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State Financial Support Measures and Risk Factors Affecting the Cost of Investment Projects for the Introduction of Industrial Robotic Complex

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ABSTRACT

The **object** of the study is the cost of an investment project for the introduction of an industrial robotics complex (hereinafter referred to as the RTC implementation project). The **subject** of the study is the factors affecting the cost and effectiveness of the RTC implementation project, including measures of state financial support and the risks of its implementation. The **relevance** of the study is due to the government's interest in ensuring the competitiveness and technological independence of the Russian industry based on the development of the robotics industry to achieve the goal set by the President of the Russian Federation of Russia's entry into the top 25 countries in terms of robotics density by 2030, which requires an assessment of the cost and effectiveness of RTC implementation projects, taking into account government financial support measures and specific risks. The **purpose** of the study is to determine the impact of government financial support measures and risk factors for the implementation of the RTK project on its investment value and effectiveness. The study employs methods of classification, investment management, risk management, and valuation. The measures of financial state support and risk factors for the implementation of the RTK project are analyzed and their impact on the investment value and effectiveness of the project is characterized. The classification of factors influencing the investment cost of the RTK implementation project is considered. The impact of government financial support measures and tax incentives on the cash flows and financial results of the project is described. A model for calculating the discount rate of the RTK implementation project is proposed, taking into account the risk factors of its implementation (technological, personnel, regulatory, environmental). It is **concluded** that in order to make a decision on the feasibility of introducing RTK into industrial production, the company must determine the investment cost and basic performance indicators of the project, taking into account the factors considered.

Keywords: investment project; investment value; discount rate; risk factors; government financial support; financial results; robotic complex

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INTRODUCTION

The relevance of the study is due to the necessity of ensuring the accelerated growth of the Russian economy and achieving national technological sovereignty in the current sanctions realities. In his Address to the Federal Assembly of the Russian Federation on 29 February 2024, the President of Russia set an ambitious task: to enter the top 25 countries in terms of the number of industrial robots by 2030, including with the aim of increasing labor productivity in the face of existing demographic challenges.

The competitiveness of Russian industry is impossible without the digital transformation of production processes, in which the key role is played by the robotization of domestic industrial companies. The scale of global robotization is constantly growing. According to the latest report by the International Federation of Robotics (IFR), from 2018 to 2023, the number of industrial robots in the world increased annually by an average of 12% and reached 4 281 585 units in 2023 (*Fig. 1*). At the same time, more than 51% of all industrial robots installed in 2023 are in China, 17% in Europe, and 10% in North and South America, with the share of the USA accounting for 68% or 37 567 units.

In Russia, by the end of 2023, 12 800 industrial robots had been implemented. Today, this figure is around 13,500 units. The level of robotization in Russia is extremely low — only 19 robots per 10,000 workers, compared to the global average of 160 units per 10 000 people. For comparison, in South Korea, this figure is 1 012 units per 10 000 people, in Singapore — 770, in China — 470, in Germany — 429, and in Japan — 419.[1]

According to calculations by the Ministry of Industry and Trade of Russia, to enter the top 25 countries in terms of industrial robot density by 2030 and achieve a rate of 145 units per 10 000 people, it is necessary to increase the robot fleet almost eightfold — to 100 000 units.

Understanding the necessity to eliminate Russia's lag behind the global level of robotization, the Government of the Russian Federation announced in July 2024 the implementation of the national project "Means of Production and Automation", which included the Federal Project "Development of Industrial Robotics and Production Automation". The total amount of declared funding for its implementation until 2030 is over 300 billion rubles. At the same time, 7.12 billion rubles will be allocated in 2025, 12.73 billion rubles in 2026, and 17.11 billion rubles in 2027.[2]

The measures of financial government support should stimulate industrial companies to implement robotics projects in their production. At the same time, the final conclusion about the feasibility of investing in such a project should be made by the company only based on the results of a comprehensive analysis of all the basic elements of its evaluation: cost, economic efficiency, timelines, and risks included in the discount rate.

Thus, the purpose of the study is to determine the impact of state financial support measures and risk factors on the cost and economic efficiency of implementing the IRC project for making an investment decision by an industrial company. To achieve this aim, the following tasks need to:

- describe the specifics of the investment project for the implementation of a robotic complex;
- identify the key factors influencing the economic feasibility of implementing the IRC project;
- analyze the existing measures of state financial support for IRC implementation projects and assess their impact on cash flows and financial parameters of the project;

[1] Assessment of the level and prospects of industrial robotization in Russia. URL: https://issek.hse.ru/news/932892785.html (accessed on 03.04.2025).

