TO THE QUESTION OF DIGITALIZATION OF INDICATORS OF THE MINERAL COMPLEX

Lyudmila P. Ryzhova[1] , Alexander M. Kurchik [2] , Angela-Urielle Saley[3], Alexander R. Kalinin[4]

[1] ORCID 0000-0002-8471-7230
Sergo Ordzhonikidze Russian State University for Geological Prospecting
Faculty of Economics and Management, Department of Economics of the Mineral Complex
Miklukho-Maklai str., 23, 117485, Moscow, Russia
E-mail: kafedra520@mail.ru

[2] ORCID 0000-0002-3162-6351
Sergo Ordzhonikidze Russian State University for Geological Prospecting
Faculty of Economics and Management, Department of Production and Financial Management
Miklukho-Maklai str., 23, 117485, Moscow, Russia
E-mail: nich.rggru@mail.ru

[3] ORCID 0000-0002-5409-2241
Sergo Ordzhonikidze Russian State University for Geological Prospecting
Faculty of Economics and Management, Department of Economics of the Mineral Complex
Miklukho-Maklai str., 23, 117485, Moscow, Russia
E-mail: saleyangelaurielle@yahoo.fr

[4] ORCID 0000-0002-1966-5497
Sergo Ordzhonikidze Russian State University for Geological Prospecting
Faculty of Economics and Management, Department of Economics of the Mineral Complex
Miklukho-Maklai str., 23, 117485, Moscow, Russia
E-mail: kalinal@yandex.ru

Abstract: *Natural resources form the basis of the economies of many developed and developing countries, determine their geopolitical role in the world, scientific, technological and social development. For the Russian economy as a whole, as well as the economy of a significant number of its regions, the mineral complex is fundamental. Digitalization of the mineral resource base is a real basis for the growth of the Russian economy and other countries and a source of general scientific, technological and social development. The main task of the exploration industry is the*

study and exploration of mineral deposits of industrial importance, specific deposits that make up the material base of the mining industry and the basis for the development of productive forces of countries.

The expected results of the study and their scientific significance involves the development of economic and statistical models of digitalization of technological processes during geological exploration.

Keywords: *digitalization, economics, minerals, mining*

JEL codes: *O13, Q32, O21*

1. Introduction

We can say that in general, the mineral resource base of Russia was formed by 1990. In the early 1990s, when the country's economy began to operate in market conditions, a number of problems appeared in the state of the country's mineral resource base:

- unprofitability of a significant amount of previously explored reserves of many deposits of various types of minerals, primarily due to the low quality of ores and the rapid increase in prices for material resources; according to the revaluation of 1995-1999. the number of balance sheet (profitable) reserves decreased, on average, by 30%;

- the emergence of severely deficient types of mineral raw materials due to the fact that large explored deposits of uranium, manganese, chromium during the collapse of the USSR were in Kazakhstan, Uzbekistan, Ukraine; in modern conditions, the metallurgical production in Russia of metals such as manganese, chromium, titanium, aluminum, niobium, tantalum is based on imported raw materials;

- a high degree of depletion of the reserves of many large deposits in old mining areas, in which mining enterprises are often city-forming;

- a significant reduction in the funding of exploration led to a sharp decrease in the physical volume of drilling, mining and other works and, as a result, to a systematic lag in the growth of reserves from production in most types of minerals from 1992 to 2004;

- aggravation of the environmental situation in large mining regions (Rylnikova et all., 2018).

Intersectoral interaction of enterprises of the mineral resource complex, focused on overcoming these problems in modern market conditions, sets the task of evaluating and managing this process based on the widespread introduction of digitalization.

2. Methodology and Data

The Russian mineral complex, as a mining and processing mineral and raw material complex of enterprises, also serving the mining complex of the exploration industry, is a fundamental vital activity of the state. Over the past decade, the enterprise, part of the mineral-transverse complex, provided more than 50% of the country's gross domestic product. The export of natural resources makes up the bulk of foreign exchange earnings. Foreign investment in the Russian economy.

