

**FORMATION OF THE KNOWLEDGE-INTENSIVE CLUSTERS AS FACTOR OF INNOVATIVE DEVELOPMENT OF RUSSIAN REGIONS***Larissa A. Tretyakova**Belgorod State University, Russia, 308015, Belgorod, Pobedy St., 85, info@ores.su**Tatyana A. Vlasova**Belgorod State University, Russia, 308015, Belgorod, Pobedy St., 85, info@ores.su**Yana V. Maslova**Belgorod State University, Russia, 308015, Belgorod, Pobedy St., 85, info@ores.su**Tatyana V. Tselyutina**Belgorod State University, Russia, 308015, Belgorod, Pobedy St., 85, info@ores.su**Olga A. Timokhina**Belgorod State University, Russia, 308015, Belgorod, Pobedy St., 85, info@ores.su**Yana I. Serkina**Belgorod State University, Russia, 308015, Belgorod, Pobedy St., 85, info@ores.su*

**Abstract.** Now transition from an export and raw way to innovative in general acts as the main priority vector of development of Russian regions and a gain of a national wealth of the country that is recognized as at the level of the top management of the country, and most of modern researchers. The specified scenario of economic development is possible only on the basis of realization of a complex of structural transformations which purpose is formation of innovative economy as bases of creation of hi-tech, highly intellectual knowledge-intensive competitive productions.

In work the current tendencies of change of indicators of innovative activity in regions of Central Federal District and the Russian Federation in general are analyzed. The conclusion is drawn that creation of the knowledge-intensive regional clusters has to act as a factor of development of innovative regional system, in work the scheme of interaction of elements of the knowledge-intensive cluster is opened, its distinctive signs and functions are defined.

**Keywords:** knowledge-intensive cluster, innovative activity, dynamics and stability of development, interaction of elements of a cluster.

**1. Introduction.** In Russia today existence of national innovative system has mainly formal character, the most important components of innovative system did not allow to combine the efforts made from the state integrally: scientific and educational spheres, subsystems of financing, commercialization of research and development and protection of intellectual property, public organizations and funds, representatives business of community, etc. (Krakovets'ka, Chistyakova, Vidyaev, Vorobyeva, 2010).

It is necessary to consider that the problem of formation and development of innovative systems is actively investigated in the context of their-level synergetic interaction in recent years: federal and regional (Muyambiri, B., and Chabaefe, N. N. (2018, Waldman, David Horacio García, Gerardo Tamez González, and Oswaldo Leyva Cordero. 2018). Besides, profound changes in the social and economic sphere of society against the background of post-industrial transformations, first of all, concern spheres of science and education which have to act as the engine of innovative development. Everything specified demonstrates relevance of justification and formation of methodological bases to development of innovative system as the complex interconnected set of its structural components, the most important of which is the sphere of science and education.

**2. Materials and methods.** Development of economy according to orientation to innovative type is characterized by strengthening of a role of scientific knowledge and innovations, information technologies and existence of the innovative infrastructure directed to creation and distribution of new knowledge. Assessment of level and dynamics of innovative activity within certain regions, federal districts and scales of Russia in general gives the chance to define a real state, tendencies of change and the level of differentiation of innovative development.

The effectiveness of innovative activity characterizes a number of the standard indicators to which, first of all, it is accepted to carry the level of innovative activity of the organizations; specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services and coefficient of inventive activity. (Yepaneshnikov, V. V., Kurdyumov, V. I., Zotova, L. E., Kraeva, M. U., Besedkina, N. I., & Filipenkova, O. G. (2016)). During an analytical part of a research the differentiation level as well as dynamics of the indicators stated above and their stability in a section of certain subjects of the CFD and in general across the Russian Federation were studied. The methodological basis of a research was based on creation of trends of a dynamic row and assessment of their variability as well as methods of the structural and comparative analysis. The empirical base of a research is presented by official statistical data of Rosstat on the indicators chosen for the analysis for 2010-2016.

During development and justification of the scheme of interaction of elements of the knowledge-intensive cluster in the course of the research the comparative analysis, expert assessment and assessment of a possibility of formation of the knowledge-intensive cluster in the region were used.

