

# Stimulation of innovative activity in Russian agriculture

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**Abstract.** Currently, the level of well-being of the world's economies is determined by the level of scientific and technological development of the economy, the accumulated scientific potential and the rate of renewal of the technological component in accordance with the latest achievements of world-class science. Cross-country comparisons make it possible to establish the current state, as well as strengths and weaknesses of innovation systems in different countries and direct efforts to increase the influence of the former and reduce the influence of the latter. The state, tendencies and problems of implementation of innovative developments have been investigated. The factors hindering the increase of innovative activity have been determined. Proposals and recommendations have been developed to improve the introduction of innovative developments in the field of agribusiness into production.

## 1 Introduction

In the present-day world, the strategy for the survival and development of society and countries is based mainly solely on the desire for leadership in various fields of activity, which implies the constant improvement of various aspects of the manufacture (e.g. through increasing output, environmental friendliness and quality, reducing resource intensity and other costs) of products (improving performance, quality, emergence of new properties, etc.) and rendering services (expansion of product range, improvement of quality and usefulness, etc.). A separate category of innovations are new breakthrough ones that allow gaining strategic superiority [1, 2].

In Russia, the transition to a highly productive and environmentally friendly agricultural economy is defined as one of the priority and promising areas of scientific and technological development of the country [3] and the agribusiness. The scientific and technological development of the agribusiness should ensure the competitiveness of Russian products in the foreign and domestic markets, primarily through the creation, dissemination and application of the latest achievements of science and technology [4], i.e. strengthening innovative activity in the industry.

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In terms of the level of innovative development, Russia has been ranked 45–47 for the last 5 years (in the Global Innovation Index [GII] in 2018–2022) [5] (Table 1), 8 in in the international rating of patent activity (WIPO technology exchange ranking) [6], and 27 in the world ranking of technology transfer (“readiness index” of the United Nations Conference on Trade and Development (UNCTAD) [7].

**Table 1.** Dynamics of Russia's positions in the GII: 2018-2022.

<b>Index</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Global Innovation Index	46	46	47	45	47
Innovation Resources	43	41	42	43	46
Innovation results	56	59	58	52	50
Number of countries analyzed	126	129	131	132	132

Source: Compiled by the author based on the 2018-2022 GII reports.

A cross-country comparison of the effectiveness of using the accumulated scientific knowledge and internal analysis show a low percentage of the introduction of scientific projects with a general insignificant innovative activity of agricultural enterprises. Growing costs for research and development and the accumulated scientific reserve in the form of finished results of intellectual activity (RIA) can provide intensive technological development and upgrading of production. It is known that the driving force behind world development is the rapid mastering of new technologies based on scientific achievements and their effective management [1]. Therefore, the problem of introducing advanced innovative projects into production should be considered as the main component of the development of the industry. The development of evidence-based proposals and recommendations to increase the level of implementation of innovative developments in the field of agribusiness is an urgent task.

## 2 Methodology

The object of the study is innovation activity and the subject of the study is the level of the RIA use in production. The purpose of the work is to develop a proposal to increase the level of RIA implementation in production in the agribusiness. The sources of information were the official websites of the Russian Federal State Statistics Service, analytical agencies, and scientific publications. General scientific methods of economic research were used, such as analysis, synthesis, concretization, monographic research methods, as well as extrapolation.

## 3 Results and Discussion

According to the state strategy, the priorities of the scientific and technological development of Russia are these areas that allow creating technologies that are the basis for the innovative development of the domestic market for products and services, as well as Russia's stable position in the foreign market [2]. The most progressive scenario of the country's scientific and technological development involves leadership in selected areas of scientific and technological development within both traditional and new technology markets and the construction of an integral national innovation system [3]. This involves the implementation of measures aimed at enhancing the commercialization of the results of intellectual activity and the large-scale creation of new products and services based on technologies that meet great challenges.

In world practice, there are several approaches to comparing projects in the innovation sphere, which are based on comparisons according to some significant criteria, such as assessing the degree of innovation, costs and profits, risks, etc. (Table 1) [8, 9].

