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TÍTULO: Génesis de la formación y desarrollo de agrupaciones científico-educativas regionales.

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RESUMEN: En los últimos años, el sistema nacional de educación superior de la Federación Rusa ha sufrido una reforma significativa, requiriendo nuevos mecanismos de interacción de elementos estructurales para los sistemas de educación federal y territorial y la comunidad de expertos en los sectores de la economía nacional, y la más completa satisfacción de las necesidades de un mercado laboral especializado. Se desarrollaron herramientas especiales para la acreditación profesional y pública de programas educativos, se introdujeron estándares profesionales y educativos avanzados, pero es necesario organizar la interacción de integración de temas de ciencia, educación y negocios, quedándose sin resolver problemas de comercialización de resultados científicos para la alta tecnología regional, los cuales actúan como elementos y forman los subsistemas del sistema nacional de innovación en regiones de la Federación Rusa.

PALABRAS CLAVES: competencia, economía innovadora, integración, investigación y grupo de educación, infraestructura de innovación.

TITLE: Genesis of the formation and development of regional scientific-educational groups.

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ABSTRACT: During the past few years, the national higher education system of the Russian Federation has undergone significant reform, requiring new mechanisms for the interaction of structural elements for the federal and territorial education systems and the expert community in the sectors of national economy and the most complete satisfaction of a specialized labor market needs. Special tools were developed for professional and public accreditation of educational programs, advanced professional and educational standards were introduced, but it is necessary to organize the integration interaction of science, education and business subjects, remaining unsolved problems of scientific result commercialization for regional high-tech systems, which act as elements and form the subsystems of the national innovation system in the regions of the Russian Federation.

KEY WORDS: competition, innovative economy, integration, research and education cluster, innovation infrastructure.

INTRODUCTION.

The experience of regional integrated complex development, which together form a key element of the regional innovation subsystem, shows the effectiveness of the substantial diversity of organizational and managerial forms, the high competitiveness of the created developments, the solution of complex problems of import substitution, the wide use of thinking youth in the cognitive environment of the transformation processes of the federal and regional scientific and educational community (Abalkin, 2006; Belov, 2006; Misakov et al, 2013).

One of the most effective tools for research and development work organization is special organizational, innovation and economic structures — scientific and educational clusters, which act in a relatively free form of scientific, educational, and business structure integration.

University complexes, as the "core" of research and education cluster development in a regional economic system, can be considered as the most priority form of university functioning and sustainable development optimization. Such a situation suggests that the considered concept of triad integration (business, science and education) should become the basis of developed regional scientific and educational clusters (Akkuzova et al, 2018; Bahremand, 2015; Razavi et al, 2015).

Theoretical and methodological provisions and practical recommendations for the creation and development of scientific and educational clusters, as an effective form of interaction between scientific institutions and economic entities on an isolated territory, have been studied by many scientists, including such as Andersen M., Kane J., Marx K., Nelson R., Risin N. and Sirotkina N.

In recent years, such problems of the studied topic as the initiation, accumulation and sustainable development of research activities have become topical in our country (A.I. Abalkin, S.Yu. Glazyev, N.V. Kondratiev, Yu.N. Treshchevsky, et al.).

These and other authors were able to analyze in detail and identify the features of cluster policy formation, modern systems of research work organization at the regional level in terms of increasing competition.

The current situation of scientific and educational activities in the Russian Federation is largely conditioned by the bias in the economy - the vector of the national economy has been focused on the extraction and primary processing of raw materials for many decades. Thus, all industries, industrial complexes and enterprises included in the knowledge-intensive high-tech national complex, serving as the basis of federal and regional target programs for socio-economic development and forming competitive advantages in knowledge-intensive industries, have always had a negative trend for all key exhibitors. The extensive development path did not contribute to the proper solution of most socio-economic problems. This was some kind of temporary solution to an urgent regional socio-economic problem at best. Moreover, this approach reinforced the technical lag, worsened the demographic and environmental components in the constituent entities of the Russian Federation, etc (Aloeva & Misakov, 2013; Pastukhov, 2010; Druker, 1986).

Today there is an especially acute problem of the need for a rapid transition to a progressive economic path of development in the Russian Federation through the precise formation of competitive advantages on the principles of new industry introduction. It requires a qualitative transformation of new level product production, activation of science achievement and new technology use in the main spheres of life.

DEVELOPMENT.

Research methodology.

The theoretical and methodological provisions were represented by the works of foreign and Russian scientists on the problems of educational and scientific space clustering, conclusions and proposals obtained in fundamental and applied research in the field of higher educational institution activity

organization in current realities, as well as the associated problems of identification and research work performance provision, as well as federal and regional programs and regulations, and statistical materials.

The study used such scientific methods of knowledge as analysis and synthesis, comparison, observation, forecasting, questioning, deduction and induction.

Study results.

