

Chapter 4

Classification of Factors Affecting the Effectiveness of Innovative Solutions



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4.1 Introduction

General trends in the development of the world economy indicate an increasing role of innovation as a factor that ensures the achievement of high rates of economic development. At the same time, attention should be paid to the fact that in addition to generating innovative solutions and developments, it is necessary to ensure their productive implementation in the practice of economic activity. In this regard, each country of the world forms its own national innovation system.

Innovation as an independent branch of scientific and practical activity is a fairly young direction, so we can speak very cautiously about the formation of an integral and complete national innovation system of modern Russia. This fact is explained by a number of external and internal factors, which will be disclosed in this study.

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4.2 Materials and Methods

The presented research materials, which allowed us to formulate the classification of factors that affect the effectiveness of innovative solutions presented by the authors, are based on the use of both general scientific research methods and special methods (summary and grouping, structuring of the problem field, the method of paired comparisons, and others). The study used open data on the development and implementation of innovative research results by Russian industrial enterprises, as well as expert surveys of specialists of these enterprises.

4.3 Results

Today there are several classification features that affect the economic efficiency of scientific developments. Within the framework of the classification under consideration, all factors should be divided into two main groups: external and internal (Davletshina, 2013). Of absolute interest within the framework of the considered problem is the concretization of the content of this package of factors identified by this paper authors:

- I. *External factors affecting the effectiveness of scientific research.*
 1. *Insufficiently effective state policy aimed at supporting scientific research and development.*

The main directions of this policy should include:

- formation of the institutional environment of the sphere of scientific research and development;
- implementation of measures to develop the infrastructure of scientific research and development;
- the mechanism of personnel support of the sphere of scientific research and development;
- appropriate resource support for research activities;
- ensuring the balance of economic, social, and environmental consequences of the implemented results of scientific and innovative activities;
- consistency of support measures at the federal, regional, and local levels of government, etc.

At the same time, the correct choice of priorities of the state's scientific and technical policy describes the volume of implementation of high-tech developments and forms the appropriate technological structure of state-owned companies. Thus, the industry composition of the largest Russian companies includes mainly chemical, oil, gas, energy, and metallurgical companies, which indicates the predominance of the fourth technological mode in the Russian economy (Davletshina, 2013). According to the "Russian Innovation Index" of the Higher School of Economics, the largest share

(approximately 40%) in the structure of innovative and active organizations is occupied by telecommunications enterprises. Also, a significant share in the analyzed structure is occupied by enterprises that produce technological equipment for the aviation and space industry and oil refining (about 30% each). In other industries and types of economic activity, the share of innovative-active enterprises is less than 25%.

Conclusion: The factor of the lack of effective state support is expressed in unsystematic, local interaction with enterprises engaged in the development and implementation of innovative projects, in the absence of effective measures to stimulate investors who invest in high-tech developments (Strekalov, 2015). Moreover, the factor of lack of external financing is found in the lack of financial support from the state, the difficulty of attracting financial resources for innovation activities, the lack of a preferential system of lending to the innovation sector (Pudkova, 2011), the rejection of long-term projects by financial institutions and venture funds (Mindeli, 2013), etc. In this sense, financing is one of the most important barriers to innovation. Thus, it is necessary to optimize the financial model, which provides appropriate resources for each stage of the research and development process. In addition to budget funding, measures are needed to attract private capital to finance research and development.

2. *Insufficient level of development of the institutional environment of the sphere of scientific research and development*

One of the most important components of the institutional environment is the system of regulatory documents regulating the process of generating and implementing the results of innovation activities (Strekalov, 2015). An important role, in this case, is played by the system of tax incentives and preferences for innovative and active enterprises (Abramova, 2007; Davletshina, 2013).

3. *Lack of market orientation of the conducted scientific research*

From the point of view of evaluating the effectiveness of innovation activities, an important aspect is the degree of commercialization of the implemented innovative solutions. Success in the market largely depends on the quality of market research of emerging markets for innovative products/services. However, most Russian enterprises are focused not on the external, but on the domestic market, being mostly not innovators, but imitators, borrowing other people's advanced technologies (Strekalov, 2015). Thus, only 9.4% of Russian companies are engaged in innovation (for comparison: in Germany, this figure is about 70%, in Belgium—60%, in Estonia—55%, and in China—30%) (Mindeli, 2013).

4. *Low level of competence of entrepreneurs engaged in the commercialization of high-tech technologies*

The factor of lack of competence of entrepreneurs is manifested: in the insufficient level of professional literacy, lack of knowledge in the field of the basics of entrepreneurship and the economy as a whole, ignoring the prospects associated with potential threats, the inability to quickly analyze the dynamics of markets, in the lack

of investment literacy of entrepreneurs, the predominant focus on current production tasks without taking into account strategic goals, in the lack of necessary experience with scientific research, etc. (Makarov, 1999).

5. *Insufficient level of involvement of consulting companies in the field of scientific research*

It should be emphasized that small and medium-sized research and production enterprises are often unable to provide sufficient resources for long-term innovative projects, while attracting venture capital investments also has a number of drawbacks: the lack of practice of interaction between counterparties, limited offers in this market segment, high risks, etc. It is clear that the world experience, on the other hand, suggests the importance and significance of consulting services, primarily for small- and medium-sized businesses. Moreover, the range of services of consulting specialists can be very diverse, for example, predictive assessment of an innovation project, individual consultations on the content and specifics of the project, support of the entire innovation process, etc. In general, Russia should note the low level of involvement of consulting companies in the field of scientific research.

