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Sustainable Development of the Regional Social-Economic System: an Innovative Dimension

Dmitriy Slesarev, Valeriy Yanovskiy

North-West Institute of Management – branch of Russian Presidential Academy of National Economy and Public Administration. B.O. Srednij pr. 57, 199178 st. Petersburg

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Abstract. *This paper revises the essence of innovation, innovation sphere and cluster models of regional social-economic system and presents the characteristics of innovative activity and the classification of innovation possibilities of the enterprise. We propose an organizational-economic mechanism of sustainable social-economic development of the territory as an instrument of territorial planning. We justify that successful functioning of innovation infrastructure objects in the form of the innovation-technological center (as cluster) may become a real instrument for spatial planning. This tool gives a significant multiplicative effect in conjunction with changes in the entire regional social-economic system, enhancing the life quality of citizens. The nature of this tool lies in the fundamental law of economic development - high innovative receptivity is ensured only by appropriate technological level on the national scale. According to this, in order to secure innovative receptivity of economy, the state needs to develop sufficiently high technological level in the key regional industries. The authors have also presented the main principles for stimulating innovations, dedicated to enhance the region's competitiveness.*

Keywords: *innovations, sustainable development, regional economy, territorial planning, clusters.*

Raktažodžiai: *inovacijos, darnus vystymasis, regioninė ekonomika, teritorinis planavimas, klasteriai.*

Introduction

The way, based on the extensive growth of production capacities, only due to sales of natural resources, will not provide Russian Federation with a possibility to become a leader of world economy. The effective direction is to create new kinds of products and services, in order to provide complex usage of innovation scientific potential [1].

Transition into the innovative type of economic growth is connected with formation of a new mechanism of social development. One of the internal

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contradictions of the existing model for the Russian Federation is the fact, that the growth of population prosperity was rested on the acquisition of natural resources rent. Removal of this contradiction requires formation of new social development mechanisms, balanced with resource economy possibilities and its creation of innovations efficiency. Such innovative type of economy development requires creation of maximum favorable conditions for attracting private companies and for widening their ability to work at the open global markets in conditions of tough competition. It is the private business sector, which is the major stimulating and motivational force of economic development. The state should form only necessary conditions and incentives for development of business, but not substituting it with its own activity. [2]

Innovations Impact for Development of World Economy

The world economy comes out of the financial crisis and, apparently, the new long wave of its development is starting on the basis of a new technological structure (see Figure 1). The innovation processes take place in the territories, which distinct from each other significantly, it means that there are various potentials for innovation development of regions.

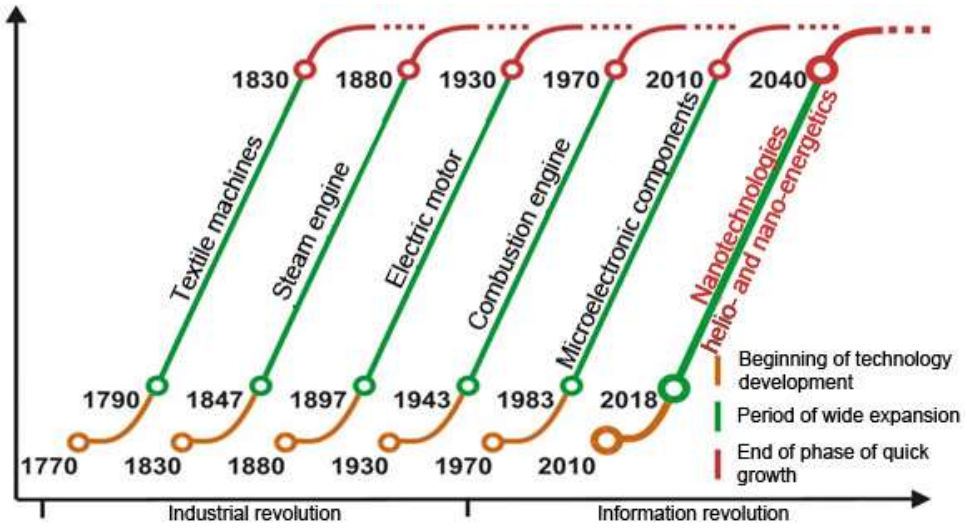

Figure 1. **Change of technological structures in the course of economic development [1]**

At the same time, the dynamics of the structure of world export commodities witnesses about the growth of share of the knowledge-intensive products in it (Figure 2) [4].

