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Global Challenges and Prospects of the Modern Economic Development

CHANGES IN THE LEVEL OF R&D EXPENDITURES IN THE RUSSIAN INDUSTRY

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Abstract

For a long time, the development of R & d has been a strategically important aspect of the functioning of a successful country's economy. The most important factor in the modernization of the domestic industrial sector is the development and improvement of R & d at the global level. This task is a priority in economic policy, since it is based on these indicators, among other things, that the global rating of economic influence of all developed and developing countries is formed. The level of expenditures in this sector of industry is analyzed in terms of comparison with world leaders in the field of scientific research. In modern conditions of the Russian economy, it is very important to pay attention to such large "objects" as industry. Against the background of the global average, the share of domestic spending in the industrial sector of the economy on R & d in GDP is constantly falling, as a result of which the volume of investment in Russia is decreasing. If we consider the main aspects of the current economic situation, the most important factor is the development of the most profitable ways and directions for improving the Russian industrial sector. Looking at the problems from this angle, we can conclude that the Russian economy was severely deformed due to the crisis of the 2000s. In fact, these key changes affected almost all sectors of the economy.

Keywords: Economic development, factors of development of economy, GDP growth, industry, R & d sector

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1. Introduction

The prospects of the R & d sector of the national industry are determined by a large number of diverse trends. Let's look at the most important ones in this article.

1. Insufficient realization of the research potential by reducing the intellectual potential.

2. Increased labor intensity.

3. Institutional transformation, changing the forms and specialization of the subjects performing the work.

To date, unfortunately, the stages of R & d from the position of economic independence are not fully formulated. It is this aspect that would allow the rapid and high-quality implementation of R & D in the work of enterprises. The list of stages and works is according to an inefficient model. Due to the large flow of foreign information and the weak distribution of structural divisions, many innovative ideas do not reach the «start-up» stage. It is because of the loss of time that innovations are no longer relevant, and industrial enterprises lose a large amount of money.

2. Problem Statement

The sphere of research and development projects in industry has long been the most important issue in the development of industrial progress in general. There is a tendency to reduce the intellectual potential of the industrial sector in Russia. The reason for this could be a number of significant factors, namely a decrease in the number of specialists who work in the R & R sector (-9% over the past decade). In this regard, there is a counter-trend of increasing the level of labor intensity, which implies significant costs for R & d personnel in the structure of investments in implemented projects (+ 7% to the cost). There is an objectively expressed transformation of the Russian sector of scientific and research developments (OECD, 2017).

- the participation of higher education institutions in the field of innovation processes is significantly developing (+15% over the past decades);

-downgrading the role of specialized research institutes (-25%);

- the scope of state participation in the implementation of scientific and technical projects is growing (+7%);

- increased participation of scientific departments of industrial enterprises (+2%).

Changing the influence of business entities, their interaction and the economy requires an innovative approach to management, which will increase the efficiency and, consequently, the productivity of R & D processes.

3. Research Questions

The amount of investment in R & d in the value added of innovative products can be determined by its knowledge intensity. To put it in other words, this is the level of technological efficiency of all industries. Its technology leaders will really be able to assess the necessary level of spending on innovative research and development. After analyzing industrial projects that have already been put into production, there is a change in the percentage ratio depending on the size of the production itself. Let's look at one of the

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examples. In high-tech and 8% of medium-tech industries, this indicator ranges from 5 to 21% in relation to the price of the product produced. If you make an accurate calculation, it will be more than 18% of the added value. These values are determined as the main medium in the treatment planning of modernization of the national economy, reflected in the Federal target program "Research and development in priority areas of development of the scientific and technological complex of Russia for 2014-2020".

4. Purpose of the Study

This conclusion was made by the author on the basis of the fact that in many industries, including industrial ones, there is no leap in development, at least not a significant one. The reason for this is that you can allocate a large amount of money that is necessary for significant changes. Namely: introduction of innovative equipment, adaptation of new technologies, reducing the level of labor intensity of objects. Of all the above, the authors highlight R & d as the most promising object of modernization. According to the author, this is the key aspect of the development of modern industrial enterprises, which was underestimated. It is due to it that the direct process of introduction and production of new technologies is formed. Due to this, investments in this industry can be considered the most profitable and payback, especially if we take into account the fact that there will be a trend of development of the entire sulfur economy as a whole. In Russia, many innovative projects are forced to seek funding from third-party organization and foreign countries (since the beginning of the 20th century, many domestic projects have been implemented at the expense of the budget of foreign countries). At the beginning of the 2010s, the Russian Federation began to finance new "innovative" projects of domestic young scientists, in which the focus is on supporting small businesses and areas of research and development in large corporations at the federal level.