[2] Federal Law "On the Federal Budget for 2025 and the Planning Period of 2026 and 2027" from 30.11.2024 No. 419. URL: https://www.consultant.ru/document/cons_doc_LAW_491969/ (accessed on 03.04.2025).

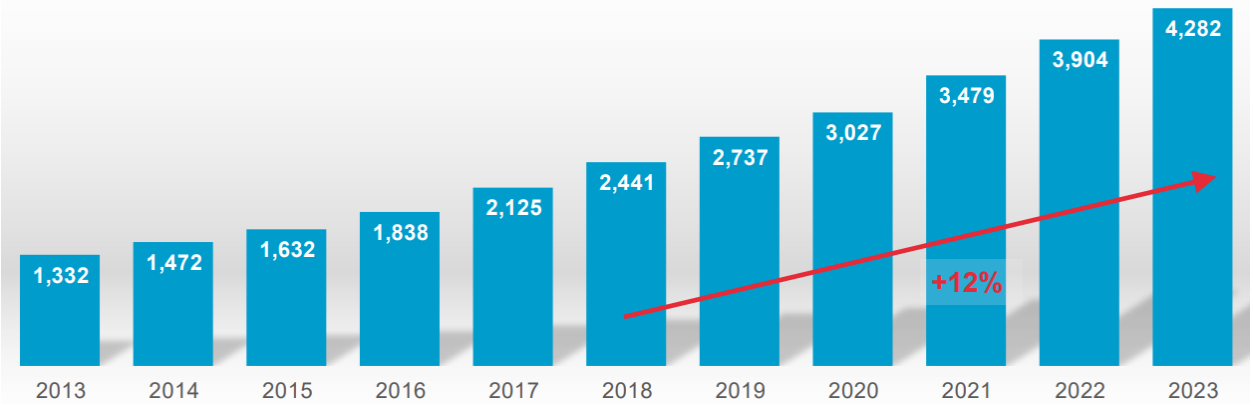

Fig. **Dynamics of the Number of Industrial Robots in the World, Thousand Units**

Source: Data from the International Federation of Robotics. URL: https://ifr.org/ifr-press-releases/news/record-of-4-million-robots-working-in-factories-worldwide (accessed on 03.04.2025).

• propose a model for calculating the discount rate of an IRC implementation project, taking into account the risk factors of its execution.

MATERIALS AND METHODS OF RESEARCH

The informational basis for writing the article consists of the results of the author's own research conducted in 2025 within the framework of the scientific fund of the Financial University on the topic "Methodological Recommendations for Evaluating the Economic Efficiency of Projects for Implementing Robotic Systems in Industrial Enterprises", as well as the works of domestic and foreign scientists on the relevant topic, regulatory legal acts regulating investment activities and the evaluation of investment projects, including in the field of robotization, national standards of the Russian Federation related to the thematic group "Robots and Robotic Devices", data from open sources and specialized websites, including the International Federation of Robotics, the Ministry of Industry and Trade, the Federal Tax Service, and the websites of companies engaged in the development and implementation of robotic systems, etc.

The prospects of robotization technological processes in companies have been studied by many Russian [1, 2] and foreign [3, 4] researchers. Particular emphasis is placed on various aspects of human-robot interaction [5, 6]. Practically all scientists acknowledge that the potential of robotization has not yet been fully realized. In this regard, innovative investment projects, including those in the robotics industry, are becoming increasingly significant, with their effectiveness proposed to be assessed using traditional indicators such as NPV, ROI, and IRR [7, 8], while improving the approaches to their calculation by considering additional factors and risks [9, 10].

Specifically, the studies on the effects of the implementation of robots and robotic systems, as well as the efficiency of this process, are dedicated to domestic and foreign works [11–14]. In some papers, the risks of innovative investment projects are analyzed [15–17].

At the same time, the scientific papers of Russian and foreign authors practically do not address the issues of the impact of state financial support measures on the economic efficiency of investment projects for the implementation of IRC, particularly on cash flows and financial results. Additionally, the specific risks of implementing these projects and the methods of accounting for them in the discount rate are insufficiently studied.