According to the GII rating, the indicators that worsen the position of Russia include the followings:

- Underdevelopment of the legislative framework (91 place), difficulties with the quality of regulation (98 place) and compliance with the rule of law (108 place),
- Environmental sustainability (122 place),
- Business environment (101 place) and policy in the field of business development and entrepreneurship,
- Lending and credit (90 place), including financing of start-ups and large-scale projects (61 place),
- Number of venture capital recipients (100 place),
- Level of advanced training (95 place),
- Level of certification according to the ISO 9001 (Quality Management Systems) for organizations and enterprises (105 place),
- Level of knowledge of employees (43 place),
- Level of school education (58 place) [5].

A trend has been recorded for a decrease in the number of applications and registered patents since 2014. The reason may be sanctions, a reduction in the participation of foreign businesses in large-scale investment projects, and other reasons that contribute to a reduction in imports of high technologies [8]. In 2021, the share of Russia in the global number of applications filed did not exceed 0.91%, and their total number was almost twice less than that in India and amounted to less than 31,000. Sanction pressure reduced their number by another 13.1% in 2022 (26,000) [9].

The number of national active patents for inventions was more than 259,000 as of the beginning of 2023. However, their number is expected to decrease in the coming years due to a general decrease in patent activity in the country and a lack of funds to bring projects to the level of technological readiness and registration of rights [8].

At the end of 2022, Russia ranked 31 out of 166 countries in terms of readiness for the development of green advanced technologies. The rating is compiled based on a composite index consisting of five indicators, such as use of information and communication technologies (ICT); skills and knowledge; research and development (R&D); industrial potential and funding opportunities [7].

In addition, in the context of internal statistics, experts note the imperfection of the statistical accounting mechanism. A full-fledged system for monitoring technology transfer indicators has not been created. There is no single body responsible for collecting data. The Russian Federal State Statistics Service collects data on scientific, technical and innovative activities and the Federal Institute of Industrial Property collects information on titles of protection. There is no reliable information on the extent of technology transfer and commercialization [10]. It is advisable to provide a system for collecting information on the legal use of IP by third parties.

Factors that negatively affect the innovative activity of enterprises in the economy as a whole also have a negative impact on the activity of enterprises in the agribusiness [11]. In addition, experts emphasize the negative impact of the following factors: imperfection of the regulatory framework; lack of dialogue between business and science; inefficiency of the technology transfer support system; personnel shortage; low level of technological readiness of projects of scientific and educational institutions; insufficient competencies in the field of managing rights to the results of intellectual activity; lack of a unified communication system in the field of technology transfer and promotion; lack of

competencies, including those in the field of engineering to bring the project to the stage of industrial production [12-15].

The latest statistics estimate the level of innovative activity of organizations in agriculture in 2021 as amounted to 8.1%, which is the best result during the observation period (since 2016). The most innovatively active are the seedling growing sector, growing annual crops and animal husbandry.

The share of innovative products in the total extent remains low. It amounted to 5% in 2021 (Table 2) [8].

**Table 2.** The share of innovative agricultural products by type of activity in the total volume of goods, work performed and services in the Russian Federation, %.

Activities	2017	2018	2019	2020	2021
Growing annual crops	1.9	1.5	1.5	3.2	2.5
Growing perennial crops	3.1	2.4	2.1	3.6	3.1
Growing seedlings	21.4	11.4	2.5	0.0	0.0
animal husbandry	1.7	2.1	3.3	1.8	2.3
Mixed agriculture	-	1.4	6.4	2.3	1.4
Auxiliary activities*	1.8	3.5	0.5	0.9	1.0
Industrial production	6.7	6.0	6.1	6.4	5.5
Food production	7.6	6.6	5.7	5.0	5.3
Beverage production	3.4	2.1	2.4	2.5	2.6
Manufacture of tobacco products	2.0	1.8	0.6	1.7	0.9

\* Ancillary activities in the field of crop production and harvesting of agricultural products.

In general, the costs of innovation activities are also growing. In 2021, the costs amounted to 33.4 billion rubles, which is 1.4% of the total costs in the industry. The main sources of financing for innovation in the agribusiness are the own funds of enterprises (60.8% of total costs) and funds from loans and borrowings (36.5%). The federal (1.8%) and regional (1%) budgets play an extremely insignificant role in financing innovative activities of agribusiness enterprises. It should also be noted the negligible impact of funds to support scientific, scientific and engineering, and innovative activities, venture funds and private equity funds, which either were not reflected in the statistical reporting or are at an insignificant level [8, 10].