For digital assessment, it is advisable to use the methodology of intersectoral interaction. Digitalization in multifactorial economic models, allowing dynamic interaction between countries. Using multivariate regression dependencies, it is possible to build forecasts of the influence of the processes of interaction of the mineral-wave complex with other products (Balasyan & Ryzhova, 2018)

Digitalization includes management goals and objectives, elements, factors and criteria of operational efficiency, the main of which is the exploration of mineral reserves in the bowels of specific deposits. Exploration of mineral deposits of industrial importance. The main end products of intelligence are the exploration reserves of various types of minerals, which are the material and technical base of the mining industry and the basis for the development of the country's productive forces. (Ryzhova et all., 2018)

A key feature of the current situation has been the transition to a fundamentally new level in the strategy of the mineral-signal complex - this is the digitalization of exploration and subsoil use. The “Strategies for the development of the mineral-crystalline base of Russia” have already formed the basic principles and requirements for the process of “digital geoeconomics”: robotic technologies for collecting, processing, accumulating and providing geological and mining-technological information, using digital technologies in technological processes for the extraction and extraction of mineral raw materials . raw materials etc. However, these activities are not enough. Digital changes in all mineral-wave complexes, as well as in related industries of a fundamentally new level, based on the use of artificial intelligence (R-technologies), technologies for managing large amounts of data (big data, etc.), digital marketing and management (CRM), etc.

In modern market conditions are increasingly necessary. In accordance with the current categories of mineral reserves, mineral resources of the mineral resources of countries in Russia, there are exploration reserves (A + B + C1 + C2) and forecast resources (P1 + P2 + P3).

The mineral-optical base of countries (or regions) is a combination of exploration reserves (A + B + C1) and preliminary estimated (C2) reserves. Oil, gas and coal (Classification …, 1997).

In Russia and in other countries, minerals are the most important factors in the formation of the budget, the welfare of the population and the competitiveness of the national economy. Today, the digital development and mining of minerals creates favorable socio-economic conditions for economic growth in the country and its regions.

Up to 75% of jobs work in some regions of Russia. Stabilization and improvement of socio-economic situations in crisis areas of Russia (North Caucasus), geological and geopolitical interests (Kuril Islands, Chukotka, Chukotka Autonomous Okrug, Magadan Region, etc.), In disadvantaged territorial territories where small ethnic groups live. Siberia and the Far East, digitalization should provide a technological leap in exploration and mining, as well as increase the welfare of the population of the mining regions of gion and reduce social tension (Radchenko et all., 2018).

The development of processing industries based on advanced technologies, without the widespread use of mineral raw materials as a source material. At the same time, mainly in the consumption of the population, the energy of primary energy and the production of the mineral-crystalline complex are used. Per capita consumption of minerals positively correlates with the level of economic development of countries. Developed countries (USA, England, Germany, France, Japan), which account for 16% of the world's population, use more than half of the world's mineral resources.

Developed countries consume more than 80% of uranium, about 77% of copper, 72% of lead, 59% of zinc, 67% of nickel, from 50 to 80% of tin, tungsten, molybdenum, more than 50% of phosphate raw materials.

In terms of the high share of exports of commodities in GDP, Russia is on a par with countries such as Saudi Arabia, Brunei, Kuwait, Bahrain, Venezuela, Chile, South Africa and others.

3. Results and Discussion

The industry of many commodity countries is one-sided, but the standard of living there is high due to the small number of population and high mountain rents. Norway sells 90% of the extracted gas and oil, but it ranks first in the world in generating electricity per capita (29 thousand kWh, 2 times more than in the USA). The proceeds from the sale of raw materials are returned to the economy by investments in high-tech production and the social sphere.