**3.Results and discussion.** Dynamics of the chosen indicators of innovative activity for 2000-2016 in general across the Russian Federation and in Central Federal District is presented in fig. 1, 2 and 3. In the considered period countrywide the innovative activity was reduced from 9.5 to 8.4%, the similar tendency is observed also on the indicator - coefficient of inventive activity. Against the background of decrease in the specified indicators the essential growth of specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services which value increased from 4.8 to 8.5% is observed. Let's note that the specified tendencies are not characteristic of the CFD in which the first two from the considered indicators tend to growth, but at the same time decrease in value of inventive activity is observed.

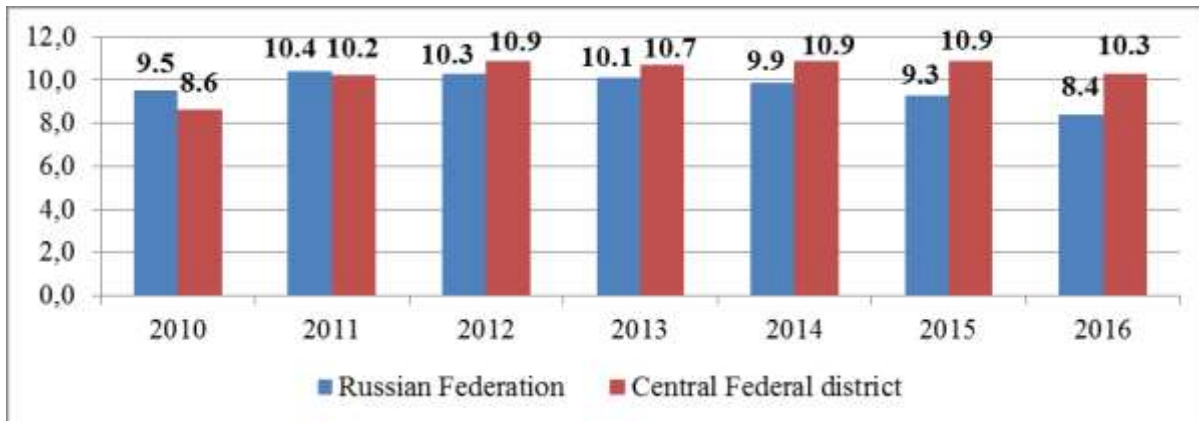


Fig. 1. Dynamics of the level of innovative activity of organizations, %

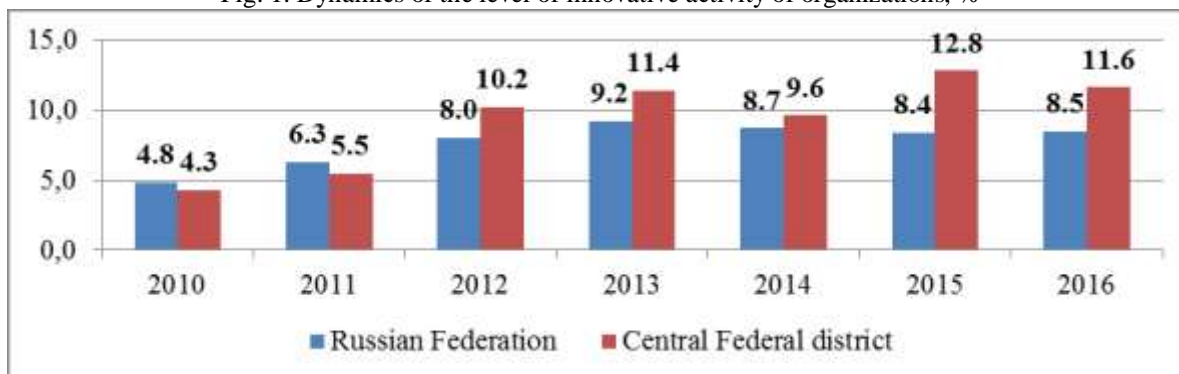


Fig. 2. Dynamics of the share of innovative goods, works, and services in the total volume of goods shipped, work performed, services, %