From our perspective, these factors can fundamentally influence the company's decision on the feasibility of investing in the

IRC implementation project, increasing the objectivity and accuracy of the assessment. This will enable the expansion of the investor pool and accelerate the processes of robotization in Russia.

When studying the factors affecting the cost and performance indicators of the IRC implementation project, methods of comparative analysis, classification, investment management, risk management, and cost estimation were used.

RESEARCH RESULTS

Factors Influencing the Investment Cost and Economic Efficiency of the IRC Implementation Project

An investment project for the implementation of an IRC will be understood as a time-limited and resource-limited set of activities for making investments (business plan), involving the implementation (or modernization) and subsequent operation of a robotic complex with justification of economic feasibility, scope, and timing of capital investments.

(Industrial) robot complex — a system consisting of an industrial robot, a working tool (or tools), sensors on the working tool, and equipment necessary for performing tasks as intended, as well as a task execution program.[3]

The implementation of the IRC deployment project should take into account the stages of the industrial robot's life cycle, defined by a set of sequential interconnected processes, starting from the justification of the need for development and direct industrial operation, and ending with the disposal and recycling of components. In accordance with the provisions of GOST,[4] the life cycle of an IRC consists of ten stages (development justification, initial requirements formation, design, manufacturing, control, operation, maintenance, repair, modernization, and disposal), differing in the set of tasks performed and the results obtained. Throughout the first five stages of the IRC life cycle, the company's cash flow in the context of project implementation is represented by the costs of creating IRC elements. At the control stage, the process of manufacturing robotic products is completed, acceptance tests are conducted, and delivery to the customer is carried out. Subsequently, the installation and industrial operation of the IRC begin.

To maintain the operability of the IRC during operation, technical maintenance, repair, and modernization are carried out. To identify the need for repair or replacement of individual components, the enterprise conducts diagnostics of the robotic system's performance. Repair or replacement of units (modules) is carried out in accordance with the manufacturer's documentation, based on which tests of the updated IRC and quality control of the produced products are conducted. For these types of work, the company regularly allocates certain funds in the budget, based on the technical documentation of the IRC and its individual modules. The specified expenses in constructing the net cash flow model adjust its amount for operating activities downward.

The development of technology, changes in consumer preferences, and the obsolescence of individual modules lead to the need for the modernization of robotic products. As a result, there are expenses for the acquisition and replacement of individual robots and their components (modules) with improved properties. These expenses increase the value of fixed assets and are accounted for as investment outflows.

[3] GOST R 60.0.0.4–2023/ISO 8373:2021. National Standard of the Russian Federation. Robots and robotic devices. Terms and definitions (approved and put into effect by the Order of Rosstandart from 20.04.2023 No. 255).

[4] GOST R 60.0.0.16–2024. National Standard of the Russian Federation. Robots and Robotic Devices. Life Cycle. Terms and Definitions (approved and put into effect by the Order Rosstandart from 15.11.2024 No. 1682). URL: https://meganorm.ru/mega_doc/norm_update_01032025/gost-r_gosudarstvennyj-standart/0/gost_r_60_0_0_16–2024_natsionalnyy_standart_rossiyskoy.html (accessed on 03.04.2025).

Within the final stage of the IRC lifecycle, the disassembly of units (modules) occurs, the identification of structures suitable for further use, and the identification of waste to be disposed of. The final cash flow is associated with the costs of component disposal, the income from the sale of units and modules suitable for further use.

In the implementation of individual stages (a set of stages) of the IRC life cycle, enterprises and organizations are involved, which, as a rule, either develop, manufacture (within the first five stages of the robot's life cycle), or operate the IRC. In our study, the focus is on investment projects for the implementation of ready-made IRCs in production (without the development stage).

Robotic complexes, in terms of technical solutions, applied control algorithms, the degree of integration into neural network and computer vision projects, differ in their level of innovation, uniqueness, and the scale of the tasks being solved, which directly affects the duration of the life cycle, the cost of projects, and the level of technological risks. At the same time, the assessment of all costs associated with owning an IRC over its lifecycle can be evaluated using the Total Cost of Ownership (TCO) method.

The volumes of investment in IRC implementation projects also depend on the scale of the robotization of production processes. Moreover, comprehensive robotization projects involve medium- and long-term implementation horizons for robotic complexes and robotic cells, while the installation of individual industrial robots and robotic devices can be carried out within a short- and medium-term timeframe (within a year). "Most often, for an enterprise, the payback period for IRC on average ranges from 24 to 36 months; sometimes the payback period can extend to 6–7 years" [11].

