

CHALLENGES AND OPPORTUNITIES OF STATE REGULATION OF THE INNOVATION PROCESS IN THE RUSSIAN MINERAL RESOURCES SECTOR

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ABSTRACT

The low innovative activity of companies – subsoil users is one of the problems of the Russian mineral resources sector, which remains a donor of the country's economy providing the bulk of funding in the export and budget. In conditions of economic sanctions and the lack of financial resources, the state regulation plays a significant role in initiating innovation activities and increasing the innovation activity. State regulation of the innovation process in the mineral resources sector can be carried out by combining the ways to support the innovation activities and stimulate demand for innovations. The purpose of the study is to substantiate the forms and methods of state regulation of the innovation process, taking into account the experience of foreign countries.

In the article, the reasons of the low innovation activity of the Russian companies of the mineral resources sector have been considered, the conditions ensuring the development of the innovation process have been substantiated; the measures of regulation and forms of state support of the innovation activities have been analyzed and summarized.

Keywords: innovations, state regulation of innovation activities, innovative activity of companies in the mineral resources sector, state support, stimulation of demand for innovation.

INTRODUCTION

The mineral resources sector remains one of the main sectors of the Russian economy providing a large share of tax revenues to the budget. According to the official data, only the share of the mineral extraction tax in the consolidated budget is 23% (for comparison, the share of the value-added tax is 18.7%, the corporate profit tax is 18.8%, the personal income tax is 20%) (Federal State Statistics Service of the Russian Federation, 2016a). The share of oil and gas revenues is still high – more than 42% (Ministry of Finance of the Russian Federation, 2016).

At the same time, for the period of 2011-2015 there was a tendency towards a decrease in the innovative activity in the mining sector (the share of organizations implementing innovations of various types has decreased from 8.4% (2011) to 6.9% (2015), and these figures are lower than across the board in the Russian Federation (Federal State Statistics Service of the Russian Federation, 2016b).

Despite the increase in the number of developed technologies over a five-year period, in absolute terms their number is very small in the mining sector and is just over a percent in 2015 of the total number of developments. For example, 31.6% of developments fell to the

share of processing industries (metallurgy – only 6.7% of the total number in the Russian Federation).

The share of innovative goods, works and services decreased significantly from 6.7% to 3.7% during the corresponding period, while the share of depreciation of fixed assets (more than 50%) remains high with a tendency towards the reduction of their renewal (Federal State Statistics Service of the Russian Federation, 2016c).

In general, the low innovative activity of Russian companies in the main industrial economic sectors should be noted in comparison with foreign countries.

The lack of own financial resources with limited credit availability, the inertia of managers' thinking and the low innovative culture, the lack of skilled innovation-oriented personnel (Demicheva, 2010), the unfavorable external economic situation, the low level of communication between participants of the innovation process (generators and consumers of innovations) (Dezhina, 2016), the low level of awareness of advanced technologies are the most common reasons for the low innovative activity of Russian companies in the mineral resources sector.

These reasons determine the "sluggish" nature of innovation processes in the Russian economy, in particular, in the mining industry of the mineral resources sector.

The main role in the formation, development and acceleration of innovation processes is assigned to the state, its innovation policy, regulation mechanisms and tools, especially in unfavorable external economic conditions. This mainly determines the relevance of the development of ways and methods of state support of the innovation activities and stimulation of innovations.

This study was carried out in the framework of the state budget research project "Ensuring the sustainable development of Russia's mineral resources sector in the conditions of the need for innovative transformations and the globalization of commodity markets" (2016), the methodology of which was first of all based on the analysis of Russian and foreign experience, state measures of the stimulation of the innovative activity in the mineral resources sector, which includes the reproduction and extraction of mineral, fuel and energy resources.

REVIEW OF LITERATURE

In scientific publications, the innovation process means the development and commercialization of the invention of new technologies, types of products and services, organizational and technical, economic, social or other decisions and other results of intellectual activity (Zharikov, 2009). The innovation process is a set of scientific and technical, technological and organizational changes occurring in the process of innovation implementation (Medynsky, 2008). The innovation activities (IAs) include a *complex* of scientific, technological, organizational, financial and commercial *activities* aimed at the commercialization of accumulated knowledge, technologies and equipment (Hargadon, 2003; Drucker, 1985; Drucker *et al.*, 2013; Innovation and Entrepreneurship in a Global Economy, n.d.).

