

# Scientific and Educational Centre as an Innovative Project for Transforming the Educational System

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## ABSTRACT

The article focuses on the activity of scientific and educational centers created in the Russian Federation as innovative projects that contribute to the transformation of education and science processes into a project for the integration of all levels of education, the development of the potential of scientific organizations and the implementation of theoretical developments in the practical sphere. Typical problems arising in accordance with the main trends in the creation and promotion of research and educational centers are formulated. Clear innovation goals and clear socio-economic results are defined, which will be achieved gradually, with each stage of implementation of the innovation project. The necessity of creating a modern model of scientific and practical research and development and a powerful technological development of the scientific and educational system is argued.

Priority tasks are specified - the formation of a project team, a scientifically based mechanism for resource planning, clear and understandable stages of implementation of an innovative project.

**Keywords:** *innovative project, education, science, technological development, scientific and educational center*

## 1. INTRODUCTION

Research and education centers are clusters that carry out innovative activities to transform the processes of education and science into a project of integration of all levels of education, the development of the potential of scientific organizations, and thus contribute to the active transition of business from a traditional to high-tech industry. Considering research and education centers as an innovative project to transform the educational system, we believe that their goal is to create an innovative product that is the core of a system of scientific and technical innovative projects for commercialization.

## 2. METHODOLOGY

The relevance of this topic is due to the fact that the innovative nature and innovative content are a necessary condition for the creation and implementation of any project. We consider the innovative project of transformation of the educational system as a complex of interrelated events based on the realities of the fourth industrial revolution, the digital economy, the penetration of information technologies into all spheres of human

activity, which stimulates the innovative development of the production potential of enterprises, turning education

into a competitive business system that creates a stable socio-economic growth of a society.

The business education system differs from the usual traditional education system because it makes the transition from a traditional culture based on a long-term planning with a cyclical nature to the "world of projects". Any educational product or process should be unique one and represent an innovative project for the development of science and technology. An innovative project of transforming the educational system is characterized by interrelated resources, clear deadlines, certain executors, and a specific set of activities aimed at achieving exact educational goals and objectives.

The innovative project is the subject of a serious research by domestic researchers.

K. V. Khomkin analyzes an innovative project as a set of interrelated measures aimed at achieving the set goals within a given period of time and with an established budget during the period of testing and finalizing the idea of creating a new product, including the forecast of its market attractiveness when selling experimental batches. The purpose of the innovation project is to confirm the technical, technological and commercial parameters of further business planning, i.e. justification of the business plan of

the investment project of serial production, sales and after-sales service of the developed product [27, p. 5-7].

**Table 1 Signs of innovation in the REC project**

	Signs of innovation.	REC activities
1	Achieving specific goals	- development and implementation of Complex research programs and conducting Complex scientific and technical programs; - commercialization of the obtained results of intellectual activity, including marketing research and the search for partners to promote products to specific markets, including external ones.
2	Limited length of time	-admission to targeted training in higher education programs within the established control figures for the admission of citizens to training at the expense of budget allocations of the Federal budget, budgets of the Russian Federation and local budgets, if there is a license to carry out educational activities and state accreditation of the main educational programs being implemented; - implementation by the initiator of the Program and the participants of the REC of educational activities for the implementation of programs of additional professional education in the presence of an appropriate license for the implementation of educational activities.
3	Focus on coordinated, interconnected actions of project participants - the project team	- ensuring legal protection of intellectual property rights management and protection of both the results of intellectual activity received by the initiator of the Program, and the results of intellectual activity transferred to its management, including abroad; -ensuring that REC participants can use the REC infrastructure on preferential terms; -informational and consulting support on certification and standardization issues; - organization of interaction with Federal and regional export support centers, as well as with trade representations of the Russian Federation.
4	Degree of uniqueness and uniqueness	-providing engineering services, including accelerated design of innovation implementation; - implementation of quality assessment of innovative projects, including when making decisions on the provision of state support for innovative projects; - implementation by the initiator of the Program and participants of the REC of educational activities of educational programs of higher education-master's programs and programs for training scientific and pedagogical personnel in postgraduate studies.

Source: compiled by the authors, partially used material [13]

V. A. Pervushin has an interesting point of view. He defines that an innovative project is a system of interrelated goals and means of achieving them, which is a complex of research, development, production, organizational, financial, commercial and other activities, appropriately organized (linked by resources, deadlines and performers), issued with a set of project documentation [21, p.14].