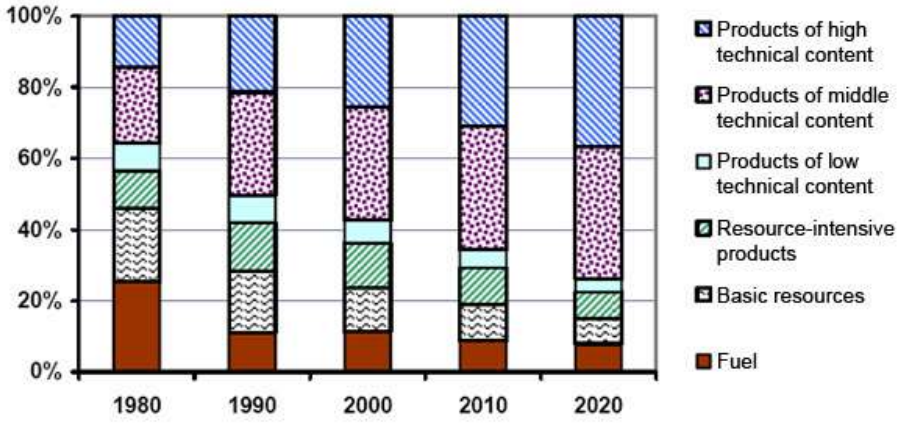

Figure 2. **Dynamics of structure of world export commodities, from 1980 to 2020.**

The conceptual meaning of innovations term is systematized by us and demonstrated schematically in figure 3. There are several generations of innovation process models. We will mention in brief only the main ones: the widely known linear model (includes 4 steps: *researches →novations→innovations→diffusion of innovations*); cybernetic model by B. Santo [5], the network model by S. Klein and N. Rosenberg [6].

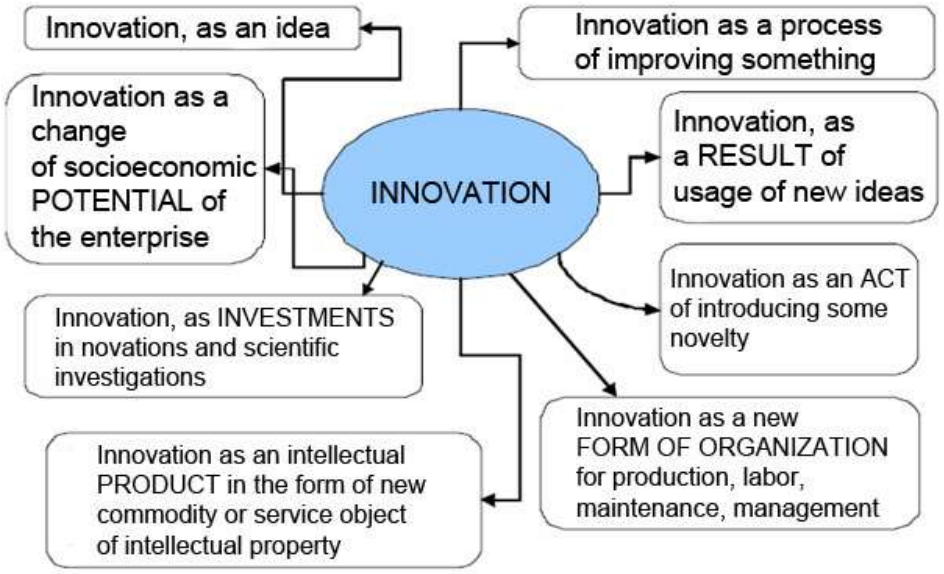

Figure 3. **Content of innovation term**

The analysis of Russian and international evaluation systems of enterprises scientific and technical activity suggests a significant widening of innovation sphere:

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in addition to technological innovations it also includes marketing and organizational innovations. It results in the necessity to develop new integrating criteria of management efficiency, including the regional one which would take into account modern aspects of innovation activity. It is supposed to use increase of business costs as such integral criteria. [7]

So, the actual scientific problem is sill to develop models and organizational-economic mechanisms for increasing competitive advantages of companies and regions through development and realization of the effective usage strategy of advanced manufacturing technologies. However, don't forget M. Porter's conclusion: "… the company achieves competitive advantages thanks to innovations… Competitors will defeat any company which stops development and introduction of innovations immediately and inevitably". [8]

Innovation System of Regions

As is known, as early as in 2006, the Government of Russia ordered the research of Russia's competitiveness and a possibility for using cluster politics, in order to increase its competitiveness. The research was performed by the group of scientists from the Harvard business school under the leadership of Michael Porter [9], which cost about 3 Mln. USD. As a result, the Porter's group made the following conclusion: the main Russian Federation (RF) problem is its one-dimensional primary trend and existence of great number of vertically integrated companies. "In order to be competitive, the key corporation must not be built on the conception of national security. The conception of national leaders died with General Motors – nobody believes in it. The heart of economy is small mobile companies." Michael Porter also pointed at the tax system, existing in the RF, as one of the major obstacles for small business development. He characterized it as "horrible, unfair, and resulting in unnecessary business expenses". It appears to him, that this system has a restraining, not a stimulating character.

Development of territory depends on the development of innovations infrastructure – complex of complementary structures, serving and providing realization of innovations creation activity (Fig. 4).

We believe that the researches and technological developments centers, created on the basis of Russian Academy of Sciences and state scientific centers, involving the leading universities, which are able to provide scientific-methodical and educational activity can be an important link of the new innovations creation system in the regions of RF. The innovations creation process is similar to continuous conveyor for generation of new know-how and its usage for production of high technology products. This process includes fundamental, pilot and application studies, development of technologies, creation and commercialization of high technology products and engaging venture capital on the state-private partnership basis