The innovation activities mean the activities aimed at *obtaining the results* of scientific research and performing the experimental development, and their *implementation* as a new or improved product in demand by the market, as well as at *creating a new or improving* the existing technological process that will be used in the future production activities of the company (Kravtsova, & Voronin, 2008). IAs are the processes of creation, development and

distribution of new or improved types of products, services, technologies, raw materials and materials, methods of organizing the production and management (Batkovsky, 2012).

Thus, the innovation activities can be considered as a complex of activities aimed at the commercialization of products and technologies obtained during their implementation, as activities related to the development and implementation of improved products and technologies demanded by the market, as a process of creation and distribution of innovations.

The state support and stimulation of the innovation activities of economic entities present one of the conditions ensuring the effectiveness of the innovation process.

METHODS OF THE STUDY

Research results are based on general scientific methods of analysis, synthesis, analogy and systemic approach. The methods collectively used in the study made it possible to ensure the reliability and validity of the conclusions.

The Methodology Of The Study Was Based On The Following Algorithm:

1. The analysis of the innovative activity of organizations of the mineral resources sector based on official statistics for the period of 2010-2015 conducted for general diagnostics of the state of the innovative activity in the mining sector and justification of the relevance of the research topic.
2. Determination of the content of the main categories that characterize the innovative activity and the innovation process from the perspective of state regulation.
3. The analysis of regulatory support of state regulation of the innovation process in the Russian Federation to identify and summarize the basic principles, subjects, objects, directions and means of state regulation established by law.
4. Identification and substantiation of state regulation methods of the innovation process, taking into account the best foreign experience in this sphere.

RESULTS OF THE STUDY

In the Russian Federation, the directions of the innovative activity and particular actions of the state in the sphere of innovative development are supervised by two executive bodies: the Ministry of Education and Science of the Russian Federation and the Ministry of Economic Development of the Russian Federation participating in the strategic planning of state development.

At present, the main documents of strategic planning of the development of the Russian Federation are as follows: "Forecast of the Scientific and Technological Development of the Russian Federation for the Period until 2030", determining the most promising areas of scientific research, and "Forecast of the Long-term Socio-Economic Development of the Russian Federation for the Period until 2030", determining the directions of the long-term socio-economic development of the country and the most promising areas of economic activity.

These documents form the basis for the development of state programs for the development and support of innovation activities.

According to the "Forecast of Scientific and Technological Development of the Russian Federation for the Period until 2030", the following are identified as priority areas of scientific and technological development:

1. Information and communication technologies
2. Life sciences (biotechnology, medicine and health)
3. New materials and nanotechnologies
4. Environmental management
5. Transport and space systems
6. Energy efficiency and energy saving.

In 2008, the "Concept of Long-Term Socio-Economic Development of the Russian Federation until 2020" established the priorities for the innovative development of the national economy sectors: *high-tech and basic* sectors.

The *high-tech sector* includes aviation and aerospace industry, shipbuilding, radio electronic industry, nuclear power industry complex, power engineering industry, information and communication technologies; the development is determined by strategies and long-term federal state programs and sets of measures.

The tasks of innovative development of high-tech industries are, in particular, the provision of technological leadership in a number of key areas, the expansion of Russia's positions in the world markets of science-intensive products and an increase in Russia's strategic presence in the markets of high-technology products and intellectual services.

The task of the basic industries (energy, oil and gas, transportation and heavy engineering industries, as well as the machine tool industry, mining and metals production sector) is to support high-tech industries.

The tasks of the innovative development of basic industries are as follows: modernization of basic industries, promotion of modernization of high-tech industries, increasing the competitiveness of mass manufacturing industries (including processing of raw materials, metallurgy, chemistry, production of construction materials, car manufacturing, food industry) in order to rationalize the import and increase the export of processed products; development of small and medium business.

Despite the fact that support and stimulation are the essence of state regulation, the identification of these methods (in a number of regulatory acts and scientific sources) is not entirely justified. In our opinion, these methods differ by the principles of action, scope and objects of regulation, the forms and methods of regulation used, as well as by the criteria for assessing the effectiveness of the use.

The analysis of the legislative base allows drawing a conclusion that *state support* is the *support* of the implemented innovation activities, in the areas of scientific research, or by the types of economic activity (sectors) identified as state priorities for innovative development, i.e. it is assumed that the goals of the development of certain areas of science, technology and industries coincide with the goals of the state innovation development in general.