Noteworthy is the position of D. I. Kokurin who considers an innovative project as planned for systematic implementation, united by a single goal and timed to a certain time, a set of works and activities for the creation, production and promotion of new high-tech products to the market, indicating the performers, the resources used and their sources [12, p.398].

R. A. Fatkhutdinov understands an innovative project as "a set of documents defining a system of scientifically based goals and measures to solve the problem, the organization of innovative processes in space and time" [26, p. 388].

In their work "the Mechanism for selecting significant projects for the company and bringing them to competitiveness using functional and cost modeling" Ryzhova V. V., Petrov V. V. indicate: an innovative project is an investment project containing a complex of research, development, production and other activities that provide an effective solution to a specific task (problem) associated

with the development, production and sale of innovative products [23, p.31].

The concept of an innovative project is logically justified by A.V. Kunitsyn, considering it in the context of an investment and innovation project as "a set of measures that include justification, calculation and practical implementation of innovations in order to obtain additional profit and/or other positive effect in the conditions of limited material resources, time and technological capabilities" [11].

As a result of studying and analyzing the works of a number of leading scientists in the field of innovation management, it can be noted that despite the difference in wording, all of them are practically the same in defining the concept of "innovation project". Therefore, an innovative project for transforming the educational system is understood as a set of clear strategic interrelated works that are implemented within a certain time frame and have limited material resources, aimed at obtaining a new innovative scientific product or service.

The activity of research and educational centers as innovative it is advisable to consider from the perspective of the project approach. It is worth noting that the website of the REC.RF has a section "about the project", which provides information about the «REC project». This section provides information about the importance of creating a project office. This is because it was initially considered a

project, and after the successful launch of five world-class RECs, there was a need for effective management of both the REC system as a whole and the individual project that each REC represents. Of course, the success and effective implementation of the activities of research and educational centers is impossible without consulting and methodological support, expertise of the developed programs of activities created by RECs, analysis of documents in the framework of competitive selection and reports with the performance indicators of existing RECs.

The research and education center is an innovative project for the Russian Federation, because such projects did not exist in our country, although some universities and large enterprises made attempts to combine education and business, but they were not translated into the large-scale long-term projects. The current world-class RECs in the Russian Federation are created taking into account foreign experience (see Table. 2 "Ten leading centers of scientific and technical innovation in the world").

**Table 2 "Ten leading centers of scientific and technical innovation in the world"**

Rating	Title	Country	Main field of science	International patent	
				filed application	Main area of technology
1	The world's science and technology hotspots	Tokyo/Yokohama, Japan	Physics	104746	Electronics
2	The world's science and technology hotspots	Shenzhen/Hong Kong, China	Engineering equipment	48084	Digital communication
3	The world's science and technology hotspots	Seoul, Republic Of Korea	Engineering equipment	37118	Digital communication
4	The world's science and technology hotspots	San Jose/San Francisco, United States of America	Chemistry	36715	Computer technology
5	The world's science and technology hotspots	Peking, China	Chemistry	18041	Digital communication
6	The world's science and technology hotspots	Osaka/Kobe/Kyoto, Japan	Chemistry	27046	Electromechanics
7	The world's science and technology hotspots	Boston/Cambridge, United States Of America	Oncology	13659	Pharmaceutics
8	The world's science and technology hotspots	New York, United States Of America	General medicine and internal medicine	12032	Transport
9	The world's science and technology hotspots	Paris, France	Physics	13318	Electromechanics Pharmaceutics Pharmaceutics Transport
10	The world's science and technology hotspots	San Diego, United States Of America	Chemistry	18217	Digital communication

Source: compiled by the authors, used material [6]

The Table "Ten leading centers of scientific and technical innovation in the world" gives a brief description of the main leading centers of scientific and technical innovation in the world. We consider the geography of the world's leading centers of scientific and technical innovation to be an interesting fact: - four research centers are in the United States, two centers have both -China and Japan, and one center each are in France and Korea. Each center focuses on one field of science only and the main area of technology within which it is being improved.

The strategic nature of the REC was defined by Vladimir Putin in his address to the Federal Assembly in 2019, where he noted: "for powerful technological development, we need to build a modern model of research and development. This is why we are creating research and education centers

in the regions, which are designed to integrate all levels of education, the capabilities of scientific organizations and businesses" [4]. State support is provided - "work on the creation of centers is carried out within the framework of the national project "Science", which is planned to allocate 636 billion rubles" [5].