5. Research Methods

After analyzing the problem, the authors formulated a research method that can solve this issue as efficiently as possible. Many scientists have long been trying to find a solution to the rapid development of the industrial sector after the 2000s, and their opinions often differ. In this regard, the authors analyzed the economic characteristics of all the constituent aspects of R & d and offered their own separate method for solving the problem. The author considered the following areas of R & d: R & d, R & d and experimental and technical developments in industrial enterprises. The main points of the analysis were:

- the amount of investment in R & d - development of the R & d sector in the industrial sector of the Russian Federation;
- the level of expenditures in this sector of industry in terms of comparison with world leaders in the field of scientific development;
- competitiveness of the Russian Federation by innovative factors.

6. Findings

Based on the results of this study, the author formulated a position, which implies that, Federal Target Program resources that serve to create and sponsor innovative developments that, in turn, provide

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access to modular developments and products in those technological areas that are identified as the most important, including the development of the latest infrastructure. In fact, the volume of co-financing of the Federal Target Program in 2016 amounted to about 300 billion rubles (Federal Target Program "Research and development in priority areas of development of the scientific and technological complex of Russia for 2014-2020"). However, the analysis of trends in the development of this sector in the country's economy was not developed (Khlebnikov, 2016). Meanwhile, if we consider the competitiveness of such a sector on the world stage, it is the development of the national innovation system (Table 1) that is the primary indicator of the research and development sector, and only in the second – institutional indicators (World Economic Forum, 2017).

Table 1. Competitiveness of the Russian Federation by innovative factors according to WEF:M-place in the world ranking; P-position (1-7, 7-max.)

Factors	2012		2017	
	M	P	M	P
Innovation factor in the economy:				
(institutional) opportunities for innovation;	38	3,5	78	4,0
quality of research organizations;	60	3,8	46	4,2
Internal R & d expenditures of enterprises;	61	3,1	66	3,3
cooperation between universities and industry in R & d;	75	3,5	46	3,7
public procurement of advanced technologies and products;	99	3,3	68	3,3
Availability of intellectual potential (scientists and engineers).	72	4,0	58	4,1

Source: author.

Shown in Table 1 dynamics, due to the share of domestic expenditures (in GDP) and the number of people employed in the R & d sector (in the total population). And stagnation is due to the rapid development of global trends. For example, over the past 8 years, there has been a dynamic and steady growth in the share of domestic R & d expenditures in the gross domestic product of the European Union (+0.25%), which is justified by stable state investment in strategically industrial facilities, and active involvement of third-party investors in such projects. Especially advantageous in this dynamic is Austria, whose growth in R & d spending from 2008-2016 was more than 0.7%, which is quite significant, compared to Italy, where the growth over the same period was only 0.18%.

Of course, leaders in domestic expenditure on the sector R & d Japan, where costs begin with 3,309% (in share of GDP for the period 2008) should be noted. Prerequisites for this phenomenon could be actively developing in the scientific sector in the design field and a large infusion of state budget for development of young scientists with a promising "start app" offers. This can also be seen in the sales market, where Asian countries (it is worth mentioning China) everywhere introduce functioning developments in the research field.

R & d expenditures in innovative countries methodically show positive growth dynamics, which is caused by the high level of scientific and technological development of countries. In Russia, expenditures remain at the level of 1% (based on the results for 2016), with a slight forecast positive dynamics of GDP growth in the medium term. This is one of the main problems of the Russian industrial sector, which

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undoubtedly requires attention from the government of the Russian Federation. Drastic measures are needed to implement an innovative industrial growth strategy that would make important changes to GDP growth. Among other things, there is a clear trend towards a decline in the number of specialists involved in R & d, especially on the contrasting dynamics of a constant increase in this ratio in the EU countries. (Figure 1)