The Law "On Science and State Scientific and Technical Policy" provides for various forms of state support of innovation activities in the Russian Federation, including: the provision of relief for the payment of taxes, fees, customs charges, educational services, information and consulting support, the formation of demand for innovative products, financial security, targeted programs, provision of infrastructure and other forms.

A group of authors of a very serious study of innovation activities of various companies and demand for innovative products (Ivanov *et al.*, 2012) indicates the main support measures:

1. Tax (and equivalent) benefits
2. Innovative infrastructure
3. Direct state financing of innovative projects within the framework of state programs.

Tax Benefits

The legislation provides for a tax rate of 0 percent to the tax base determined by operations with shares, bonds of Russian companies, investment shares that are securities of the high-tech (innovative) economic sector (Federal Law of December 29, 2015 No. 396-FZ "On the Budget of the Russian Federation for 2016"). This measure is limited for most companies.

Innovative Infrastructure

By 2012, a number of development institutions operating in the innovation sphere were formed in the Russian Federation (Ivanova, & Akimenko, 2012):

1. State Corporation "Russian Corporation of Nanotechnologies" – Rosnano OJSC;
2. The Russian Venture Company (RVC) OJSC is both a state fund and a development institution.
3. The Fund for Promoting the Development of Small Forms of Enterprises in the Scientific and Technical Sphere is a state non-profit organization.
4. The Development Fund for the Center for Elaboration and Commercialization of New Technologies (Skolkovo Fund).

Based on the results of the assessment of the performance of the innovation infrastructure activity conducted in 2014, it was recognized as successful. At the same time, this form of state support has a number of drawbacks:

First, at present the criterion for assessing the performance of the activity is the cost of innovations, but not their effectiveness.

Secondly, this form of support significantly depends on the macroeconomic and political situation (for example, by the end of 2014 the investments from venture funds reduced by 61% compared to the beginning of the year, which was caused by economic sanctions).

Thirdly, the complexity of monitoring the directions of venture capital investments, which do not always correspond to government needs (for example, the bulk of venture capital (up to 70%), even in a favorable period (2013), was invested not in breakthrough technologies, but in e-commerce).

Fourthly, there is no access to support for small and medium mining enterprises from the Small Entrepreneurship Promotion Fund, since mining business (even when it is organized in the form of small enterprises) is not included in the list of activities falling under the action of the law "On the Development of Small and Medium Businesses in the Russian Federation".

Fifthly, the principle of supporting high-tech industries and priority scientific, technical and technological areas does not provide support for the companies of the mineral resources sector (except for fuel-and-energy and geologic exploration companies) with the help of development institutions.

Direct Government Funding

The main form of state support of innovation activities is the budget allocation from the federal budget in the framework of specific programs, according to the Innovation Development Strategy adopted by the Government of the Russian Federation.

Programs as a form of state support of innovation activities have certain benefits and drawbacks.

Benefits include the direct connection of the Program with the objectives of the state innovation policy, which allows concentrating budgetary funds, the possibility of coordinating state, branch and commercial interests, uniting the efforts of independent program participants (business entities of different management levels and ownership forms, public organizations, municipalities, etc.).

One of the most important areas of the innovation policy in the Russian Federation is the development and implementation of innovation development programs (IDP) by companies with state participation (Gershman *et al.*, 2015).

The list of companies with state participation implementing innovative development programs in 2016 in the mining industry includes the following companies: Gazprom OJSC, Gazprom Neft OJSC, Rosneft Oil Company OJSC, Zarubezhneft OJSC, Joint-stock Oil Company Bashneft OJSC, Public Joint-Stock Company ALROSA (Department of Strategic Development and Innovation, 2016).