Innovative activity in the agribusiness is supported by a number of state (Economic development and innovative economy) and federal programs (Federal Scientific and Technical Program for the Development of Agriculture for 2017-2025 [FSTP], Federal Scientific and Technical Program for the Development of Genetic Technologies), national projects (Small and medium-sized entrepreneurship and support of individual entrepreneurial initiative, International cooperation and export, Science, International cooperation and export) through subprograms implemented within their framework, departmental and targeted programs and federal projects [11].

Export development is supported on a systematic basis by Russian Export Center JSC, which provides Russian exporters with a wide range of financial and non-financial support measures within the framework of the National Program for the International Cooperation and Export and Federal Program for the Export of Agricultural Products. SME Corporation JSC provides for the financial, infrastructural, property, legal, methodological and other support for small businesses, cooperatives and farmers [16].

The target institutions for the development and stimulation of innovative activity in the agribusiness are Rosagroleasing JSC and Rosselkhozbank JSC, which provide modernization of production facilities, long-term and short-term investments, and stimulate the development of cooperation and rural areas. The organization of the National window

of open innovations in the agribusiness at the Ministry of Agriculture of Russia to collect information on requests for innovation from business, innovative projects, as well as services provided in the field of technology transfer, will ensure the interaction of all participants in innovation and end-to-end acceleration of the process from the creation of an idea to launching products on the market or receiving investments [10, 17, 18].

Based on the analysis of the conditions and factors of the innovative environment in the agribusiness, the following measures are also proposed to improve the introduction of agribusiness innovative projects into production:

- Increase in the size of budgetary funds to finance innovation activities in the agribusiness,
- Stimulation at the state level of funds to support scientific, scientific and engineering and innovative activities, transfer centers and intellectual property, venture funds and private equity funds, other institutions to support participation in supporting innovative projects in the agribusiness,
- Indirect promotion of implementation, i.e. an increase in tax, customs, non-financial benefits for companies conducting research and organizations involved in the commercialization of third-party developments,
- Direct financing of high-tech industries, increasing the innovative activity of state-owned companies, including that based on public-private partnership, which is an effective tool for state participation in significant projects, their involvement in the innovation process as infrastructure platforms for the commercialization of innovative projects,
- Support for private companies acquiring high-tech processes, products and services by providing preferential credit terms and government guarantees,
- Promoting the formation of a system of interaction between research organizations and institutions and the real sector of the economy based on the creation of an infrastructure for cooperation and partnership on the basis of backbone centers, that is to say, the formation of industrial clusters and technological platforms,
- Taking into account the fact that the right and correct use of R&D results ensures the effective introduction of the right to RIA into circulation, it is necessary to develop training programs and advanced training courses in the area of the Specialist in Intellectual Property Management and Technology Transfer, as well as to introduce the professional standard in technology transfer everywhere in organizations involved in the implementation of innovation.

The proposed activities will contribute to increasing the level of readiness of innovative projects in the field of agribusiness and the share of implemented ones from the number of established ones, increasing the efficiency of agricultural enterprises and their competitiveness and achieving national goals.

## **4 Conclusion**

The position of Russia in the international technological exchange is still rather weak in relation to the leading countries. Russian companies are poorly represented in the international technology transfer market, in particular, in the largest US market.

The analysis revealed a large number of activities of programs and projects within which the government provides support for innovation. For the same purposes, funds and development institutions operate, while forming a system of seamless integration of state support measures and through acceleration of the process of accelerating projects whose activities are directed by the reform to achieve national goals.

However, there are still factors hindering the intensification of innovation activities in the economy as a whole and for the agribusiness in particular: underdevelopment of the

legislative framework, environmental instability, insufficient favorableness of the innovation environment, difficulties in financing innovation activities, weak human resources, and insufficient integration into the international management system. These factors, together with the difficult foreign policy environment, have a negative impact on patent activity and the level of readiness for the development of green advanced technologies.

The main sources of financing for innovation in the agribusiness are credit and own funds. Attention should be paid to the insignificant role of the state and support funds here. We assume that the lack of funding for innovation activity is the determining factor that negatively affects innovation activity. In this regard, they proposed the following measures that will contribute to the activation of innovative activity in the agribusiness: increasing the amount of funding for innovative activity in the agribusiness, including funds and development institutions; formation of a system of interaction between research organizations and institutions and the real sector of the economy; increasing the level of competencies in the field of circulation of rights to RIA and collecting statistical information on the turnover of RIA.