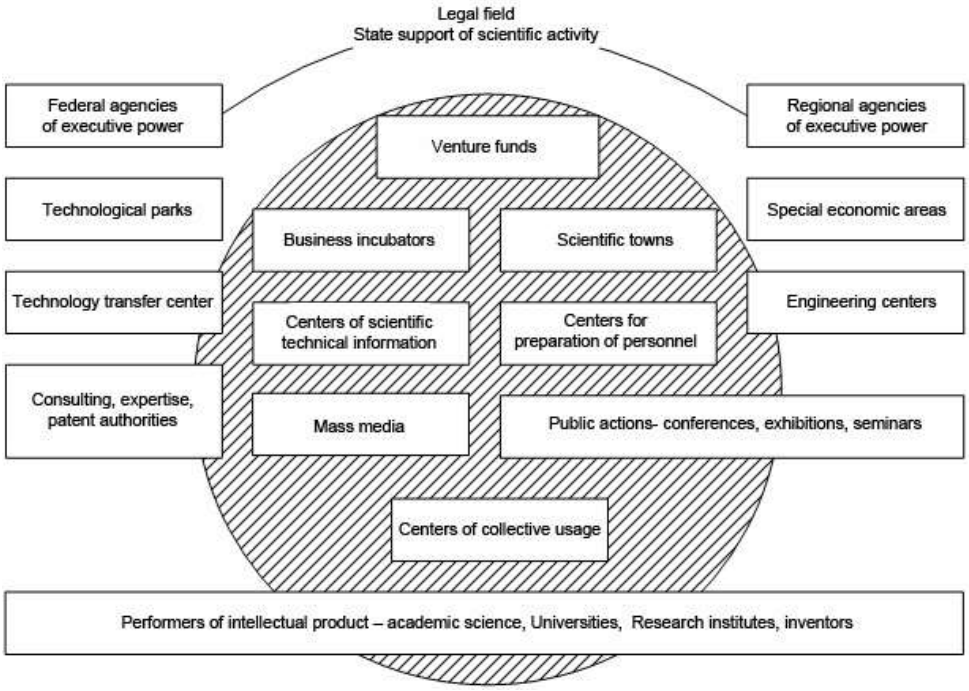

Figure 4. **Innovations creation infrastructure on regional level. [11]**

Therefore, there is a necessity in cluster organization of Russian economic system, its regionalization for promotion of innovations and support of small and medium business enterprises. In addition, the clusters are the most elaborated and experimentally checked method of self-organization. As structures, the clusters may appear spontaneously or as a result of administrative impacts from the state administration bodies as an organizational innovation for regional economy. Successful functioning of cluster objects is a variation of regional development, an instrument of territorial planning, providing a significant multiplicative effect. It is accompanied by substantial changes in the whole economic and social system of the region, increasing the quality of life for citizens.

Innovation may be a "real innovation" only in case if it results in irreversible changes of the system, where it is realized. While such changes are absent, it is not an innovation but an innovation resource, contributing to creation of viable innovation. For example, a mobile phone is not an innovation but creation of the mobile communication system is a typical breakthrough innovation. If the country wants to keep its territorial-political integrity and to provide economic competitiveness, it is necessary to build such state system, in which each constituent entity of the Federation will own freedom to conduct its own innovation and technological policy.

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Table 1. **Internal expenses for innovation development (in % of the GDP)**

Priorities/ Years	**2009**	**2010**	**2011**	**2012**	**2013 forecast**
Innovation development, incl.	1,5	1,1	0,9-1,1	0,9-1,1	0,9-1,0
Development of fundamental and applied science	0,1	0,2	0,2-0,4	0,2-0,3	0,2
Development of high-technology branches (military-industrial complex, space, aircraft industry, atomic, power-production complex, biomedical engineering, pharmaceutics	1,3	0,7	0,6	0,6	0,6-0,7
Development of information society	0,2	0,2	0,1	0,1	0,1

Source: data from the Federal State Statistics Service

The development of high innovative receptivity can be ensured only by development of sufficiently high technological level in the key producing companies of the region. [11] We also share the author's position that the technological level of production acts as a factor of economy innovation sensibility. Correspondingly, with the high technological level it makes sense to keep high innovation activity – the production will be able to introduce generated innovations efficiently. If the technological level lags behind the innovation activity, so, the innovations will be unclaimed by the archaic production. So, the advanced growth of innovation activity is ineffective and to a large extent senseless consumption of resources. At the same time, the expenses on innovation development grow dynamically in the Russian economy (Table. 1) [12, 34.]

For now, the situation when the technological level supersedes the level of innovation activity is possible also. In this case, the high innovation sensibility of economy is formed, the demand for researches and developments is stimulated, and it provides a possibility to increase innovation activity. However, the examined advance cannot be too big, since in this case the crisis appears. It is usually caused by dissatisfaction of demand for new technological solutions. The countries where the described situation appeared may be called as technologically over mature (Greece, Spain, Italy, Portugal). This type of development is typical to a large extend, and it is proven by time.

Recently, many people joked on the term "enforcement for innovations", when the state program of MEDT of Russia, which considered the state companies would design the programs of innovation development and arrange their activity according to these programs, appeared. However, today's innovations creation policy of Russia needs to be strengthened in the field of implementation. The state must use all its possibilities for pushing innovations into practice in the created conditions. Even the

strictest administrative measures, which will provide a possibility to implement new production technologies on a wide scale, may be considered as feasible.

For development of world experience and for solution of existing problems of innovation irresponsiveness of economic entities, we propose to use an innovation-technological center of cluster type (hereinafter referred to as the ITC), proposed earlier, with introduction of several additional units, as a mechanism for activation of stable development of the regional economic and social system [13]. Development of such ITC, combining industrial enterprises and scientific organizations on the single technological level with high-tech specialized small (medium) structures in the single infrastructure may become essential for provision of global competitiveness of our regions and provision of stable development of their economic and social systems.