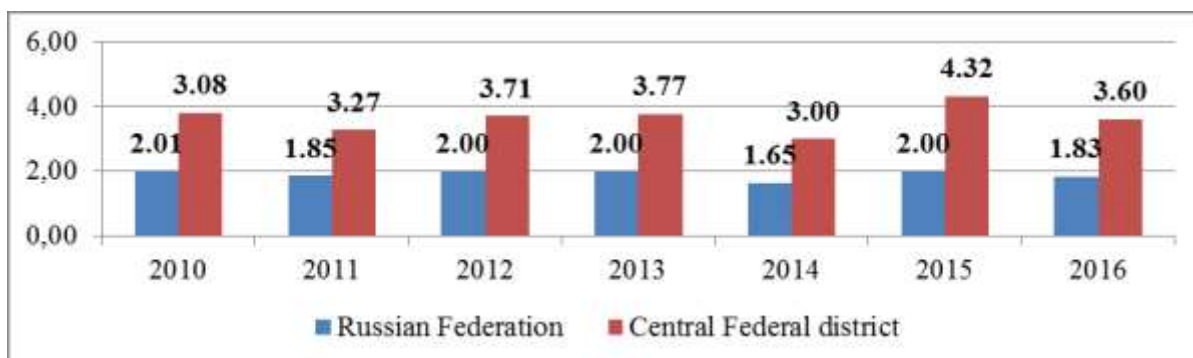


Fig. 3. Dynamics of the coefficient of inventive activity, unit.

The research showed rather high level of differentiation of level of all three considered indicators in the CFD of the Russian Federation that is confirmed by these tables 1.

Despite the general trend of growth of level of innovative activity of the organizations, in most of subjects of the CFD decrease in an indicator which stability in most cases is average is observed.

The value of specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services tends to growth as in general across the Russian Federation and the CFD, and in a section of certain subjects of the CFD. However turns on itself the fact that this tendency has extremely unstable character.

Table 1 - Dynamic trend and assessment of its fluctuation of innovation activity indicators in the regions of the Central Federal district and Russia

Subject	Level of innovative activity of the organizations, %		Value of specific weight of innovative goods, works, services in a total amount of the shipped goods, the performed works, services, %		Coefficient of inventive activity, un.	
	Trend equation	Variability Coefficient, %	Trend equation	Variability Coefficient, %	Trend equation	Variability Coefficient, %
Russian Federation	$y=9.68-0.06*t$	5.9	$y=6.61+0.11*t$	25.9	$y=1.91-0.02*t$	7.5
Central Federal District	$y=10.10+0.12*t$	7.5	$y=7.46+0.15*t$	44.9	$y=3.64+0.03*t$	12.6
Belgorod region	$y=11.83-0.05*t$	17.3	$y=4.75+0.04*t$	53.6	$y=0.95+0.05*t$	16.7
Bryansk region	$y=8.24-0.10*t$	10.7	$y=9.95+0.05*t$	48.3	$y=0.48+0.02*t$	11.9
Vladimir region	$y=11.24-0.10*t$	20.1	$y=6.59+0.09*t$	43.4	$y=1.56+0.09*t$	14.0
Voronezh region	$y=10.43-0.21*t$	15.9	$y=7.05+0.01*t$	39.1	$y=2.67-0.01*t$	11.8
Ivanovo region	$y=5.43+0.10*t$	33.3	$y=2.19-0.39*t$	51.1	$y=5.02-0.62*t$	26.2
Kaluga region	$y=9.91-0.16*t$	18.2	$y=3.72-0.13*t$	27.1	$y=1.18+0.02*t$	24.1
Kostroma region	$y=8.19-0.20*t$	18.7	$y=2.86+0.16*t$	50.0	$y=0.59-0.01*t$	17.9
Kursk region	$y=9.59-0.13*t$	25.4	$y=3.35+0.34*t$	52.7	$y=2.18+0.15*t$	14.1
Lipetsk region	$y=13.59+1.16*t$	16.2	$y=9.43+0.09*t$	41.5	$y=0.69-0.01*t$	17.5
Moscow region	$y=8.1+0.03*t$	10.1	$y=10.81+0.08*t$	32.5	$y=2.47+0.09*t$	31.9
Oryol region	$y=10.76-0.61*t$	9.9	$y=4.09-0.25*t$	74.4	$y=1.39-0.23*t$	18.3
Ryazan region	$y=9.42+0.74*t$	15.5	$y=3.50+0.11*t$	32.6	$y=1.20+0.05*t$	20.6
Smolensk region	$y=6.95-0.09*t$	12.4	$y=2.51+0.16*t$	53.0	$y=0.63-0.05*t$	9.8
Tambov region	$y=9.21-0.08*t$	16.4	$y=5.04-0.01*t$	28.1	$y=0.91+0.02*t$	16.4
Tver region	$y=6.97+0.38*t$	17.7	$y=6.92-0.04*t$	44.3	$y=0.94+0.09*t$	10.7
Tula region	$y=12.11-0.01*t$	12.6	$y=7.15+0.17*t$	70.9	$y=1.20+0.02*t$	38.5
Yaroslavl region	$y=9.49+0.01*t$	21.5	$y=9.68+0.06*t$	39.5	$y=1.41-0.05*t$	14.8
Moscow	$y=16.35+0.02*t$	15.9	$y=7.70+0.17*t$	79.6	$y=7.81-0.001*t$	19.9

