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DEVELOPMENT OF A SCIENTIFIC AND INNOVATIVE SPHERE IN OIL AND GAS SECTOR OF KAZAKHSTAN

The sphere of science is the most important institution of the modern state, and the degree of its development is one of the significant factors of the transition to an innovative economy. The growing interest in the field of science by the government and commercial enterprises by the need to improve the competitiveness of industries, expansion of scientific and technological base, gaining new scientific or technical achievements, their appearance on the basis of new knowledge and technologies. The article explores the development of the innovation management system of the scientific sphere in Kazakhstan: on the example of the oil and gas industry. The main purpose of the article is to identify areas of innovation and scientific and technological development of Kazakhstan on the example of the oil and gas industry. The article identifies the directions for reforming the current system of development of the oil and gas industry and offers a strategic program for scientific, technical and innovative development of the oil and gas sector in Kazakhstan.

Keywords: science; innovation; scientific activity; innovative activity; management system; innovation management; management of scientific sphere; oil and gas industry; development; Republic of Kazakhstan.

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РАЗВИТИЕ ИННОВАЦИОННОЙ СИСТЕМЫ УПРАВЛЕНИЯ НАУЧНОЙ СФЕРОЙ НА ПРИМЕРЕ НЕФТЕГАЗОВОЙ ОТРАСЛИ КАЗАХСТАНА

Важнейшим институтом в современном государстве является сфера науки. В настоящее время степень развития сферы науки — один из факторов перехода традиционной экономики к инновационному типу развития. Усиливающиеся внимание со стороны организаций и государства к сфере науки вызвано в первую очередь необходимостью расширения научной базы, получения новых достижений в науке и технике и на этой основе повышения конкурентоспособности отраслей экономики и предприятий. В статье исследуется развитие инновационной системы управления научной сферой в Казахстане на примере нефтегазовой отрасли. Основной целью статьи является выявление направлений инновационного и научной-технического развития Казахстана на примере нефтегазовой отрасли. На основе современных методов инновационного менеджмента в статье выявлены направления реформирования действующей системы развития нефтегазовой отрасли и предложения по стратегической программе научно-технического и инновационного развития нефтегазового сектора Казахстана.

Ключевые слова: наука; инновации; научная деятельность; инновационная деятельность; система управления; инновационный менеджмент; управление научной сферой; нефтегазовая отрасль; развитие; Республика Казахстан.

Introduction. Kazakhstan according to the riches of its subsoil mineral resources and their diversity is part of a group of countries that are rich in minerals. Its mineral resource base is formed by deposits of the fuel and energy complex (hydrocarbons, coal, and uranium), ferrous, non-ferrous, noble and rare metals [1]. The country's interior is also one of the main sources of the socio-economic development of the state. The key sector of the economy of the Republic of Kazakhstan is the oil and gas sector [1], which forms almost one third of the country's GDP. In addition to stable cash inflows to the country's economy, the oil and gas sector ensures the development of related industries — engineering, transport, construction, services, including the production and maintenance of equipment for the oil

and gas sector of the country [2]. We all understand well that in the market conditions of economic development, as well as taking into account changes in the economic and geopolitical situation in the world, our state needs to develop all sectors of the economy, and especially the oil and gas sector. To do this, it is necessary to create conditions for the continuous updating of information about the geological structure of the subsoil, the emergence of new ideas and concepts, and scientific research in geology should be developed in a priority order.

In terms of the quality of research and the amount of research, the level of scientific and technical support for the oil and gas sector of the Republic of Kazakhstan is in a critical state, that is, research in the field of geological exploration has decreased to a minimum. Geological research does not rely on the base of new technologies, the development and production of domestic technological equipment is practically absent. There are several scientific geological organizations belonging to various departments that do not provide the state with a systematic, scientifically based assessment of the mineral and raw material potential of the country's mineral resources. The state authorized body for the geological study of the subsoil of the country does not have a single sectorial institute [3].

In connection with all the above problems existing in the sector of scientific and technological development of the oil and gas industry, the state envisages measures to introduce innovative technologies for geological exploration of the subsoil in the form of a geological exploration «State program for Innovative and Industrial Development of the Republic of Kazakhstan for 2015–2019» [4], which will give an impetus and advance the development of the oil and gas sector countries a step higher. First of all, new technologies should be introduced in the field of geophysical, geochemical research. The issues of creating a sectorial scientific and technological center for the study of the country's mineral resources are being considered. On the basis of the Nazarbayev University, a university that combines «the advantages of the national education system and the world's best scientific and educational practice» [5] with a research direction, the scientific and methodological support of the industry and information and analytical support of the oil and gas enterprises of the Republic of Kazakhstan will be implemented. This will be ensured by conducting complex laboratory and analytical studies of the composition of rocks and the ability to process and analyze a huge amount of geological, geophysical, and geochemical data. As a result of all these scientific studies, the depth of research and sound proposals for the development of state programs for the sectorial development of the mineral resource sector in Kazakhstan will increase.

The main purpose of the article is to identify areas of innovation and scientific and technological development of Kazakhstan on the example of the oil and gas industry.