First of all, we propose to introduce a renewed approach for budgeting innovation activity in the ITC, using the principle of maximization of regional added value as a universal instrument for estimation of cluster efficiency. Legislative introduction of added value as a measure of efficiency for separate cluster and for the territory as a whole is essential and principal. It will provide a possibility not only to coordinate interests of the state and business, but to form specific measures of state protectionism. The regions form their strategies of development for 15-20 years. This is the major reason, why it is necessary to have effective resolution of legislative problems at the state institutions level. It helps to create the necessary capacity of innovative activity in the regional economy. It is also very important to boost the volumes of competitive participation of SME's in innovative activity, stimulating it through participation in public programs and orders.

Cluster Ideology For a New Economy

At that, the cluster ideology may become a powerful tool for proceeding to more competitive forms of territorial resettlement and organization of economy. At the present time, we see that goods (whose quality are often the same) do no compete, but we see competition of enterprises and as a result, the main competitive advantage is not in the characteristics of goods but in the sphere of competences and possibilities of the company to decrease expenses in the course of realization of produced goods. In the light of "patent wars" between Samsung and Apple we can see, that a seemed fundamental principle of patent protection of rights on the product, starts to lose its inviolability. As such, this protection is beneficial for a company, but from the strategic perspective it kills its business. Openness and readiness to move faster than competitors, copying your know-how, are becoming the basic characteristics of company. Apple is successful thanks to its openness, possibility for any programmer to arrange his soft, to add it to the Apple Store and to receive money for it. So, it wins by means of creating a network, which operates like self-organizing structure. It consolidates the market of developers with the market of consumers. It is not necessary to make arrangements with companies, to discuss issue of your products under their brand – you just load your software and if users download it, you will get

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compensation. It caused a rapid eruption of developments for Apple and resulted in its great popularity.

But often and often, separate enterprises can not make such spurt by themselves. That is why, the organizational innovation in the form of ITC or the cluster of industrial manufacturers may become a significant reserve for development of the regional economy. In this case, not a single enterprise but a territorial cluster with all its resources acts as a participant in the competitive struggle on the market. It is practical to form production territorial-industrial clusters, connected organizationally and technologically with the ITC, arranging them along the trans-modal transport corridors. Using and widening the possibilities of such corridors in Russia, considering its huge size and significant expenses for delivery of energy and raw materials. This formation may be one of strategic directions for regional territorial planning.

Let's mention, that the system of planting innovations in Russia must optimize risks of the innovation creation process, decrease labor costs and increase profitability. It will help to change the situation with relation to profit and amortization charges in the economy of Russia, whose level is critical now (see Fig. 5.). Risk management during the process of spreading innovative activity and innovations should be based on its insurance; moreover, insurance companies must provide the subjects of innovation activity with high quality insurance products with competitive prices [15].

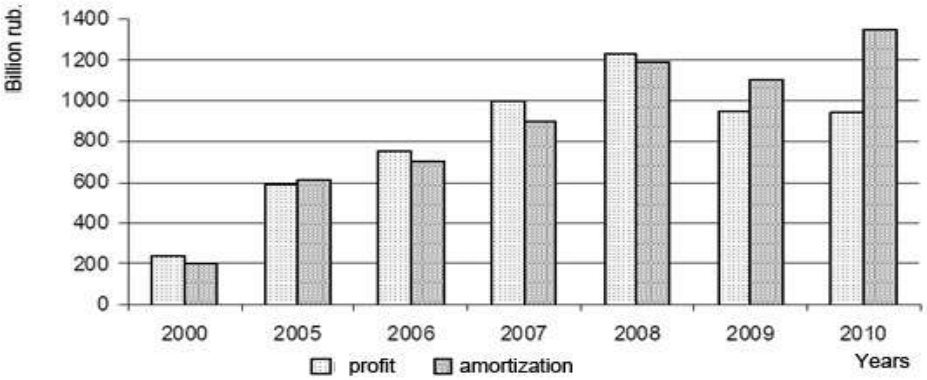

Figure 5. **Dynamics of net profit and amortization charges in the economy of Russia. [14]**