At the same time, the drawbacks of the program-based form of support in the market conditions are as follows:

1. The lack of methods to accurately assess the effectiveness of the program, i.e. to compare the cost of its implementation with the results obtained (since the results can be social in nature),
2. Application of insufficiently grounded criteria for assessing the results of the Program (these can be various indicators)
3. The need to establish program management structures, develop regulatory and methodological support (due to the complexity and individuality of the Program),
4. As a rule, the long-term nature of programs based on forecasts that may not be justified,
5. The risk of "closing up", postponing the implementation or sequencing of the program due to budgetary deficits, structural adjustments in government bodies, external factors. For example, the share of R&D costs from budget funds in the total amount of financing in 2010-2012 was 80%, in 2013 – 88% (Analytical Center for the Government of the Russian Federation, 2014). In 2014-2015, a planned decrease in expenses of budgetary funds was 7-10%,
6. Excessive bureaucratization of the process of inclusion of projects in programs;
7. Overestimated state requirements to co-financing the projects included in the programs (interference in the activities of companies, increased requirements for projects, disclosure of information).

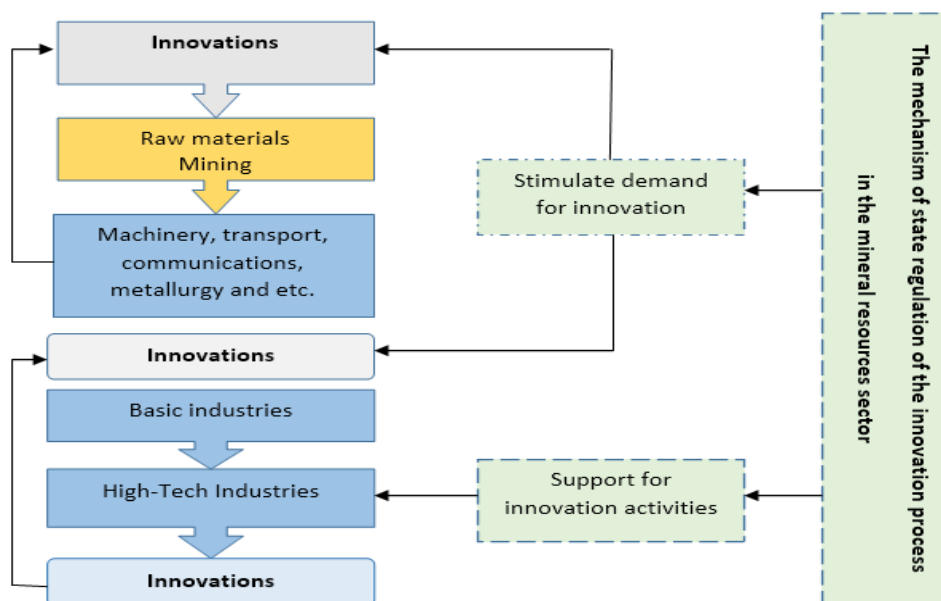
The state stimulation of innovation activities is a method of regulation, based on the motivational component of economic activity, involving *influencing* an object of regulation, which is the demand for innovations. The state stimulation is to create conditions for the development of the innovation market and stimulate the demand for innovative products.

Unlike the support (assistance) of innovation activities, the state's decision to create incentives for (have an influence on) the introduction of innovations should apply not only to the high-tech sector, but also to the basic sector, which is also a consumer of innovative products and provides high-tech and other basic industries with raw and other materials.

DISCUSSION

State regulation of the innovation activities in the conditions of Russia is a necessary condition for the successful development of innovation processes, carried out by combining two methods: support for innovation activities and stimulating the demand for innovation (Fig. 1).

Figure. 1
THE MECHANISM OF STATE REGULATION OF THE INNOVATION PROCESS



In Russia, the state supports only those areas and areas of activity that are of high priority to it.

In the USA, the priority areas of the technological development are alternative energy technologies, hybrid cars, energy storage systems, and "smart electrical networks". In Great Britain and China, these are new materials, bio-sciences, sensors and photonics, information and communication technologies.

In Germany, priority industries are those characterized by high competitiveness, social importance and great potential for the market growth (automobile industry, chemical products, pharmaceuticals, medicine, etc.) (Anokhin *et al.*, 2014).

In Finland, Sweden, Norway, the priority areas of the technological development of the mining industry are the creation of environmentally friendly, non-waste and safe technologies, corresponding to the "Green Mining" concept. In these countries an effective system of state and municipal support for innovation activities has been created.

Depending on the motivational component, the methods of negative (forced) motivation and methods of positive (incentive) motivation can be identified.

According to the authors (Rothwell, & Zegveld, 1981), demand is the most important and most effective tool (as opposed to subsidizing) that the government can use to stimulate innovation.

Currently, in the Russian Federation such demand is provided only by major companies with state participation (Yakushev, 2015).