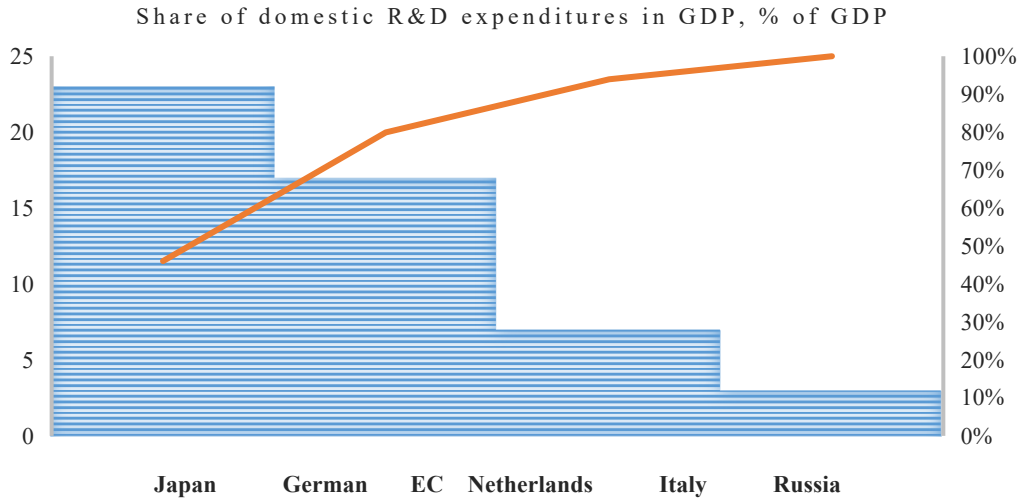

Figure 1. Data from the analysis of the position of the industrial R & d sector in Russia and world leaders
Source: author based on (OECD, 2018).

If we talk about the absolute number (34) of engineering and research personnel in the R & d cycle, then since 2015 their number has amounted to 813.2 thousand people (which is more than 50%), of which 391.1 thousand people are operating on the basis of applied research (more than 45%). When considering R & d expenditures in GDP, Israel is also the leader, whose indicator for 2017 exceeded 4.25%. Then Korea - 4.24%. And closes the US and China.

This kind of negative trend is observed primarily due to the lack of skills of employees and specialists in the scientific field, and the demand for potential labor resources in this sector. After analyzing the data, we can clearly identify the main problem that generally "hinders" the development of R & d - this is, of course, a weak investment program within the country and at the level of state support and subsidies for the development of research and development. At the same time, it is necessary to distinguish between the concept of state support in this area, since we are talking about the introduction (the final stage) of new developments for production and their further application. In 2018, Russia entered the top ten in terms of domestic R & d spending, taking into account purchasing power. But in terms of unit costs for this sector of industry, and the level of GDP, Russia closes the third ten. Speaking about the employment of researchers in the field of R & d, per researcher, it ranks 47th in the world ranking (93 thousand dollars/per year). But in terms of the scale of employment in science, Russia is among the top twenty (428.9 thousand people in 2016) (Ivliev, 2019). It should be noted that on the basis of this analysis, we can confidently discuss the possibility of developing an organizational model in the process of scientific research, which will lead to an overall increase in the coefficient of development of the domestic industrial sector. Development at the

start-up stage will only take into account system control in specialized industries at each stage, including the institutional development of the national sector of the IOS market (Khlebnikov, 2016).

One of the positive features of the development of research and development over the past decade is the departure from the traditional (outdated) model of development of the industrial sector and the introduction of new technologies. The cluster approach has become predominant in this type of activity, which in turn affects the stable dynamics of growth. At the moment, most companies have started to attract new sources for cooperation in new developments - universities, design bureaus, and, most importantly, start-up projects of Russian young scientists. In the industrial field of development, the concept of "outsourcing" has appeared, which allows you to save time and costs at the stages of development and implementation of innovative approaches.

7. Conclusion

Summing up the work done, the author highlights the key innovative directions in the development of industry, which will allow us to observe the development of the state of the energy sector and the sphere of energy conservation. In the Decree of the President of the Russian Federation No. 642 of 01.12.2016 "On the strategy of scientific and technological development of the Russian Federation", which refers to the development of scientific and technical development(STD), this was highlighted as a priority in the work, which will indicate the main points of growth of the national development of research and development that have a great impact on the innovation sector (Decree of the President of the Russian Federation No. 642 of 01.12.2016). Based on the development of the innovation sector, the Russian state has more prospects for growth, which will lead the economy to a significantly new and progressive level. Countries such as China and the United States have long used all the main resources to introduce innovative technologies both in everyday life and in strategically important economic objects. If all structural divisions, innovative sectors, investors and the state interact correctly, Russia can claim a new place in the world ranking of developed countries.

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