To choose the optimal implementation option for IRC by industrial companies, in addition to the total cost of ownership of IRC, the calculation of potential economic benefits is carried out, including cost reduction, increased labor productivity, and improved product quality, as well as the social and environmental effects generated by the project.

In making the final decision about the feasibility of investing in the IRC implementation project, the key role is played by the *investment cost of the project*, which is traditionally understood as the amount of money that an investor is willing to invest in the project, based on its potential income, risks, and other factors affecting future cash flows. In other words, it is the sum of the company's investments at all stages of the project's implementation, discounted to the present time. Provided that all investments are made at the beginning of the project, we will obtain the traditional indicator for assessing the economic efficiency of investments in the project — the net present value (NPV), which should be greater than zero. When selecting alternative projects, the company can additionally apply the return on investment (ROI), internal rate of return (IRR), and discounted payback period (DPP) indicators.

Overall, the set of factors influencing the investment cost of the IRC implementation project can be classified into the following groups (*Table 1*): a) strategic and organizational; b) technological; c) infrastructural and operational; d) personnel and organizational; e) financial and market.

The size of the NPV is primarily influenced by the amount of cash flows and the discount rate. The positive cash flow balance at all stages of IRC operation may directly depend on measures of financial government support and tax incentives for robotization processes, which are currently being actively implemented by the Government of the Russian Federation. When determining the discount rate, accounting for the specific risks of implementing the IRC project can play a significant role. In this regard, we will further examine the financial factors affecting the

Table 1

Factors Influencing the Investment Cost of the RTC Implementation Project

Factor	Explanation
Strategic and organizational	
Project goals	Automation, cost reduction, quality improvement — different goals require different solutions.
Scale of implementation	One IRC or an entire robotic line — a radical difference in the volume of investments
Planning horizon	Long-term projects require a larger budget reserve for updates and modernization
Selected implementation model	Purchase, rental, leasing, outsourcing (e.g., RaaS — Robot-as-a-Service)
Sustainable development and ESG indicators	Additional income from reducing emissions, waste, and increasing energy efficiency when implementing IRC
Technological	
Type and characteristics of IRC	Complexity, precision, load capacity, functionality, versatility
The need for additional equipment	Conveyors, CNC machines, sensors, cameras, enclosures
Level of adaptation to the existing infrastructure	Integration into the current IT infrastructure and production environment can be costly.
Complexity of management systems and software	Software development, interfaces with production management systems ERP, MES, SCADA
Infrastructural and operational	
Site preparation	Re-equipping work areas, reinforcing floors, laying communications
Modernization of electrical networks and safety	Mandatory requirements for high-power IRC
Engineering and design work	Design development, 3D modelling, technical documentation
Installation and commissioning	Often constitutes 10–20% of the equipment cost.
Personnel and organizational	
Staff training	Additional costs for training operators, adjusters, programmers
Availability/absence of personnel	It may be necessary to hire specialists or collaborate with integrators.
Change management	Costs for changing business processes, overcoming resistance, and developing corporate culture
Financial and market	
Exchange rate differences and imported components	Currency risks can negatively impact the project budget.
Taxes, duties	When importing, IRC can have a negative impact, while tax preferences can have a positive impact.
Availability of subsidies, grants, benefits	Government support can cover up to 50% of the project costs.
Cost of capital (discount rate)	Consideration of implementation risks when calculating NPV, IRR, DPP

Source: Developed by the authors.

Table 2

Classification of General Financial Measures of State Support for Companies Implementing RTC

