become:

1) activities of the territorial and production complexes (TPC) till 1990th;

2) current existence of Federal Target Development programs of industries of economy, construction of facilities of infrastructure in the territory of clusters and forming of free economic zones in regions;

3) prevalence of the state participation in innovative development of the participating entities of clusters of chemical, pharmaceutical industries and mechanical engineering;

4) presence of a large number of research and design institutes and organizations within the military industrial complexes specializing now in the field of aviation, petrochemical, military-industrial production;

5) a voluntary business and organizations merger in consecutive production processes that leads to unilateral management of corporation within vertical integration.

According to M. Porter (Porter, 2007), the concept of clusters promotes the development of a special form of the political and state thinking which is beyond gross requirements of economy. The thinking based on cluster approach can direct the policy for science and technology, education and professional training. At the same time, it is necessary to consider that formation of market relations between subject in the territory of regions of the Russian Federation happens since the end of the 1990th years. Porter M. (Porter, 2007) claims that clusters in the conditions of the developing economy not only include less participants. Many of them take the form of the structures with strong hierarchy containing a network of communications and surrounded with a small number of the large companies forming a cluster kernel. In the works of Gordon and MacCann (Gordon, & McCann, 2012) it is confirmed that the interregional clusters including the high-concentrated entrepreneurial networks are capable to provide successful innovative development of the entities and organizations in the territory of regions, and development of competitive advantages. At the same time, it is impossible to forget that innovative development implies availability as a part of participants of a cluster of the organizations performing the activities in the sphere of Research and Development and further creating an innovative product. Availability of cooperation horizontal communications between the organizations in the sphere of Research and Development and production enterprises, business incubators, science and

technology parks provides the creation of an innovative product. Kowalski claims, (Kowalski, 2014) that clusters stimulate horizontal cooperation communications between research organizations and the entities implementing results of researches and developments directly in production process. According to Sallet, Paisley and Masterman (Sallet, Paisley and Masterman, 2009) innovations act as an exclusive factor of economic growth in the long term. However, they assume that the innovation can create and stimulate their development, identifying this mechanism with cultivation.

For this reason, the assessment of social and economic consequences of creation and functioning of cluster education should be carried out in the following groups of indicators:

‒ the indicators characterizing structure of production of clusters, resource potential of a cluster and economic activity of a cluster;

‒ the indicators reflecting efficiency of usage of the intellectual equity within a cluster (in particular, synergy effect of joint use of key spheres of competences and intangible assets within a cluster, such as the cost of consumer assets, information technologies, infrastructure assets and so forth);

‒ the indicators considering external and internal institutional factors in the companies - participants of a cluster (for example, the level of transactional expenses).

2. Problem statement

Support of innovative clusters in the territory of the Russian Federation is performed by means of the Programs allocating funds of the federal budget for reconstruction and upgrade of a property, plant and equipment of the participating entities of clusters, creation of business incubators, assignment for Research and Development, creation of infrastructure facilities in the territory of regional clusters. It is necessary to find out how effective this mechanism of the state support is. Therefore, Dan (Dan, 2012) assumes that support of clusters shall be not unconditional, but be under construction based on empirical data and the analysis of the processes happening in each specific spontaneous created cluster. Only in this case the cluster will provide economic development of regions. As Chloe and Roberts assume (Chloe, & Roberts, 2011) the role of the state in this process is considerable and allocate it in one of key components of development of the cluster-oriented economy.

On the other hand, in modern market conditions a role of the intellectual equity in creation of an innovative product certainly is big. Presence in the territory of innovative clusters of organizations performing the activities in the sphere of Research and Development shall provide increase in a share of innovative products in a total amount of the realized goods in the territory of innovative clusters. In this context as an innovation, we mean the usage of results of scientific researches and developments for the purpose of change of object of management and receipt of the following effects: economic, social, ecological and so on. In this case, the innovation and technology centers, technology parks, technology incubators) act as an innovative infrastructure in territorial innovation clusters. Creation of these objects of innovative infrastructure in the territory of regional clusters is supported within Target state programs of development with use of means of federal and regional budgets. In the work it is

considered dependence between a share of the organizations occupied research with developments in total number of the organizations and entities in the territory of clusters and shares of innovative products in the total amount of manufactured goods of hectare of the territory of innovative clusters

3. Research Methods

In the work the authors considered results of activities of those regions in the territory of which innovative clusters in the Russian Federation are located . Now in the territory of the Russian Federation there are more than 20 innovative clusters performing the activities in various industries that is reflected in table 1:

- information technologies and electronics;

- new materials;

- production flying and spacecraft, shipbuilding;

- pharmaceutics, biotechnologies and medical industry;

- chemistry and petrochemistry;

- nuclear and radiation technologies.