*Source: compiled and calculated by authors based on data of Rosstat (In Russian)*

The value of coefficient of inventive activity in general across the Russian Federation for the considered period has a steady tendency to decrease. At the same time in the CFD the insignificant average annual growth of this indicator, despite its some decrease in 2016 is observed. The average annual pure gain of an indicator in general across the CFD is provided with its gain only on a half of subjects.

Thus, against the background of the remaining high differentiation of level of key indicators of innovative activity in certain subjects, steady decrease in level of innovative activity of the organizations and level of inventive activity in general across the Russian Federation and in the majority of regions of the CFD is observed. Despite growth of specific weight of innovative goods, works, services in a total amount of the shipped goods, this tendency it is impossible to recognize the performed works, services steady.

The developing tendencies threaten achievement of the planned target indicators of a gain of VPR, and as a result and GDP due to growth of level of innovative activity. Let's note that GDP gain due to growth of the innovative sector in economically developed countries makes 75-90% when in Russia this indicator is 10% that also found the reflection in negative impact on dynamics of the main regional economic and social processes.

For the solution of policy issues of complex modernization of economy of regions of the Russian Federation the paramount task is represented by formation and development of the knowledge-intensive clusters (Gerasimov, Tretyakova, 2017). In the developed countries use of cluster approach found broad application, the functioning branch and territorial cluster educations show high efficiency (Gazimagomedov, Huseynov, Rashidov, 2017). At the moment use of cluster approach already occupied one of key places in the strategy of social and economic development and a number of territorial subjects of the Russian Federation and municipal units (Vardapetyan, 2009, Pronyaeva, Fedotenkova, 2017 <[https://elibrary.ru/author\\_items.asp?authorid=580031](https://elibrary.ru/author_items.asp?authorid=580031)>).

