Implementation Of New Educational Technologies Through Cooperation Of Economic Clusters Of Enterprises With Scientific And Educational Centers

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Abstract

The article describes the ongoing work on the implementation of new educational technologies within the Kama innovative regional production clusters in the direction of cooperation with the scientific and educational centers. Reviewed activities, develop recommendations and proposals that contribute to the development of science, education and innovation infrastructure in the Cluster.

Keywords: centers of innovation development, scientific infrastructure, integrated interuniversity concept, the development of the cluster.

1. Introduction

The cluster approach is a form of territorial-production industry organization that promotes the implementation of innovative business economic development projects that lead to synergy with the research, design institutes in the committed involvement of the state and municipal governments. In contrast to the previously used the branch principle of production management cluster approach allows you to create an efficient economy in the field, focused on the revitalization and commercialization of scientific discoveries and inventions, the production of competitive...
high-tech competitive high-tech products. Occurrence and distribution of clusters and innovation activities are regular processes. Tendency to form clusters are likely to have joint research and production base, further successful development of the cluster can only be guaranteed if the scientific basis can not build a cluster for specialized and differentiated by type. The role of clusters in the development of innovation lies in the fact that in their framework formed strong ties between innovation system, centered in the regional centers of innovation development ("innovative core" clusters), traditional industries and enterprises ("production sites" clusters). Synergy innovation centers and the formation of regional clusters provide conditions for the promotion of innovative technologies in traditional industries and the emergence of new businesses and industries that could compete successfully in the global market. In addition, in cases where the clusters include educational institutions and research centers, it is possible the immediate implementation of the findings of scientific research, commercialization of research and monitoring needs in the field of scientific research in the region. In this aspect, a cluster is an innovative system of practical importance.

2. The model

A striking example of the cooperation with the scientific and educational centers is Kamsky innovative regional production cluster (herein after - the cluster). Cluster Development Programme represents a new mechanism for the Republic of Tatarstan, a comprehensive development of the area, based on the mutual interaction of the participants with a Cluster of university centers, allowing forming a long-term sustainable demand for innovation and significantly expanding its presence in the domestic and global markets of high-tech products.

The existing research and education center cluster:
- 6 universities - trained 60 thousand people;
- 13 institutions of primary and secondary vocational education - study 6 thousand people.

The cluster consists of Kazan (Volga) Federal University (KFU), Kazan State Technical University named after Tupolev (KAI) and Kazan National Research Technological University (KNRTU). The Republic of Tatarstan is the only region of the Russian Federation (except for Moscow and the Moscow region, St. Petersburg), where a concentrated number of federal universities. This status was granted to them by close cooperation with leading enterprises cluster in the area of health research and development (R & D) as an integral part of the long-term development programs of universities is to conduct research on the orders from these companies. The total R & D should reach by the year 2020 more than 60 billion rubles. On the territory of the Cluster share of innovative products at 22.3%, higher than the average in Russia (Russian Federation - 18.7%, RT - 19.5%). By 2020, the share of innovative products is expected to increase to 44.7%, and also increase the volume of industrial output from 600 billion rubles to 1,996 billion rubles.

Table 1. Enterprises Cluster Co-operation with the scientific educational centers.

| KFU                                      | KNRTU                                      | KAI                                      |
|-------------------------------------------|--------------------------------------------|------------------------------------------|
| The world-famous chemical, physical and   | Russia's only university-general designer of| R & D center in the field of aviation,   |
| mathematical science schools              | large plants                               | automotive and information technology    |
| Center for Fundamental science and        | Federal Centre for Cluster Development    | (KAMAZ, Ford-Sollers) Nanotechnology     |
| education in Russia and the Volga         | (direction: the polymer composition. Material | Centre and prototyping (ROSNANO)         |
| Federal District                          | and processing of hydrocarbon raw materials)|                                          |
| Center of cluster development in the     |                                            |                                          |
| information technology                    |                                            |                                          |
| OJSC «Nizhnekamskneftehim»                | OJSC «Nizhnekamskneftehim»                 | LLC «Ford Sollers Holding»               |
| OJSC «KamAZ»                              | OJSC «Chemical Plant L.Y. Karpova»         | OJSC “KamAZ”                             |
| OJSC «Tatneft»                            | OJSC «Tatneft»                             | OJSC "PO ElAZ"                           |
| OJSC «TAIF-NK»                            | OJSC «TAIF-NK»                             |                                          |

However, there are factors that hinder the development of Clusters at this stage. The main drawback is the lack of Cluster development of an integrated database, communication network and the lack of qualified personnel. Achieve the objectives set for the cluster can only be due to the close cooperation of scientific and educational organizations, innovation infrastructure and industrial facilities.
3. Empirical analysis

World experience shows that the development of world-class industrial clusters is impossible without building a strong scientific infrastructure. The presence of a cluster of R & D and Research Work (RW) centers encourages the use of advanced technologies to both large and small and medium-sized businesses. In the global refining and petrochemical industry as a successful example was the cluster Jurong (Singapore), a cluster of Ludwigshafen (Germany), part of which is a powerful scientific centers that performed the full range of R & D and RW as an anchor for the investor and for the residents of the cluster. Taking into account international experience in the Cluster much attention is paid to alignment of the scientific infrastructure, rapidly and flexibly responding to the basic needs of the market and able to provide a Cluster competitiveness in global markets - both in the production of innovative products, as well as the results of research activities. For the creation and development of new technologies will be involved in leading Russian research institutes (Boreskov Institute of Catalysis, Siberian Branch of the name of the Russian Academy of Sciences, Institute of Petrochemical Synthesis name Topchiev Russian Academy of Sciences, Institute of Problems of Chemical Physics, Russian Academy of Sciences, Society with limited liability Company "INCO-TEK" and others). In cooperation with the Russian Academy of Sciences (RAS) projects will be developed for the implementation of the most promising companies in the petrochemical industry:

- commercialization of technologies for deep processing of natural and associated gas to produce light olefins (Institute of Petrochemical Synthesis, Russian Academy of Sciences, Institute of Problems of Chemical Physics, Open Joint Stock Company "EIINP");
- commercialization of new heterogeneous catalytic alkylation processes for the production of high-octane gasoline components (iso-paraffins) and valuable raw material for the petrochemical industry (Institute of Petrochemical Synthesis, Russian Academy of Sciences, OJSC "EIINP");
- commercialization of new technologies for the Arctic winter and diesel fuels by catalytic dewaxing (Russian Academy of Sciences);
- new technologies for producing hydrogen and synthesis gas through the use of nano-structured oxide membranes and catalysts (Institute of Solid State Chemistry, Ural Branch of the Russian Academy of Sciences);
- development and commercialization of the process of the production of ethylbenzene on heterogeneous catalysts (Institute of Petrochemical Synthesis, Russian Academy of Sciences).

Thanks to the determination within the Cluster of the largest enterprises of the republic is possible to use a system of integrated and continuous training system. The main objective of the cluster development policy of continuing education should be to ensure co-operation between enterprises and educational institutions, including the following areas:

- monitoring and forecasting needs of members in the Cluster of specialized human resources and planning , participation in the development of job training;
- identification of best educational practices in companies of Cluster members and their scaling in the cluster , the culture of supervisors, mentors
- the organization of training and work experience in enterprises Cluster;
- implementation of specialized training programs for the development and implementation of cluster policy , and organizational development and implementation of Cluster- cluster initiatives.

During the creation of teaching materials, new forms of education and the educational process necessary to create model training programs on key areas of the cluster policy. Their goal is to create a large-scale, unified in their principles of transfer of knowledge and skills necessary to achieve the objectives of cluster policy. This system will give priority to prepare the organizers, experts and other participants in the project for the development of clusters.

To support and encourage the professional development of science teachers need to create a work plan, the highlights of which are:

- support of domestic and international academic mobility of teachers and researchers in priority areas of the Cluster;
- the implementation of targeted training of the teaching staff in leading Russian and foreign universities in priority areas of the Cluster.
To deepen the international scientific and technical cooperation support Higher education institutions need to strengthen the Cluster partnerships with leading international research and education centers. Is an important part in international exhibitions and forums, the organization and conduct of similar events in the Cluster. High level of fundamental knowledge and skills training is a key factor in the successful development of existing and creation of new high-tech companies in the Cluster, ensuring their competitiveness and attractiveness, increase profitability.

The main priorities of the cluster development policy innovation must be:
- Promotion of joint research and development activities of the cluster enterprises, institutions and universities;
- Promoting the development of research programs, long-term partnerships, cooperation between enterprises in financing and implementing R & D, including - In the form of innovation consortia;
- Promote the creation of innovative new businesses, including the provision of advice to the creation of new innovative enterprises;
- The development and provision of high quality services innovation infrastructure facilities, including - business incubators and technology parks, technology transfer centers, centers for the development of design.

Significant role in the development of research and innovation cooperation methods play a supporting effective interactions of various innovative subjects. In this case, in order to enhance the processes of cooperation between companies, research and educational institutions, faster development should receive support mechanisms for cooperation projects, involving them in the implementation of at least 3-8 companies and organizations in the priority tasks of the Cluster.

Among the primary methods of state support can be identified:
- government funding and other interdisciplinary studies conducted jointly by various scientific institutions;
- state allocations for innovative programs and projects carried out on the basis of cooperation and innovation leading to its expansion and deepening;
- tendering cooperation projects in the field of research and innovation, including the principles of equity financing;
- dual finance work in the science and innovation cycle and clusters of interacting organizations;
- development of subcontracting in the performance of government orders scientific innovation profile;
- the formation of specific cooperative culture in the field of research and innovation through the development of the institute dedicated funding from the budget funds;
- increase in the proportion of cooperative contribution to the criteria for assessing the efficiency of public organizations in the field of research and innovation;
- co-financing of programs of cooperation in science and technology from the budgets of different levels.

Obvious need to find ways to create and maintain cooperative relations between the different actors of innovation, as namely the cluster structures, where there is an exchange of knowledge and innovation transfer, determine, among other factors, the economic progress of the region. However, the successful development of a cluster can only be guaranteed if the scientific basis can not build a cluster for specialized and differentiated by type.

4. Results

The implementation of the existing favorable prerequisites for the development of the Kama innovative regional production cluster, including based on the technical innovation of the Special Economic Zone (SEZ), territory-based industrial parks, allows for increased use of existing scientific and technical potential. The formation of a network of stable relations between all cluster members is essential to the efficient transformation of inventions into innovations, and innovations - a competitive advantage. The development of research and innovation infrastructure in the Cluster will improve the efficiency of research activities, create conditions for the development and commercialization of their implementation in enterprises cluster, an effective system of innovation development cooperation ties "science - business " and "business - science - business." As a result of cooperation of industrial enterprises, scientific and educational centers, creating centers of excellence, parks and experienced pilot plants (which provide access to expensive high-tech equipment) minimizes the cost of cluster members on research and development and innovation, will increase the overall level of innovation and scientific research activity. As a result of the successful completion of the works and projects in the field of research and development, Cluster members
will have access to effective innovative technologies for the production of advanced materials and products. This will give impetus to the creation of new competitive industries, the organization of production of unique products to Russia, which ultimately will enable enterprises to cluster to take a leading position in their respective segments of the Russian and world markets.

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