Name of the measure	Operator	Regulatory documents	The essence of the measure	Duration of the measure
Industrial mortgage (IM)	Ministry of Industry and Trade of Russia	Resolution of the Government of the Russian Federation from 06.09.2022 No. 1570	Conducting the modernization of the facility with preferential financing not exceeding 500 million rubles	Until 7 years
Preferences	Industrial Development Fund	Resolution of the Government of the Russian Federation from 17.07.2015 No. 720	Receiving from the government during the modernization process and after its completion a number of advantages in participating in public procurement and benefits for promoting Russian products in domestic and foreign markets	Indefinitely
Co-financing	Industrial Development Fund	Resolution of the Government of the Russian Federation from 22.02.2023 No. 295	Receiving a loan of up to 100 billion rubles at a preferential interest rate	Investment phase of the project + 2 years
Special Investment Contract (SPIC 2)	Industrial Development Fund	Federal Law from 31.12.2014 No. 488, Resolution of the Government of the Russian Federation from 21.03.2020 No. 319 etc.	State support for investments in serial production projects in an amount not exceeding 50% of the project's capital investments from the total amount of budget expenditures and revenues not received by the state	Up to 20 years
Special Investment Contract (SPIC 1)	Industrial Development Fund	Federal Law from 14.03.2022 No. 57 and etc.	State support for investments in modernization and production development	Throughout the entire duration of the SPIC
Leasing	Industrial Development Fund	Resolution of the Government of the Russian Federation No. 719, Order of the Director of the Industrial Development Fund dated 17.02.2025 No. 17	Acquisition of IRC under co-financing conditions with an initial payment of no less than 10% at a preferential interest rate of 5%	For the duration of the lease agreement

Source: Compiled by the authors based on data from the Robotics Consortium. URL: https://robot-control.ru/support_measures (accessed on 03.04.2025).

investment cost of the IRC implementation project, highlighted in *Table 1*.

Analysis of Financial Support Measures and Their Impact on Cash Flow and Financial Indicators of IRC Implementation Projects

A comprehensive set of state support measures and incentives for the development of industrial robotics and production automation as tools of state policy to ensure technological sovereignty in achieving national development goals by 2030 contributes to the goals of scientific and technological development of the Russian Federation[5] — to form an

[5] Decree on the national development goals of the Russian Federation for the period up to 2030 and the outlook up to 2036. Unified plan for achieving the national development goals of the Russian Federation up to 2030 and the outlook up to 2036

Table 3

Classification of Tax Benefits for Companies Using the General Taxation Regime And Implementing RTC

Name of the tax	An article containing benefits	The essence of the benefit
Profit tax	259.3	The introduction of increasing coefficients of 2 and 3 in the calculation of depreciation for objects with high energy efficiency, for advanced technological equipment for SPIK participants, for companies that have leased equipment, and others
	286.1	Receiving regional tax investment deductions that reduce the company's expenses on acquiring fixed assets
	286.2	Receiving federal tax investment deductions (by organizations paying profit tax to the federal budget at a rate of 8%), which reduce the company's expenses on the acquisition of fixed assets by 50% of these expenses from the initial cost
Insurance premiums	427	Introduction of reduced insurance contribution rates for: – societies implementing utility models and industrial designs, the rights to which belong to their participants and founders (autonomous, budgetary scientific institutions and universities); – organizations and individual entrepreneurs engaged in technology implementation activities in the corresponding zone; – companies included in the register of radio-electronic industry organizations and participants of industrial clusters

Source: Developed by the authors based on the Tax Code of the Russian Federation.

effective system of interaction between science, technology, and production, ensuring increased receptiveness of the economy and society to new technologies, and creating conditions for the development of high-tech entrepreneurship.

The mechanism of state support measures, approved by the resolutions of the Government of the Russian Federation, allows companies to access project financing on preferential terms and thereby reduce financial costs for securing project funding sources at the stages of the IRC lifecycle. The impact of financial measures of state support for companies implementing IRC on project efficiency is manifested in the reduction of financial expenses related to the renewal of machinery, equipment, and technological lines, the shortening of the investment phase of projects, the reduction of resource intensity, the increase in the transparency of management processes, and the controllability of results.

For companies implementing IRC, government support measures can be divided into direct and indirect. Indirect measures are aimed at forming infrastructure, creating industrial techno parks, robotics development centers in all federal districts of Russia, stimulating research and development of new IRC models, and preferential promotion of products in the Russian market, as well as restricting access (banning) of foreign-origin goods to procurement.

Direct measures are related to the financial support of companies implementing IRC. They include preferential lending, leasing of robots, subsidies for the technical re-equipment of organizations producing robots

(approved by the Government of the Russian Federation). URL: https://base.garant.ru/411256963/ (accessed on 03.04.2025).