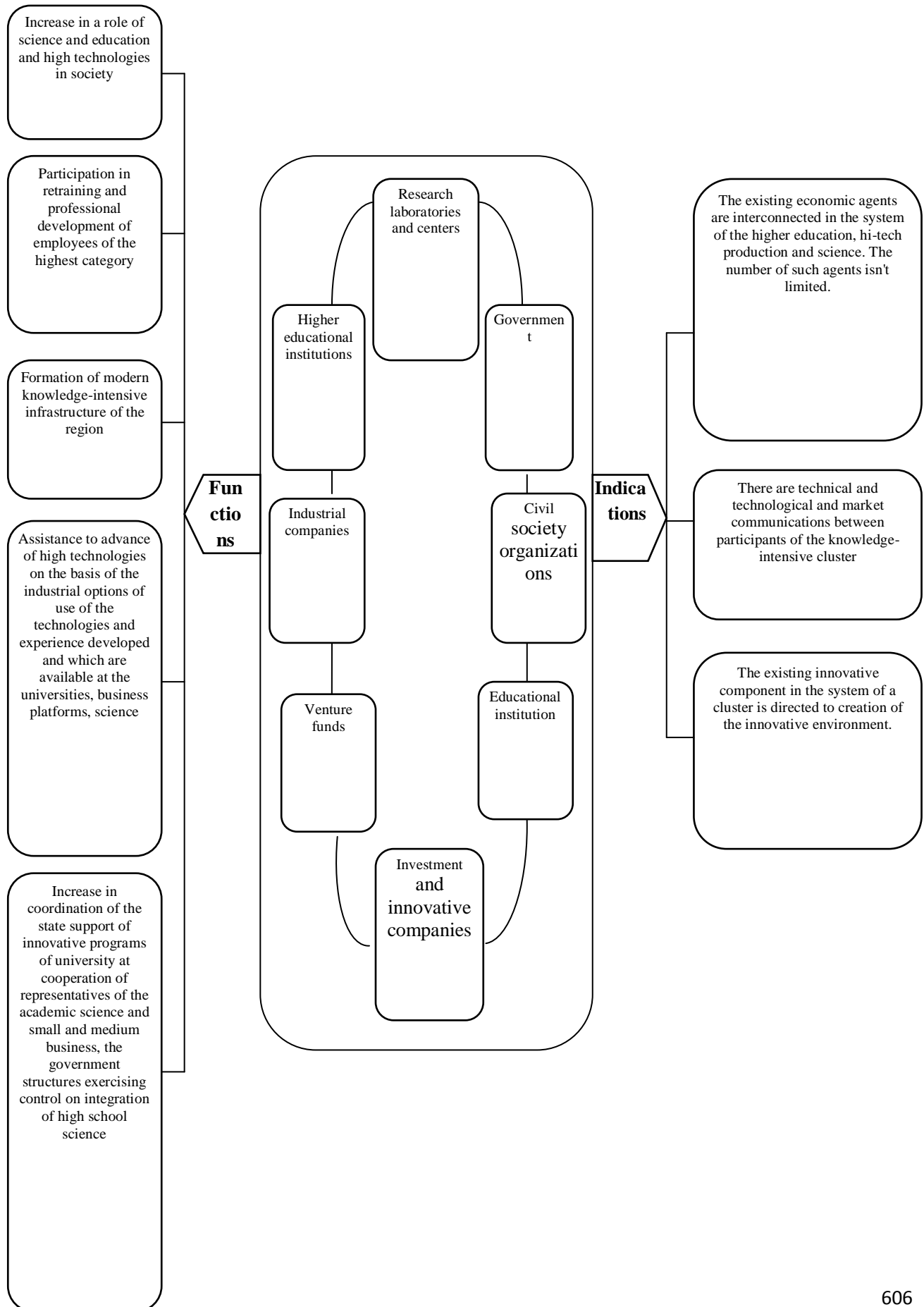


Fig. 4. The scheme of interaction of elements of a knowledge-intensive cluster of the region is the set of the organizations (the companies, corporations, the universities, research institutes, science and technology parks, business incubators, public organizations) integrated into uniform regional economic space, with the created innovative infrastructure, the interconnected economic agents increasing the competitive advantages due to spatial localization.

Cluster education assumes cooperation of links of system for successful functioning on commodity market and services. Uniting in clusters, the enterprises and the organizations, science and technology parks and innovative platforms increase the competitive lead other enterprises, providing availability to their resources, a close spatial arrangement as well as increasing quality and the number of the rendered services, the offered goods or the benefits (Porter, 2005, Pronyaeva, Pavlova, 2016).

In fig. 4 the scheme of interaction of elements of the knowledge-intensive cluster is submitted. Along with creation of infrastructure of support of development of the knowledge-intensive branch of economy of the region realization of strategy of cluster development of the region provides formation of optimum network structure for implementation of interaction of the enterprises of the knowledge-intensive branches of economy of the region with public authorities, research laboratories, educational institutions as well as institutes of civil society (Tretyakova, Tselyutina, 2015).

Cluster approach in formation and development of the knowledge-intensive branch can be used at the solution of a number of state important tasks:

- 1) when developing programs of social and economic development of the region;
- 2) at assessment of competitiveness of the region or separate branch;
- 3) as a basis for stimulation of scientific and innovative activity;
- 4) as instrument of interaction of small and big business.

**4. Conclusions.** Thus, the inter-conditionality of processes of cluster territorial development of the region as well as increase in image of the knowledge-intensive branch represents essentially new economic regularity which will allow to increase innovative activity, and as a result to keep competitiveness in the conditions of globalization of the markets to territorial economic systems.

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