At the first stage of research of the areas of innovation and scientific and technical development of Kazakhstan on the example of the oil and gas industry, it seems appropriate to use methods of collecting, systematizing and analyzing literary sources.

Further, the official statistics of the Committee on Statistics should be used, since they will help characterize the current state of science and innovations in the oil and gas industry of Kazakhstan. To identify differences in the development of the main elements of the national innovation system — science and innovative entrepreneurship — it is advisable to use the comparison method.

In our opinion, it is also necessary to use graphical methods in the study, since they are used to visualize functional dependencies in order to quickly find the value of functions by the corresponding argument value.

Results and Discussion. In the past 15 years, the extractive industries in Kazakhstan have developed at a rapid pace. In 2016, they amounted to 12,9 % of GDP, compared to 11,4 % in 2001. The reason for this growth was the development of hydrocarbon production and related services.

For today's global economy the importance of oil and gas cannot be overemphasized. So, if for a number of countries hydrocarbons is an important factor of production, one of the priority import goods, for other countries it is a source of significant export earnings. The Republic of Kazakhstan belongs to the second group of countries, being the largest oil producer in the world.

Since gaining independence to the present day proceeds from the sale of oil and gas began to form an important share of the funding, this is formed at the expense of the budget of Kazakhstan.

Thus, every year, targeted and guaranteed transfers of funds from the National Fund, formed and replenished from the proceeds from the export of hydrocarbons, are made to the state budget of Kazakhstan.

Despite the efforts of the government of Kazakhstan to modernize and diversify the economy, the oil and gas sector of the country's economy is still the basis of the industrial and socio-economic development of the state [6].

Knowledge-based GDP has a multiplier effect. The country's GDP will grow at a larger rate with an increase in investment in science than the initial cash investment. In addition to the primary effect, subsequent effects occur. In this regard, most countries in the world are interested in increasing public and private investment in science, and those countries in which the knowledge-intensiveness of GDP exceeds 3 % are in the forefront of technological progress.

Among the main sources of funding of science are almost no representatives of business, representing the real sector of economy of Kazakhstan. According to the OECD, at present, for American and European companies, the share of the real sector of the economy in total expenditure on research and development at the level of 60–65 % is optimal. At the same time, the financing of R & D in many developed countries of the world is currently at the level of 60–75 % carried out by the business sector of the national economy.

Consider the situation in Kazakhstan's geology that has emerged since the 90s of the last century, which led to the fact that mining in Kazakhstan is many times more than the added new fields, that is, prospecting and exploration work are minimized. The people of Kazakhstan can be proud that the hidden potential of our subsoil is so huge and only a powerful, technically equipped geological service will possibly in the future provide our people with effective exploration and growth of new and new reserves. Our President has set a task for the country to revive the exploration industry, which cannot be solved without a powerful industry infrastructure. In other words, without specialized educational institutions [7], domestic science, research and competent specialists, the solution of this problem is simply impossible [8].

The strategy «Kazakhstan-2050» is a new political course of the established state. In his message, the Leader of the Nation Nursultan Nazarbayev announced: «As a result, over 15 years, oil production has increased by 3 times, natural gas — by 5 times. Revenues from raw materials are directed to the National Fund. This is our reliable shield against possible economic and financial shocks. This is a guarantee of security for present and future generations».

Analyzing the situation in Kazakhstan in order to decide on what exactly we should pay attention to in order to revive domestic geological exploration, we understand that the development of a program for the development of the oil market makes it possible to ensure its stable functioning and development. It should be noted that the development of the economy over the past decades has confronted modern society with a number of complex problems, mainly caused by the following factors: the energy and raw material crisis, the uneven development of technological potential in various countries of the world. The solution of these important problems is closely associated with the prospects for the provision of primary energy sources, the improvement of their production methods, processing technology and expedient end-use [9]. Today, «the Government of the Republic of Kazakhstan is working on

the transformation of the geological industry and the Code of the Republic of Kazakhstan “On Subsoil and Subsoil Use”» [9], where they try to take into account both international experience in this area and their own, using best practices. According to the global trend, an increase in the consumption of raw materials activates geological research to identify them. The annual increase in production requires an increase in the volume of geological exploration to replenish mineral reserves.

A fundamental factor in the economic development of the Republic of Kazakhstan [8] and, accordingly, one of the most effective tools for the implementation of the natural resource policy of the state, ensuring the effectiveness and efficiency of environmental management, can be the development of Kazakhstan geology as a science based on the introduction of new technologies and processes. The mineral resource base of Kazakhstan is depleted, the quality of the structure of reserves is deteriorating, and all this requires starting a widespread use of innovative technologies in geological exploration and mining. In this case, the change in the direction of the development of the science of geology and the choice of an innovation strategy based on research projects are of great importance.

World experience shows that intensive use of high-performance technologies, horizontal drilling, enhanced oil recovery methods, three-dimensional seismic, all this in terms of the development of hydrocarbons can reduce by 2–3 times the costs associated with their exploration and production. On average, the introduction of new technologies — this is confirmed by the advanced experience of the leading oil and gas companies — makes it possible to reduce capital costs by 20–30 % with a fixed level of oil production.