The widespread distribution of metals in the earth's bowels, the incomplete geological study of mineral resources, and fundamentally different reserve accounting systems do not allow us to determine the potential leader by the volume of raw material reserves. Today, the main potential of metal ore reserves is concentrated in eight countries, such as Australia, Brazil, South Africa, Canada, China, Russia, the USA, and India. Significant mineral resources of certain types of metal raw materials are also concentrated in countries such as Peru, Chile, Indonesia, Kazakhstan and Mongolia.

The G8 countries dominate in most types of raw materials, but China has a significant active growth in proven reserves. Huge volumes of raw material imports force China (rare-earth metals of the platinum group) to actively search for promising areas in their own country and actively invest in geological exploration in other countries (Trubetskoy et all., 2018).

Over the past decades, through active exploration and mining companies in the countries of the world, large ore reserves have been identified, especially in Indonesia, Mexico, Bolivia and the countries of the African continent. The potential of African countries is still not fully appreciated due to the unstable political situation on the continent and the limited access to national resources of these countries. But in West Africa, for example, in Côte d'Ivoire, the most important mineral resources are gold (Iti, Angovia, Subre deposits), oil and natural combustible gas (Baobab, Espoir, Lyon, Panther offshore deposits). According to the Ministry of Mining of Côte d'Ivoire, there are deposits of diamonds (primary and placer more than 3 tons), manganese ores (8 million tons), iron, copper, nickel (298 million tons), cobalt (145 million tons), niobium and tantalum, bauxite (1.5 million tons), as well as cement raw materials, quartz sand, clay, gravel, rubble stone, etc. (www 1).

An increasingly important role for the economy of Côte d'Ivoire is played by hydrocarbon production in the eastern shelf of the Gulf of Guinea. Largest hydrocarbon deposits (from west to east):

• Lyon (oil and natural gas, opened in 1994),

• Panther (gas, discovery year 1983, initial proven oil and gas reserves of the Lyon and Panther fields were estimated at 350 million barrels and 303 billion cubic feet, respectively);

• Foxtrot (gas, discovered in 1981, gas reserves are estimated at 1.502 billion cubic feet);

• Espuar (gas and oil, 1979, initial proven oil and gas reserves are respectively estimated at 156 million barrels and 399 billion cubic feet).

The role of Russia among the countries leaders in reserves, one of the most significant and promising in view of the large area of the country and the geological diversity of tectonic structures and ores.

According to the proven estimated reserves of minerals (metals), for 2018, Russia is in the top five countries in terms of metal reserves. In terms of reserves of copper (4%), aluminum raw materials (5%), lead (10%), and molybdenum (2%), Russia is among the ten largest countries in the world, and Russia occupies the reserves of such highly demanded raw materials as manganese and chromium ores. 11th and 12th places. In terms of the reserves of rare metals, Russia occupies one of the leading places in the world: magnesium (27%), selenium (20%), vanadium (36%), rhenium (7%), cadmium (8%), cobalt (21%), nickel (36%) and others. A significant number of reserves of rare metals is contained as a by-product component in ores of more common metals, but the balance sheet in state bodies for accounting for reserves of solid minerals has their own content of rare metals in the bowels (Trubetskoy et all., 2017).

4. Conclusions

In general, the country's potential for reserves of ore (metal) raw materials has not been fully disclosed due to the presence of a huge number of unaccounted deposits with forecast resources, which require additional exploration work to clarify and improve the quality of information on reserves for transferring to the status of deposits.

The metallurgical industry of Russia is the base for the country and makes a significant contribution to the Russian economy. The share of the metallurgical industry in the country's GDP is about 5%, in industrial production - about 18%, export - 14%. (Rylnikova et all., 2017).

Russian industry optimally combined with the problems of the entire global metallurgical industry. The development of the ore base of metal raw materials with an increase in potential reserves, the use of an integrated approach to the extraction and processing of raw materials will solve the internal problems of the industry and improve the financial security of companies, which is 13% of the value of all types of raw materials.

The expected results of this study to involve the development of economic and statistical models of digitalization of technological processes during geological exploration and development of solid mineral deposits. There is a need to develop the digitalization of management processes in the mineral resource complex.

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