Today, we see formation of unique social control for a principally new type of employee in the area of controlling innovation processes – an accelerator of innovation process, corresponding to the interests of financial, technical and organization spheres, within the limits in which the stages of innovation life cycle are developed. The outstanding characteristic of process connected with preparation of specialists introducing innovation business is the fact that it must have a character of complex preparation, according to settled competencies. Advanced training and education of managers should become continous and must have additional degrees of postgraduate study. The training system of professional managers for the complex

system of innovations must be not only multifunctional but multilevel, in order to consider requests from various categories of professionals with various levels of knowledge, skills and competencies. In addition to the basic university education, seeking to increase innovation activity it is necessary to use intensive efficient forms of teaching, in the form of trainings, oriented, as a rule, towards the leading innovation practices. Generally, the complex training is characterized by continuity, periodicity, proposing a remote qualified consulting and various supports as part of development of innovative entrepreneurial activity [16, 57].

The system of consulting services for enterprises is necessary for active development of the cluster approach in the regional economy. Table 2 demonstrates the classification of innovation pre-conditions for development of this direction. The list and values of forecast indicators of qualitative development of the innovations in Russia are given in table 3 [17, 78].

Table 2. **Classification of innovation possibilities of enterprises**

Classification feature	Classification groups of innovation possibilities
Stages of NTP	Scientific, technical, technological, structural, production, information
Stimulus for development	Caused by the development of science, technics and requirements of production and market
Scale	Complex (synthetical) simple
Volume	"Dotty" (separate adjustments, rules) system (technological and organizational systems), strategic (principles of production and management)
Action radius	Out of the enterprise, at the enterprise
Purpose (goal)	Efficiency of production, efficiency of management, improvement of labor conditions, change of property form, refinement of labor content, product quality, preservation of health, improvement of education, economy (of materials, energy, labor, cost), ecological purposes

Let's note, that the following tendency can be observed during introduction of innovations (among the factors of internal character): resistance is more intensive in the case of more complex innovations and more serious changes of staff, organizational, technological and other characters. It is especially applied to complex innovative solutions, which introduction is not possible, without significant reorganization of all acting sub-systems of production and-social-business activity – such as stuff, economical, organizational and technological.

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Table 3. **Forecast indicators of situation in innovation development in Russia**

Denomination of indicator	2010	2016	2020
Coefficient of invention activity (number of domestic patent applications for inventions, filed in Russia, with a view to 10000 people	1,95 (2008)	3	4
Number of created leading production technologies	854 (2008)	1500	2500
Intensity of expenses for technological innovations (specific weight of expenditures, connected with technological innovations in the whole volume of shipped goods, executed works, rendered services)	1,39 (2008)	2,0	2,5
Share of unique, high-precision, measuring, analytical, technological devices and equipment, of unique stands and complexes with the age of not older than 8 years (considering their modernization) in the total cost of machines and equipment of NIS participants, %	45%	65%	85%

The process of innovation commercialization in the ITC of cluster type requires constant efforts for performance of internal operations – starting from intellectual property protection and audit of projects to additional operations, connected with modernization of experimental technological installations, development and revision of design documentation, search for new materials and localization of the newest technologies, enlargement of installation sizes and etc.

In order to implement the clusterization of regions it is very important to train staff in making interdisciplinary researches and to enlarge and intensify interdisciplinary contacts. The ITCs have the whole set of elements for the innovations creation infrastructure, plus the infrastructure for control of the regional innovative potential realization, combined in the network structure.

Creating the cluster in one structure it is preferable to concentrate the project specific technical specifications, corresponding to possible structure. The functional organizational connections not only provide scientific analysis of projects, but also contribute to bringing the projects to the stage of production, through their support or direct orders from venture firms or various state programs and funds are formed in such ITC.