Before dealing with the prerequisites, the creation and development of scientific and educational clusters, we decided to determine how the Russian Federation is positioned in the world ranking concerning high-tech developments. For such purposes, a special science development index is used in world practice to assess the knowledge-intensiveness of the national economy. According to the International Business School (INSEAD) and the World Intellectual Property Organization (WIPO), Russia occupies the 51st place. Mauritius, Moldova, Romania and Brunei are also close to the position 51 in this respect (There is no need to comment on this). This situation is easily explained - the per capita expenditure on research and development in the United States, Finland, Japan and a number of advanced countries is more than $1,100, while it makes less than $140 in Russia (Frumina, 2014).

Obviously, with such funding it is impossible to withdraw Russian science from a crisis state. Apparently, it is not by chance that it was not possible to implement the concept of socio-economic development of Russia for the period up to 2020 regarding the transition of the national economy to the knowledge-intensive way of development. It is clear that in these conditions it is unacceptable to talk about any sustainable regional socio-ecological-economic development.

The first reason for this situation is that quite a few initiatives concerning the science-intensive programs and projects proposed by the authorities and other institutional structures generate deliberately unrealizable or ineffective actions, for example, numerous attempts to apply

nanotechnology in the areas where it is impossible to use them a priori, or to create high-tech clusters or even separate territories of advanced development in the regions without the potential for their innovative development.

We believe that the role of independent expertise is extremely inadequate, although nowadays only such commissions are able to give an objective conclusion about the feasibility of a knowledge-intensive research and education cluster development in the studied region, which will become the engine and the source of competitive advantage for the territorial economic system.

Undoubtedly, the relationship of government, business and science is also important here. Without the development of business partnerships, it will be difficult to implement such a "sensitive" intellectual project.

In our understanding, the concept of "high-tech products of a territorial scientific and educational cluster" is a special product, work, service that combines intellectual, scientific, industrial, resource and human potential within the framework of a cluster initiative and satisfies social needs most fully.

We realize that the specific qualities of a high-tech product and its competitive advantages are quite difficult to determine accurately - there is a very wide variation in the use of this term.

During a detailed examination of this indicator one can state that, unambiguously, a high-tech product is a type of innovative products, the final result of scientific and educational activities. It is appropriate to recall M. Weber, who called for a fundamental distinction between "useful products" and "provided things". Continuing his thought, it can be argued that the human dimension is capable of predetermining the properties and consumer qualities of high-tech products (Gvozdev, 2012; Weber, 2012).

Moreover, one can consider the final results of production and research activities based on the systemic use of a complex of multivariate innovations as high-tech products (with some assumption).

In (Index, 2017), high-tech products are considered as the results of the original intellectual activity, which have unique competitive advantages, which, ultimately, allow them to occupy a significant niche of the relevant market. At that, the predictors of high-tech industry competitiveness propose to attribute a number of conditions that make up a special table of high-tech products, including:

- Extrapolation business model.
- The system management of the market entry process.
- Staff formation.
- Consumer need, etc (Index, 2017).

It should be noted that the ultimate goal of any regional science-intensive scientific and educational system development is the maximum satisfaction of the needs of both individuals and legal entities. This correlates with the statement of the President of the Russian Federation that Russia needs to modernize the country, improve the quality of life of the population and the national economy competitiveness quickly for a scientific breakthrough.

Integrated knowledge-intensive complexes are the institutional basis of knowledge-intensive educational systems. In recent years, a network-based approach has been actively used to analyze and diagnose the performance of high-tech research and educational systems, with the emphasis on the internal and external links of separate components.

There is an interesting author approach which proposes to study a high-tech research and education cluster from infrastructural points of view, highlighting the main elements of this system (Blyakhman, 2012; Gelman, 2009; Vidyapin, 2007).

It seems to us more expedient to consider the science-intensive scientific and educational cluster using a systematic approach, because it allows to consider institutional, network, infrastructure and other aspects. Moreover, such an approach has proven itself quite successful for the analysis of other industries where institutional forms exist in the form of holdings, concerns, trusts, financial and

industrial groups, joint ventures with foreign partners, transnational companies, and special economic zones.

It is easy to see that the designated institutional forms are almost adapted to development in the Russian context, although, of course, not all of them are engaged in the production of high technology products, many of them are not integrated with universities.

The most popular integrated subjects in the Russian Federation engaged in scientific and educational activities are technoparks, scientific and business parks, special economic zones, techno-complexes, innovation and science-educational clusters. Undoubtedly, the Novosibirsk Academgorodok is the first integrated complex in the world.

The abovementioned integrated formations are still in the intensive formation phase. They can already be classified according to a number of signs:

- What is the priority for this institution?
- What is the organizational and legal status of the park structural elements?
- Availability of a general activity profile.

It seems to us that when you choose a reasonable organizational and legal form of a research and education cluster, it is necessary to determine the structural elements of the mechanisms for its formation and development.

And this is natural, because the correct choice of the optimal legal form contributes to the definition of the regulatory framework, identifying the nature of the relationship between participants in integrated structures. At that it is necessary to take into account many nuances, in particular, the created integrated structure can be an open joint-stock company, a full partnership, etc.

Depending on the chosen variant of an integrated structure, an organizational and management mechanism is developed, which ensures the management of the created association (Artihina, 2013; Blinova, 2012; Misakov et al, 2013).