Table 1. The name of the federal district, region and sector of economy in the territory of which innovative clusters are located. (it is created by authors with use of information posted on the official site cluster.hse.ru)

Name of the federal department	The name of the region	The sector of economics
1. Siberian Federal district	- Altay	-biopharmaceutics
	- Kemerovo	- to processing of coal,
	- Krasnoyarsk	technogenic waste
	- Novosibirsk	- innovation technology
	- Tomsk	- information technology
2. North-west Federal district	- S. Peterburg	- information technology
	- Lenin's region	- radiation technology
	- Archangelsk's region	- shipbuilding
3. Ural Federal district	- Sverdlovsk region	- titanium production
4. Central Federal district	- Moscow city	- new materials, nuclear
	- Kaluga region	technologies
		- pharmaceutics
5. Volga-region Federal district	- Novgorod region	- car structure
	- Perm's region	- petrochemistry
	- Bashkortostan Republic	- rocket engines
	- Tatarstan Republic	- space cluster
	- Samara region	- science and educational
	- Uliynovsk region	- radiation technology
6. Far East Federal district	Chabarovsk region	shipbuilding

In the Russian Federation, it is observed the annual growth in volumes of financing in the sphere of science and scientific researches for the last eight years, according to data of official statistics that it is reflected in table 2. As we see, more than a half of amounts of the state costs for activation of scientific activities is the share of costs for Research and Development. But annual rate of a surplus of these investment investments does not exceed ten percent.

Table 2. The Government Expenses on the activity of R&D organizations on the territory of the Russian Federation within the period of 2008-2014.

Indicator	2008	2009	2010	2011	2012	2013	2014
1. The total volume of expenses on science activity, billion rubles	411	461	489	568	655	700	795
1.1 including R&D, billion rubles	254	271	302	348	418	451	510
1.2 including fundamental (basic) researches, billion rubles	77	97	96	107	108	115	130

(Source: The Official Federal Government site of cluster's statistics data in the Russian Federation, 2014)

It is used the data for creation of the charts reflecting extent of influence of the state participation on increase in a share of innovative products in the total amount of the made products, on the one hand. On the other hand, a share of the organizations occupied in the sphere of Research and Development on increase in a share of innovative products in a total amount of the made products.

4. Findings

The regression analysis given by the author and shown in Figure 1 was made to evaluate functional relationship of the effective index conditional average (the share of innovation product sales proceeds in the total volume of revenue) and the factorial index (the share of the government investments to the reconstruction and modernization of fixed assets in the total volume of investments) on the territories of innovation clusters pointed out in Table 1:

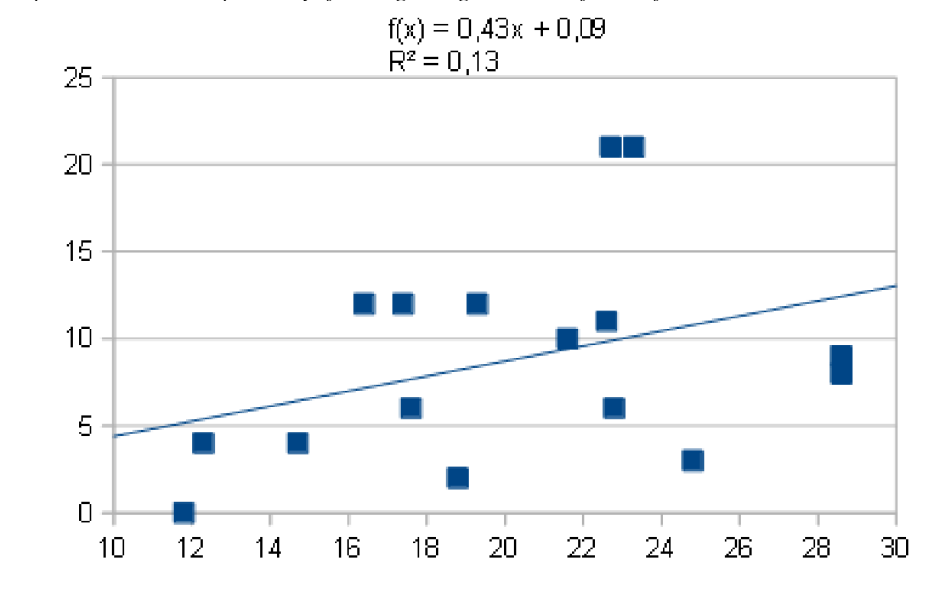$$f(x)=0.43x+0{,}09 \tag{1}$$

$$R^2=0.13 \tag{2}$$

Fig. 1. The Government Investments to the Reconstruction, Modernization and Volume of Innovation Products produced on the innovation cluster's territories in the Russian Federation.

x- the share of the government investments to the reconstruction and modernization of fixed assets in the total volume of investments, percent;

y- the share of innovation product sales proceeds in the total volume of revenue, percent.