The demand stimulation methods, which are based on forced motivation, may include: the adoption of directives, the introduction of new standards, rules, requirements and regulations in the design of enterprises and the product release. Such measures are of particular importance for the enterprises –sources of increased danger, which carry out the extraction and processing of mineral raw materials. For mining companies, such measures can increase the innovative activity to a certain extent.

An example is the transition to new quality standards for granite crushed stone produced by mining companies.

On February 15, 2015, the Technical Regulations of the Customs Union on Road Safety came into force. These Regulations were developed on the basis of the "Agreement on Common Principles and Rules for Technical Regulation" in Belarus, Kazakhstan and the Russian Federation as of February 15, 2010, the requirements of which are harmonized with a number of European Agreements on highways, road traffic and road construction.

The consequence of the adoption of the Technical Regulations was the need for all crushed stone producers to use European square-mesh sieves, respectively, producers are forced to acquire technologies of foreign companies – producers of crushing and screening equipment.

Another example is a significant increase in fees for the disposal of mining waste, which has served as a certain incentive to take measures on its reduction or recycling. However, in this case, a method of "negative motivation" was used in combination with measures to support mining companies in Murmansk, Sverdlovsk, Rostov, Kemerovo and other regions by including activities on waste reduction (recycling) into regional projects to eliminate the accumulated environmental damage, according to the State Program of the Russian Federation "Environmental Protection" for the period of 2012-2020" (Decree of the Government of the Russian Federation as of April 15, 2014 No. 326 (as amended on August 13, 2016) "On the Approval of the State Program of the Russian Federation "Environmental Protection" for the period of 2012-2020" (Federal Law No. 7-FZ "On Environmental Protection", 2002].

In the scientific literature there is an opinion that environmental problems and regulation through instructions/standards contribute to a more active development of innovations than, for example, R&D subsidizing (Palmberg, 2004).

The government order can be referred to the methods of state stimulation of the development of demand for innovation based on positive motivation (Kamenskikh, 2014). The process of government procurement takes place through the placement of a tender by the government, based on certain needs, and companies compete for it. Thus, the government order promotes the development of demand for innovative products and the increase of the creative potential of companies, which makes it more effective tool than the direct subsidization (Geroski, 2010).

Methods of positive motivation (indirect state regulation) include the methods aimed at forming a positive image of companies introducing innovations (this is especially relevant for environmental innovations), methods of disseminating the information on new technologies (exhibitions, conferences, advertising, i.e. methods promoting the spread of innovation). But the key point here is the allocation of an active coordinating center that performs the functions of an economic agent responsible for solving the task of innovation promotion (which is not yet in Russian practice).

CONCLUSIONS

State regulation of innovation activities in the Russian Federation is concentrated on priority research and scientific-technical areas and high-tech industries, which corresponds to global trends. State development programs (industry, targeted integrated, regional programs) are the main form of financial and organizational support. In the mineral resources sector, the geological exploration and fuel-and-energy complex are identified as the priority areas. At the same time, the problems are still as follows: low motivation for innovation activities and weak demand for innovation among the mineral resource industries, small and medium mining enterprises that are not included in the state support programs.

Therefore, stimulating the demand for innovation in mining companies, taking into account the motivational component, is also the task of state regulation of the innovation process. The methods used to stimulate the demand for innovation in Russia generally correspond to international practices, but, unlike them, they are of a disparate nature, due to the lack of an organizational structure that carries out, on a daily basis and on a professional basis, the activity aimed at stimulating the demand for innovation, and is responsible for the achievement of the objectives of this activity. This structure is an effective alternative to a set of disparate initiatives and actions (Foreign Practices Stimulating Demand for Innovation in Public Procurement and Procurement in Companies with Public Participation, 2015).

Taking into account the specifics of the activities of mining companies (technology, mining and geological conditions, location of enterprises, life cycle duration, a negative impact on the environment, etc.), the main methods of demand stimulation can be as follows:

1. Forced stimulation methods (an increase in requirements to the quality of products and technologies, reduction of environmental load, etc.). The standards of conformity of products and technology to the international requirements and regulations can serve as a specific tool.

2. Incentive stimulation methods:

- The government order for high-tech products,
- The formation of industry centers of coordination of innovation activities, the task of which is to ensure the promotion of innovation to the end user.

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