Table 4

The Impact of Financial Measures of State Support for Companies Implementing RTC on Cash Flow and Financial Performance

Name of the measure	Impact on expenses, income, financial result	Impact on individual elements of cash flow	Impact on the financial feasibility of the project	The stage of the project life cycle
Industrial mortgage	Reducing financial expenses for securing project funding sources leads to an increase in pre-tax profit	When calculating the discounted cash flow to equity: a) the net profit before tax and interest on debt (EBIT) increases; b) the amount of capital investments is reduced by the amount of interest savings on the loan; c) the amount of interest at the subsidized rate leads to a reduction in the amount of change in long-term liabilities; d) the discount rate of cash flows decreases when applying the CAPM model due to the reduction of the beta coefficient in the rate calculation When calculating the discounted cash flow on total capital: effects a) and b) are similar to those discussed above; c) The discount rate of cash flows decreases when applying the WACC model due to the reduction in the cost of debt financing	Reduction of the investment phase period of the project, improvement of the balance of cash flow for the project in terms of the timing of inflows and outflows and volumes, increased transparency of management processes and controllability of the result, which reflects in the reduction of project insolvency risks	Operation, modernization
Preferences	The increase in income and profit is associated with the growth in production volumes, changes in the structure and assortment of products, which are of higher quality, due to an increase in their prices	When calculating the discounted cash flow, the net profit in the EBIT calculation increases due to the increase in product output	Similarly to industrial mortgages	Operation, indefinitely
Co-financing	The reduction of financial expenses for securing sources of project financing leads to an increase in pre-tax profit	The mechanism of influence on individual elements of cash flow is similar to industrial mortgage	Similarly to industrial mortgages during the period: investment phase of the project + 2 years	

Table 4 (continued)

Name of the measure	Impact on expenses, income, financial result	Impact on individual elements of cash flow	Impact on the financial feasibility of the project	The stage of the project life cycle
Leasing	Reduction of the tax burden in terms of profit tax, property tax, the possibility of offsetting VAT amounts, the application of accelerated depreciation, and the reduction of financial expenses for securing project financing sources, provided that preferential loan financing is attracted to cover up to 90%* of the advance payment for a leasing deal for technological re-equipment and modernization of fixed production assets	The amounts of cash flows should be calculated specifically for the project, taking into account the terms of the contract with the authorized leasing company	Synchronization of the lease payment schedule with the cash flow from the project within the periods corresponding to the lease term in the lease agreement, increasing the transparency of management processes and the controllability of the result	Operation, modernization

Source: Developed by the authors.

Note: * The maximum loan amount from the Fund can be up to 45% of the total cost of industrial equipment. URL: https://frprf.ru/zaymy/lizing/ (accessed on 03.04.2025).

or their component base, as well as subsidies to compensate for discounts that robot manufacturers and companies implementing them provide to customers.

The characteristics of the current financial support measures are presented in *Table 2*.

The digitized database of all subsidies and grants for business support, which are financed from federal, regional, and municipal budgets on a competitive basis, is presented on the Portal for Providing Financial State Support Measures.[6]

The choice of the measure of state financial support for companies implementing IRC will depend on:

- the specifics of the project being implemented;
- the type of subsidy, the field of activity in which the company applying for the support measure operates,
- categories of the applicant, size of the business submitting the application;
- maximum subsidy amount, etc.

Tax benefits in terms of their economic content are tools for the state to stimulate certain types of activities. They are not mandatory to use; the organization independently decides how appropriate their application is in the course of its activities (Article 51, paragraph 2, part 1 of the Tax Code of the Russian Federation). The classification of tax benefits is presented in *Table 3*.

The effect of a company implementing IRC tax benefits will manifest in a reduction of the tax burden and an increase in cash flow due to the application of accelerated

[6] URL: https://promote.budget.gov.ru/public/minfin/activity (accessed on 03.04.2025).

Table 5

Specific Risks of the Implementation of the RTC Implementation Project for Accounting in the Discount Rate

Risk category	Description	Possible consequences	Rate premium (%)
Technological and infrastructural risks	Failures in the operation of RTK, incompatibility with the current infrastructure	Rework, delays, additional costs for modernization and equipment	+1.5–3.5%
Personnel and social risks	Lack of specialists in RTC operation, social tension	Delay in implementation, increased costs for training, social adaptation	+2.0–4.0%
Regulatory risks	New requirements for safety and certification, restrictions on the import of RTK	Additional costs, project delay	+1.0–3.0%
Environmental risks	Increased environmental requirements for the operation and disposal of equipment	Increase in costs for environmental measures	+1.0–1.5%

Source: Developed by the authors.

depreciation, in the reduction of expenses not only in investment but also in operational activities, which will ultimately lead to an increase in the operational efficiency of companies throughout the entire period of IRC operation. Unlike general financial state support measures, which are predominantly temporary in nature (83.3% of the measures), two out of four tax benefits remain in effect until they are legislatively repealed and may exceed the useful life of the IRC. A summary of the impact of state financial support measures for companies implementing IRC on cash flows and financial performance is presented in *Table 4*.