## References

1. E. Letyagina, A. Storozheva, E Dadayan, *Innovative processes and modernization in the agroindustrial complex of the Russian Federation: results and prospects*, E3S Web of Conferences, **247(93)**, 01062 (2021) doi:10.1051/e3sconf/202124701062
2. A. V. Bogoviz, A Competitive Model of Innovational Development of the Russia's AIC in the Conditions of the EAEU, *Lecture Notes in Networks and Systems (Growth Poles of the Global Economy: Emergence, Changes and Future Perspectives)*, **73**, 211-217 (2020)
3. Decree No. 642 of the President of the Russian Federation titled "On the Strategy for Scientific and Technological Development of the Russian Federation" dated December 1, 2016, retrieved from [www.kremlin.ru/acts/news/53383](http://www.kremlin.ru/acts/news/53383) (Last accessed 16.05.2023)
4. Forecast of scientific and technological development of the agribusiness of the Russian Federation for the period up to 2030, retrieved from [issek.hse.ru/data/2017/05/03/1171421726/Prognoz\\_APK\\_2030.pdf](http://issek.hse.ru/data/2017/05/03/1171421726/Prognoz_APK_2030.pdf) (Last accessed 16.05.2023)
5. Global Innovation Index (2022), retrieved from: [www.globalinnovationindex.org/Home/](http://www.globalinnovationindex.org/Home/) (Last accessed 16.05.2023)
6. World Intellectual Property Indicators (2022), WIPO, retrieved from [www.wipo.int/publications/en/details.jsp?id=4632](http://www.wipo.int/publications/en/details.jsp?id=4632) (Last accessed 16.05.2023)
7. Trade and Development Report (2022), UNCTAD, retrieved from: [unctad.org/system/files/official-document/trd2022\\_en.pdf](http://unctad.org/system/files/official-document/trd2022_en.pdf) (Last accessed 16.05.2023)
8. Rosstat Science, Innovation and Technology, retrieved from [rosstat.gov.ru/statistics/science](http://rosstat.gov.ru/statistics/science) (Last accessed 16.05.2023)
9. World Intellectual Property Indicators (2022), retrieved from [www.wipo.int/publications/en/details.jsp?id=4632](http://www.wipo.int/publications/en/details.jsp?id=4632) (Last accessed 18.05.2023)
10. The Practice of Introducing Advanced Innovative Developments in the Field of Agribusiness into Production: Analytical Review, 112 (Moscow, Rosinformagrotekh, 2022)
11. T. Marinchenko, *Methodological approaches to the evaluation of innovative projects in the agribusiness*, E3S Web of Conferences, **389**, 03017 (2023)

12. I. Sandu, S. Butorin, N. Ryzhenkova, *Scientific basis for forecasting the innovative development of the agricultural sector of the region's economy (based on the materials of the Perm region)*, IOP Conference Series: Earth and Environmental Science, **274**, 012016 (2019)
13. V. N. Kuzmin et al., *Mechanism for increasing innovative activity in agriculture in Russia using programing*, IOP Conf. Ser.: Earth Environ. Sci., **723**, 032055 (2021)
14. A. P. Korolkova et al., *Factors of influence on the innovative activity of agricultural enterprises*, IOP Conf. Ser.: Earth Environ. Sci., **604**, 012005 (2020)
15. I. Rodionova et al., *Problems and status of innovative development of agriculture in Russia*, IOP Conf. Ser.: Earth Environ. Sci., **403**, 012146 (2019)
16. T. Marinchenko et al., *The Role of Development Institutions in the Agricultural Sector Modernization*, AIP Conference Proceedings, **2661**, 020019 (2022)
17. E. Vasilyeva, Y. Krupnov, *Development of the methodological approach to the comprehensive assessment of the innovative project effectiveness*, E3S Web of Conferences, **164**, 10037 (2020)
18. T. Marinchenko, *Improving the infrastructure for the transfer of innovations in the agribusiness*, E3S Web of Conferences, **371**, 03001 (2023)