The goal of implementing the REC is to achieve international-level indicators, namely, the five world-class RECs operating in the Russian Federation are aimed at implementing "...the presence of the Russian Federation among the five leading countries in the world that carry out research and development in areas determined by the priorities of scientific and technological development".

**Table 3 Goals and activities of the five world-class RECs operating in the Russian Federation**

Title	Goal/Tasks	Areas of activity
REC "Innovative solutions in agriculture"	1)Development of agricultural science 2) Capacity building agricultural enterprises 3) Improvement training systems for professional staff for the region's agroindustry	1) Biotechnology 2) Selection and genetic research, cell technologies and genetic engineering 3) Digital transformation of the agro-industrial complex and resource saving 4) Food and veterinary medicine production 5) environmental Management
REC "Kuzbass"	1) Achieving global leadership in the field of exploration, efficient production, transportation and deep processing of solid minerals.	1) Pure coal 2) Green Kuzbass 3) Healthy person in an industrial region
REC Technoplatfrom 2035	1) growth of regional market share and domestic enterprises in the world markets of goods and services 2) training of highly qualified personnel for industrial enterprises	1) Innovative production, components and materials 2) Intelligent transport systems 3) high-Tech personalized medicine and medical instrumentation 4) Advanced digital technologies 5) Ecology and elimination of environmental damage
REC "Rational subsoil use"	1)Ensuring technological breakthroughs in subsurface use 2) Attracting and retaining active and talented young people	1) Hydrocarbons 2) Solid minerals 3) New materials and substances 4) Power engineering 5) Digitalization and production robotization and services 6) Ecology and territory security 7) Chemical technologies
West Siberian REC	1)The creation of the centre for process simulation 2)the Establishment of a centre for systems engineering	1) Biological safety of humans, animals and plants 2) the Arctic: cold world resources and the quality of the environment, human in the Arctic 3) Digital transformation of the oil and gas industry

Source: Compiled by the authors

So, the main parameter for evaluating the effectiveness of scientific and educational centers as an innovative project will be the socio-economic effect, which is expressed in the formation of elements of a new system of science organization, increasing the status of Russian science and accelerating the technological development of the Russian Federation.

### 3. RESEARCH RESULT

On the basis of the conducted research we can confidently say that each existing research and educational center is a separate unique project. At the same time, creation, and implementation of activities of scientific-educational centers in the Russian Federation as a whole represents one of the strategically important innovative projects of

transformation of the educational system, which involves restructuring the Governance of education, the reconstruction of interaction, representation and protection of scientific development in a relatively short period of time, identification of vacant niches and the development of a new businesses, new products, services and the like. This structure requires serious coordination between multiple levels of Government, both regional and Federal. Therefore, the organization of management of a scientific and educational innovation center as an innovation project should have a project team, project resources, clear innovation goals and a clear socio-economic result that will be achieved gradually, with each stage of the implementation of the innovation project.

**Table 4** Managing a research and education center as an innovative project

Phases of project management		Stages of the project life cycle		Management function		Achieving the goals of the Decree*	Socio-economic effect
Initializat ion	Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024, national project "Science" until 2024.	Concept (goals, tasks, project requirements)	1)Development of agricultural science; 2) Capacity Building agricultural enterprises; 3) Global leadership in exploration, efficient production, and transportation and deep processing of solid minerals; 4) Training of highly qualified specialists personnel for industrial enterprises; 5) Ensuring technological breakthroughs in subsurface use 6) Creation of a center for technological modeling and system engineering center	Temporari resources	1)Development and implementation of world-class technologies  2) Positioning universities in the academic space and international rankings	Ensuring the presence of the Russian Federation among the five leading countries in the world that carry out research and development in areas determined by the priorities of scientific and technological development	Formatio n of the elements of a new system of science organization
Planning	To create fifteen world-class RECs in 2019.	Project analysis	Today only education, business and science interact with each other, and the state is not a participant in the technology transfer system. At the same time, the reality of the situation is that the state and business are on the one hand, but	Financial resources	1)Cooperation with organizations operating in the real sector of the economy 2) Creation of specialized laboratories for research and development in the interests of the project	Increase in domestic spending on research and development from all sources compared to the growth of the country's gross domestic product	Increas ing the status of Russian science