Thus, the considered measures of financial and tax state support allow reducing the investment cost of the project for the industrial company-investor, increasing the NPV, and thereby enhancing the economic feasibility of implementing the IRC project.

Risk Factors of Implementing the IRC Project that Affect the Discount Rate

When implementing robotic systems (IRC) in industry, it is important to consider various types of risks that affect the return on investment. These risks are incorporated into the discount rate on equity when evaluating the economic efficiency of the project, which is proposed to be determined using a modified CAPM model (formula 1).

$$CAPM = R_f + \beta \times \left(R_m - R_f\right) + S_{sp}, \qquad (1)$$

where R_f — the yield rate on zero-coupon OFZ-30 bonds; β — beta coefficient; R_m — expected market return; S_{sp} — specific risk of implementing IRC.

Types of specific risks are presented in *Table 5*.

The table does not specify financial and market risks, as they are incorporated into the discount rate at the level of β, as well as into the average market return R_m for industrial companies of a specific industry affiliation. The premium to the discount rate is determined by expert judgement in the range of 0–5%. At the same time, different types of IRC are more characteristic of certain risks (*Table 6*).

There are various ways to minimize risks, in particular:

Table 6

The Impact of Risks on the Discount Rate for Various Types of RTC

IRC type	Main risks	Specific risk (Rsp)
Manufacturing (welding, assembly, processing)	Technological and infrastructural, personnel	+2–3%
Logistics (AGV, AMR)	Technological and infrastructural	+1.5–2.5%
Agricultural	Environmental, technological	+3–4%
Medical (Da Vinci, exoskeletons)	Regulatory, personnel, and social, technological	+4–5%
Safety robots	Environmental, personnel, and social	+2–3%

Source: Developed by the authors.

Technological and infrastructural risks → pilot testing before large-scale implementation.

Personnel and social risks → employee training, attracting qualified engineers; gradual transition, explanatory work with staff.

Regulatory risks → analysis of legislation, consultations with lawyers, development of domestic robotics.

Environmental risks → standardization of the operation and disposal of IRCs, consideration in the company's sustainable development strategy.

But in any case, their consideration will increase the objectivity of the discount rate calculation, and consequently, the reliability of the economic efficiency indicators of the IRC implementation project, which will allow the investing company to make an informed decision about the feasibility of its implementation.

CONCLUSION

In conclusion, the following conclusions can be drawn:

1. Russia significantly lags behind world powers in terms of robotization density, therefore one of the directions of the activities of the Government of the Russian Federation is the development of measures for state financial support and tax incentives for industrial companies engaged in the development and implementation of robotic systems.

2. The investment project for the implementation of IRC has specific features related to the life cycle of IRC, its technical characteristics, the risks of implementation and operation, and other factors, which are collectively proposed to be classified into the following groups: a) strategic and organizational; b) technological; c) infrastructural and operational; d) personnel and organizational; e) financial and market. In making the final decision on the feasibility of investing in the IRC implementation project, the industrial company-investor primarily considers financial factors: the availability of government financial support, tax incentives, and the cost of equity (which is taken into account in the discount rate), all of which will determine the investment cost of the project and its economic efficiency indicators: NPV, IRR, DPP.

3. The article characterizes the impact of government support measures on cash flows, financial performance indicators of an

industrial company that has implemented IRC, and the financial feasibility of the project itself. The specific risks of implementing and operating IRC have also been considered, which are proposed to be taken into account when calculating the discount rate using the modified CAPM model. An expert assessment of their magnitude has been provided, including depending on the field of application of IRC.

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O.V. Loseva — development of the concept of the article, introduction, construction of a model for calculating the discount rate taking into account the risk factors of the implementation of the RTC project, formulation of conclusions.
M.A. Fedotova — writing an abstract, analyzing literature, methods and materials, and preparing a list of sources.

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