II. *Internal factors affecting the effectiveness of scientific research*

In addition to external factors that significantly affect the effectiveness of the research and development process, it is necessary to conduct a study of internal factors, among which the authors include:

1. *Low potential of high-tech enterprises*

The indicator of the low level of potential of high-tech domestic enterprises is manifested: in the predominance of a limited range of products; in the low level of diversification of business processes (Guseva & Dalekin, 2017); in the weak development of the research production base (in the absence of its own services for the development of scientific research (Strekalov, 2015), in insufficient equipment with the necessary scientific equipment, etc.), in the absence of a corporate policy in the field of intellectual property protection, in the immunity of enterprises to innovations, in the absence of effective tools for managing innovative resources, etc. (Makarov, 1999).

2. *Personnel composition of the participants that do not meet the modern requirements of high technologies*

The factor of unsatisfactory personnel composition of Russian high-tech enterprises is expressed: in the shortage of qualified specialists in the field of innovation management and commercialization of scientific and technical developments, in the obsolescence of the competencies of existing scientific personnel (lack of creativity, high motivation, flexibility, fundamental openness to new phenomena, etc.), in the outflow of highly qualified specialists in the field of business and entrepreneurship, as well as their migration to other countries (Verti, 2009).

3. *Poorly developed innovative infrastructure of domestic business*

The insufficient level of the development potential of Russian high-tech enterprises consists in the narrowness of the product line/services provided and the weak diversification of business processes (Guseva & Dalekin, 2017), as well as the lack of research and development services in the organizational structure and the lack of necessary equipment (Strekalov, 2015). In addition, it is necessary to form an internal policy of the enterprise for the protection of intellectual property of the results of scientific and innovative activities (Makarov, 1999).

4. *Low level of business activity*

The quality of management of an innovative and active enterprise depends on many factors, including the level of business activity (Davletshina, 2013). Basically, we are talking about establishing effective communication between the structural divisions of innovative and active enterprises. In addition, the level of business activity depends on the effectiveness of the company's interaction with external contact audiences (suppliers, consumers, competitors, state and local authorities), etc.

This also applies to the system of relations between various participants of scientific projects, including the relations of implementing organizations with the enterprise—the customer of scientific research, the scientific organization, the relations of a particular enterprise and implementing organizations with state authorities and local governments.

These factors can also include the parameters of interaction between management and personnel of an innovative and active organization:

1. from the point of view of the management system of an innovative and active organization:
 - the presence of a reasonable goal-setting of innovation activities;
 - the system used to motivate and stimulate personnel engaged in the field of generating and implementing innovations;
 - training of managers who coordinate innovation activities at the enterprise;
 - working conditions;
 - technical equipment;
 - reduction of occupational diseases and injuries;
 - providing the necessary resources, etc.
 - leadership style;
2. on the part of the employee:
 - understanding of production goals and objectives;
 - internal motivation;
 - highly qualified workers;
 - no fear of error;
 - professional skills;
 - state of health;
 - level of knowledge and experience;
 - reducing the loss of working time, etc.

Moreover, it is known that for each individual innovation project there is a specific set of factors that determine its effectiveness:

- the presence of a clear innovative concept of development;
- favorable macroeconomic situation;
- awareness in the development of this field of scientific research;
- the relationship of enterprises with various sectors of science and institutional structures of the innovation sphere;
- financing of scientific research;
- the existence of extensive basic research before development;
- the amount of research costs and their distribution over time;
- the duration of the period from the moment of completion of the scientific research to the beginning of the implementation of the obtained scientific results;
- the volume of implementation and its distribution over time during the entire life cycle of the innovation;
- the duration of the period of increasing the volume of implementation and the dynamics of the volume of implementation;
- presence of effective coordination of innovative ideas;
- use of advanced technological and organizational solutions;
- taking into account the risks associated with the financing of the project;
- the share of the company's own funds, etc.

Analyzing the possibility of the above mentioned factors, it is possible not only to speed up the implementation time of a particular project, reduce additional financial costs, but also to identify additional market segments in order to systematically and more capaciously develop it (Guseva & Dalekin, 2017).

4.4 Conclusion

Thus, the main goal of conducting a comprehensive assessment of the factors affecting innovation is to increase the effectiveness and scale of modern scientific research.

Among the priority factors of the external environment, the following factors were identified in the article: taking into account the priorities of state industrial policy and legislation; stimulating innovative activity of enterprises; orientation of scientific research to the market; selection of optimal sources and conditions of financing at each stage of the development of an innovative project; use of consulting services, etc.

For successful planning and implementation of innovative projects, it is necessary, in addition to the abovementioned efficiency factors, to take into account the internal factors of the business entities themselves, indicated above in the article: the availability of the potential of high-tech enterprises; emphasis on the quality of corporate governance; creativity and the degree of motivation of personnel; the availability of effective communications and infrastructure of the enterprise, etc.

It should be remembered that the possibility of an objective assessment of all the abovementioned factors provides an opportunity to effectively manage domestic competitive high-tech products not only within the country but also on the world market.

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