The principles of powerful forecast method FORESIGHT [18] are quite suitable for forming territorial cluster policy. This method is notable by the fact that all interested parties take part in this process: representatives of state administration bodies, business, and general public. Why some perspective and interesting projects cannot be realized? Because the resources are always restricted and the selection is

subjective. The risk of such undesirable consequences decreases significantly, if viewing of the projects is coordinated by all interested parties. Here, the position of consumers is especially important: if there is a consumer group, which is ready to pay for specific products, the manufacturer and the scientists start to realize where to go and the authority starts to understand, which directions are the most foregrounds. For example, in Finland, the political elite realized that the only reliable resource for long-term development of the country is technologies, and first of all it organized a dialog with business in 1970s. So, the first Finnish priorities in the area of science, that formed one of the highest levels of life in the world, were determined.

Conclusions

1. Orientation toward the model of innovation growth through creation of conditions for accelerated modernization of industrial equipment, used by knowledge-intensive production by means of private-state partnership with diversification of support channels for innovative activity. One of the mechanisms for activation of innovations creation process is formation of the ITC of cluster type, using the advantages of self-organizing principle for subjects with innovative activity.

2. Realization of state support functions through business-mediators in the ITC of cluster type for decreasing the risk of ineffective usage of resources. Preferential provision of services instead of direct financing and co-financing: teaching and advanced training of personnel; market evaluation and protection of intellectual property rights and provision of scientific and technical information and results of research and development; provision of areas on attractive terms and etc. Support of small and medium science-driven business as a medium where innovations are tried which can be implemented by big companies in the future. Implementation of leasing through the ITC of cluster type as a full alternative to bank credit.

3. Liquidation of unjustified serious stratification of society by increasing the life level for the majority of regional residents. There are no countries with low labor productivity among the countries with high quality and level of life, and the new highly-competitive innovations appear in the areas with necessary quality of population.

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Dmitrijus Slesarevas, Valerijus Janovskis

Regioninių socialinių-ekonominių sistemų darnus vystymas: inovatyvi dimensija

Anotacija

Straipsnyje nagrinėjama inovacijų raiška, jos apimamos ekonominės veiklos sritys ir regioninių socialinės-ekonominės sistemos klasterių modeliai. Atlikę analizę, autoriai siūlo teritorijose/regionuose, kaip teritorinio planavimo priemonę, naudoti darnaus socialinio-ekonominio vystymosi organizacinį-ekonominį mechanizmą. Pateikiami duomenys rodo, kad inovacijų infrastruktūros objektų sėkmingas funkcionavimas yra galimas, kai naudojama inovatyvaus technologinio centro klasterio forma. Ji laikytina efektyviausia erdvinio planavimo priemone. Ši priemonė suteikia ženklų didinamąjį efektą visoje regioninėje socialinėje-ekonominėje sistemoje ir tokiu būdu pagerina visuminę piliečių gyvenimo kokybę. Pastarosios priemonės prigimtis glūdi ekonominio vystymosi dėsnyje: technologinis lygmuo turi lenkti inovacijų kūrimą, nes kitaip nebus realių galimybių pritaikyti sukurtas inovacijas. Straipsnyje autoriai taip pat pateikia jų suformuluotus inovacijų kūrimą skatinančius ir regiono

konkurencingumą didinančius pagrindinius veiksnius, siekia šios srities pasaulinę patirtį pritaikyti Rusijos Federacijos specifikai.

Dmitriy Slesarev – Doctoral studies student at North-West Institute of Management – branch of Russian Presidential Academy of National Economy and Public Administration, St. Petersburg.
E-mail: slesarev.d.a@yandex.ru

Dmitrijus Slesarevas – Sankt-Peterburgo Šiaurės-Vakarų vadybos instituto, Nacionalinės ekonomikos ir viešojo administravimo Rusijos Prezidento akademijos doktorantūros studijų studentas
E. paštas: slesarev.d.a@yandex.ru

Valeriy Yanovskiy – Doctor of Economic Sciences is a Professor at North-West Institute of Management – branch of Russian Presidential Academy of National Economy and Public Administration. St. Petersburg.
E-mail: ianovski@mail.ru

Valerijus Janovskis – Sankt-Peterburgo Šiaurės-Vakarų vadybos instituto, Nacionalinės ekonomikos ir viešojo administravimo Rusijos Prezidento akademijos profesorius, ekonomikos mokslų daktaras.
E. paštas: ianovski@mail.ru

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