			science and education are on the other, and each side has its own requirements for technology				
Implementation	2019 - five world-class RECs started functioning. In August 2019, twenty-six applications for the creation of RECs were received in the "portfolio" of the Ministry of Education and science, in February 2020, another 17 applications were submitted	Detailed design	Education, science and production act as a single whole, are created and developed: - research and production platform - target development model - international and regional collaboration	Risks	The Creation of breakthrough research results in the priority SNT	Attractiveness of working in the Russian Federation for Russian and foreign leading scientists and young promising researchers	Acceleration of technological development of the Russian Federation
Result	<ul style="list-style-type: none"> <li>- advanced technologies for the real economy;</li> <li>- intellectual property objects;</li> <li>- innovative product;</li> <li>- development of license agreements on the use of the RID;</li> <li>- growth of young promising researchers;</li> <li>- involvement of large and medium-sized Russian companies in the knowledge-intensive markets</li> </ul>	Integration	In May 2019 the Government approved measures to support the creation and development of scientific and educational centers: the activities of the first RECs were a selection and genetic research, "ensuring the genetic independence of the Russian Federation", the production of biofertilizers to "achieve world productivity indicators", the research in the Arctic and the development of "technologies for robotic mining and transportation of solid minerals»	Human resources	Targeted training		

Source: compiled by the authors, partially used material [22]

#### 4. DISCUSSION OF RESULTS

The use of an innovative approach in the education system contributes to the modification and improvement of both the educational product, the learning process, and the management of the educational system, bringing it in line with modern requirements. Innovative development of the education system in modern economic conditions is becoming a key factor in its competitiveness, as it contributes to the creation of breakthrough scientific results in priority areas of the strategy of scientific and technological development.

Time resource management is the implementation of a complex function, since it involves the process of creating and bringing to the market an innovative product formed during the implementation of an innovative project, which is an economic, legal and organizational justification for the final innovative scientific and technological activity. We assigned the development and implementation of world-class technologies and positioning of higher education institutions in the academic space and international rankings as part of the "Time resources" project management function.

We have considered targeted training within the "Human resources" project management function. We believe that the technological development of our country will do contribute to the development of new market niches, creating jobs, creating the attractiveness of working in the Russian Federation, helping to retain young and promising researchers.

Achieving the goals - the creation of specialized laboratories for research and development in the interests of the project, as well as the formation of cooperation with organizations operating in the real sector of the economy and as a result, the development of intellectual, informational and innovative products obtained in the course of the REC activities, is possible when making effective and competent management decisions in the field of Finance, which are aimed at product development, promotion and implementation. Between any enterprise and the external environment, there are different relationships, more precisely, between the resources of the enterprise and its external financial environment. One of the goals of REC development is to attract investment from the domestic market for research and development.

Managing and achieving breakthrough scientific results on priority SSTD is associated with risk. Risk in innovation can be caused by one or more reasons and, if it occurs, it can either have a negative impact on the result as a whole, or influence one or more factors that in turn will not allow you to achieve the goal. Risk circumstance may include aspects of the organization's or project's external environment that increase risk (for example, poor choice of methods for project management, lack of common management systems, simultaneous execution of several projects, or dependence on external project participants that

cannot be controlled). Risk management planning in innovation is the choice of approach, planning and execution of project risk management operations.

#### 5. CONCLUSIONS

The acceleration of technological development is directly related to social innovations, which play a huge role in the economic development of society and improves the life of the population and contributes to solving complex situations in society, smooths the transition from one stage of technological processes to another. The main goal of REC in the social sphere is to create a society of balanced social, economic and environmental needs.

In changing socio-economic conditions, appropriate mechanisms are required for the implementation of the activities of the scientific and educational center. The formation of a science-based mechanism for resource planning for a strategic innovation project will allow achieving the goals set by the Government of the Russian Federation in a short time.

Consequently, the implementation of RECs and the achievement of socio-economic effect - the formation of elements of a new system of science organization; increasing the status of Russian science; acceleration of technological development of the Russian Federation is associated with innovations, the transformation of scientific and technical developments into fundamentally new technological processes that form a complex of scientific and educational and scientific and technological innovation activities.

All of the above will allow the Russian Federation to become one of the five leading countries in the world that carry out research and development in areas determined by the priorities of scientific and technological development, promotion of innovations to the market and obtaining commercial benefits from their further implementation will attract additional investors from the domestic market to research and development, and the implementation and implementation of scientific ideas in practice will create the attractiveness of working in the Russian Federation for Russian and foreign leading scientists and young promising researchers.

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