Let us consider the most significant proposals in the areas of reforming the current system of development of the oil and gas industry and describe in a little more detail the proposals for a strategic program for the innovative development of the oil and gas sector in Kazakhstan:

1. The tax burden, or as it is customary to say, the tax burden of companies that operate in the oil and gas sector of Kazakhstan is large enough. If the tax burden is too high, financial assets may be taken abroad or frozen, which will automatically play a role in slowing economic growth and prevent the introduction of innovations in the industry. Therefore, it was proposed to introduce several directions to stimulate companies in the oil and gas sector to introduce innovations.

2. Development of incentive taxation for design and engineering companies that introduce advanced innovative technologies in the oil and gas sector.

3. Exemption of companies from taxation in terms of profits aimed at research and development.

4. Granting preferential tax conditions to companies in the oil-producing sector of the Republic of Kazakhstan, the tax rate for oil production should be calculated taking into account the well production rate, that is, unprofitable facilities with hard-to-recover reserves, crude oil prices and opening times.

5. Intensive use of high-performance technologies in the form of horizontal drilling, the use of enhanced oil recovery and three-dimensional seismic research methods.

6. Formation of new oil and gas production centers due to the simultaneous development of the resource base and logistics system.

7. Construction of plants for processing of associated natural gas and reconstruction of oil refineries based on innovative high-tech equipment.

Conclusions and Recommendations. It should be noted that the greatest reserves of innovation development and, accordingly, the multiplication effect are hidden in the needs of the main processes, and in order to identify them and use them effectively, we need to systematically change the existing approaches and management systems.

Thus, for the effective development of innovative activity in the oil and gas sector, a clear formulation of the process is necessary: investment — development — implementation

process — obtaining quality improvement, both from government authorities at all levels and from industry enterprises.

Ordering products with a high innovation component on the part of the oil and gas industry should trigger a corresponding chain reaction in a number of closely related sectors of the national economy of Kazakhstan, in particular:

- fundamental and applied science;
- construction, including road and building materials industry;
- machine building and instrument making;
- metallurgy and metalworking;
- petro chemistry;
- information technology;
- transport; ecology, etc.

Thus, the joint efforts of market participants at the state and corporate levels are necessary. At the state level, the priority tasks should be:

- a comprehensive and systematic increase in confidence in the state system;
- making appropriate adjustments to the legislation;
- prohibition of changing the conditions of legislation to the negative side for a certain period;
- the formation of a truly independent judiciary;
- the formation of focused on the development and innovation of fiscal and tax policies;
- development and adoption of strategies and policies in the field of innovative development and tools for their implementation;
- the creation of an appropriate infrastructure to support innovation, etc.

The priority measures of state support for innovation activity of enterprises in the oil and gas sector include: increasing the availability of long-term loans, continuous monitoring of the development of oil refining and petrochemicals, information support for the industry, and improving infrastructure.

From the side of the industry itself, the following steps are necessary:

- developing the spirit of innovation within companies;
- development of an innovation development strategy;
- introduction of effective corporate systems for managing innovative programs and projects;
- creation of program and project offices;
- development of effective personnel training programs;
- placing orders for the purchase of products and technologies with a high innovative component.

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ENSURING ECONOMIC AND ENVIRONMENTAL DEVELOPMENT OF THE REGIONS OF BELARUS ON THE BASIS OF INNOVATIVE TECHNOLOGIES OF GARBAGE PROCESSING

The article examines the indicators of development of waste processing and use of secondary material resources in the world, identifies the problems of garbage disposal in the Republic of Belarus. Based on the analysis, it is proposed to solve the environmental problem of solid municipal waste processing through the introduction of innovative technologies, which will significantly increase the technological level of the waste processing industry of the Republic of Belarus, as well as provide a socio-economic effect at the level of the country's regions and ensure economic and environmental development.

Keywords: economic and environmental development; innovative technologies; waste processing; regions of Belarus; environmental problems; solid municipal waste; secondary material resources.

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ОБЕСПЕЧЕНИЕ ЭКОНОМИКО-ЭКОЛОГИЧЕСКОГО РАЗВИТИЯ РЕГИОНОВ БЕЛАРУСИ НА ОСНОВЕ ИННОВАЦИОННЫХ ТЕХНОЛОГИЙ ПЕРЕРАБОТКИ МУСОРА

В статье исследованы показатели переработки отходов и использования вторичных материальных ресурсов в мире, выявлены проблемы утилизации мусора в Республике Беларусь. На основании проведенного анализа предлагается решение экологической проблемы переработки твердых коммунальных отходов на основе внедрения инновационных технологий, что существенно повысит технологический уровень мусороперерабатывающей отрасли Республики Беларусь, а также обеспечит социально-экономический эффект на уровне регионов страны и экономико-экологическое развитие.

Ключевые слова: экономико-экологическое развитие; инновационные технологии; мусоропереработка; регионы Беларуси; экологические проблемы; твердые коммунальные отходы; вторичные материальные ресурсы.