Under the conditions of the agrarian-oriented republics of the North Caucasus Federal District, it seems to us that it is most realistic to form a research and education cluster and similar structures specializing in agro-industrial complex. In this case, the agro-industrial complex is able to concentrate the cumulative resource potential of diversified enterprises (agricultural, processing, transport and other) and scientific and educational institutions within a comparatively small territorial area operating in a closed cycle of food production.

It should be noted that this kind of institution can become a source of competitive advantage development in the depressive agrarian-oriented republics of the North Caucasus Federal District. It is also important that such institution will be very attractive for small businesses, farms and personal subsidiary farms (Afashagova et al, 2014; Karmokova & Misakov, 2008; Sandu, 2013).

The analysis of the special literature allowed us to present a modified algorithm for a regional scientific and educational cluster development:

1. Detailed research and assessment of the regional economic space.

2. The choice of a scientifically-based option for a regional scientific and educational cluster establishment.

3. The development of conditions for the maximum adaptation of integrated institution in the regional economic system.

4. The conduct of targeted marketing research.

5. The creation of loyalty among the local population, business community, self-government bodies to the created integrated association.

6. The improvement of organizational and managerial mechanism for the sustainable development of the developed cluster.

7. The development of information base and broad support activities.

8. Cluster infrastructure support.

It is clear that the effectiveness of the regional scientific and educational cluster being created has a substantial variation, which is conditioned by the multitude of possible risks in terms of increasing competition, especially characteristic of enterprises engaged in search and innovation activities. Thus, for example, the special economic zone created in the Kabardino-Balkarian Republic proved to be extremely ineffective. There are many similar examples in other regions.

All this suggests, that initially the concept of regional development should be considered as an integrated system of legal regulations, the formation and development of diversified enterprises integrated into a single complex, while possessing a certain autonomy.

It should also be borne in mind that such concepts may have different forms, variants and regulatory status. In any case, it is necessary to designate a clearly formulated and objectively controlled general goal, a set of principles, factors, possible restrictions and norms, by means of which we will have to solve the tasks of promising zone creation for the economic development of the region.

In modern realities, one of the most effective methods of practical involvement of intellectual activity final results, in our opinion, is the initiation of specific organizational and practical structures - scientific and educational clusters. They, as a rule, are created on the basis of educational institutions of various types.

Based on the industry affiliation, the identification of research and education clusters is functionally oriented and should:

- Increase the social significance of science and education.
- Promote an objective extrapolation of innovation, scientific, educational activity results through the industrial testing of technologies and experience that have been gained in universities.
- Contribute to the improvement of the competence profile of researchers and teachers.
- Organize and develop the knowledge-intensive infrastructure of a university.
- Identify new sources of financial income from scientific and educational activities.

- Create conditions for high-tech product competitiveness provision.

- Increase university importance and image.

An example to follow and the experience for use can be the "Skolkovo" research and education cluster. It is a megacluster consisting of five clusters per se, in which the latest breakthrough technologies are involved - nanotechnologies, nuclear energy, etc.

Nowadays, Skolkovo is also viewed as a pivotal source of growth for global problem solution and the national economy of the Russian Federation modification according to high-tech development strategies.

The activity of the scientific and educational cluster in the Republic of Tatarstan on the basis of the Kazan State University of Architecture and Civil Engineering is interesting and useful. In addition to the scientific and educational activities, there is a number of production clusters, including high technologies, energy, light industry, etc. There are also similar clusters in the Arkhangelsk, Voronezh and several other regions and territories.

In the course of the study, we found that it is necessary to form a centralized information and analytical base, we also need to issue official methodological guidelines to evaluate and analyze investment and final results of the research and education cluster, there is still no monitoring and ranking scheme for performance indicator evaluation, etc.

Obviously, all this is a very complex and specific problem, because it is extremely difficult to calculate the effectiveness of a regional scientific and educational cluster for a short period (two years), because they cannot be evaluated and calculated explicitly, due to the fact that they have a deferred nature of action and their manifestation is rather indirect. But already today it is possible to calculate related indicators, such as the index of human capital development, the index of population life quality in the region, the level of education accessibility, its quality, etc.

CONCLUSIONS.

There are some conclusions to take into consideration:

- The development of a regional scientific and educational cluster is the key institution, which is the source for a territorial high-tech subsystem creation.

- The identified features, functions and properties of high-tech partnership systems allowed to determine their essence and the created competitive advantages, on the one hand, and possible risks and restrictions, on the other.

- They proposed the algorithm for a regional scientific and educational cluster development. They studied the factors and possible sources of its activity efficiency increase, formed on the life cycle of its performance.

- During the study, we found that there are favorable factors for research and educational cluster development with core cluster-forming local universities and colleges in almost all agrarian-oriented depressed republics of the North Caucasus Federal District.

- The basis of the scientific and educational clusters should be a strategic partnership approach, which undoubtedly determines the focus of all the backbone components of the cluster on the implementation of set goals and objectives.

Conflict of interest.

The authors confirm the absence of a conflict of interest.

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