Source: Author's work

The regression analysis given by the author and shown in Figure 2 was made to evaluate functional relationship of the effective index conditional average (the share of sold innovation products in the total volume of revenue) and the factorial index (the share of R&D organizations in the total quantity of enterprises) on the territories of innovation clusters pointed out in Table 1:

$$f(x) = 1,44x + 0,062 \tag{3}$$
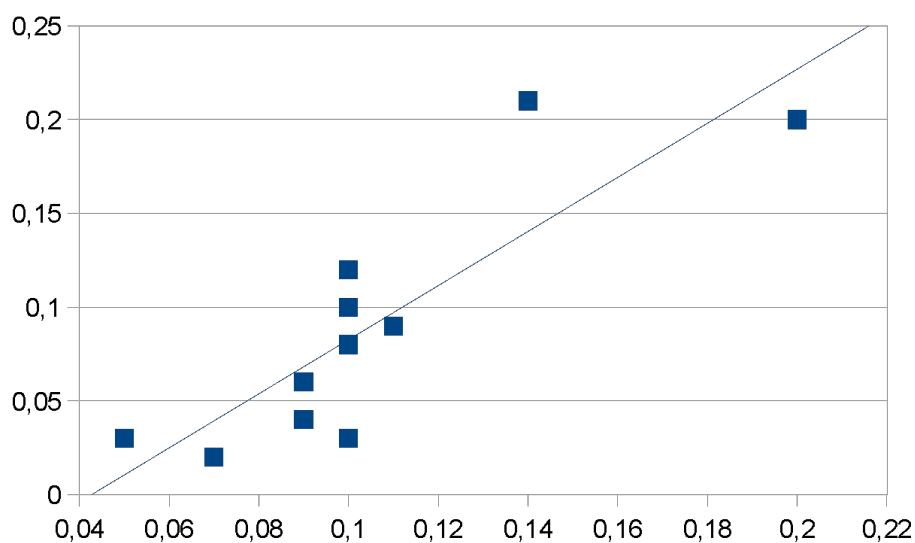$$R^2 = 0.72 \tag{4}$$

Fig. 2. R&D Organizations and Volume of Innovation Products produced on the innovation cluster's territories in Russian Federation.

x- the share of R&D organizations in the total quantity of enterprises, shares of units;

y- the share of sold innovation products in the total volume of revenue, shares of units.

Source: Author's work.

5. Conclusion

The paper deals with innovation activities of enterprises and organizations located on the territory of various federal districts: Northwestern, Siberian, Volga - region, Central and Ural Districts. As it is seen from Table 1, each federal district has its own innovation cluster. The peculiar feature of all these clusters is that their activities are inspired by state investments directed to reconstruction and upgrading of capital assets as the share of cumulative investment in fixed-capital assets. The outcome of such state stimulation of enterprises' activities is the enlargement of innovation produce share in the total volume of produced and shipped goods, works done and services rendered. We considered the given key figures on the abovementioned cluster territories apart from the Arkhangelsk Region and the Perm Territory. The received quantitative expression of dependence of specific weight of the made innovative products in a total amount of release from a key factor - the number of the organizations occupied in the sphere of Research and Development is created with use of linear regression in which the coefficient of determination is 73%. What allows using this dependence in further forecasts for production of innovative products for the territories of innovative clusters? Especially important the fact that in case of increase in number of the organizations occupied in the sphere of Research and Development at 1%, the growth of a share of innovative products in a total amount of release is 1, 44%.

At the same time increase in a share of the investments directed to upgrade and reconstruction of plant assets is not always followed by growth of specific weight of innovative products in a total amount of release. The linear regression model of selected parameters was preconditioned by nothing else but 13%. In the given case, pure 13 % change of innovation produce share is conditioned by the enlargement of the investments share allocated to reconstruction and upgrading in the total volume of investments. From the one hand, it confirms that active stimulation of economic entities' activities on the territory of clusters not always gives positive effects. From the other hand, the given model proves permanent increase of innovation produce share in the total volume of goods, works and services. Therefore, if the share of investments in reconstruction and upgrade in the total volume of investments is not increased but the share of innovation produce is increased by 9%, it definitely shows positive effect. It also says that clusters are capable of producing innovation activities using other (not financial) growth factors, that is, intellectual potential (capital) formed on the abovementioned territories. Therefore, in the subsequent periods one can expect the strengthening of innovation activities of clusters on the territory of the above federal districts.

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