

# *Risk analysis of the execution of applied projects*

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**Abstract** — The characteristic features of applied projects are highlighted and described, and the main tasks are highlighted. The expediency of introducing applied projects in the modern digitalization of the economy has been substantiated. The essence of applied projects is highlighted as part of the state program "Information Society". Different types of applied projects are considered depending on their cost part. The article examines the characteristics of each type of applied projects. The authors focus on the risks that accompany applied projects at all stages of the life cycle: from design to implementation and post-sales service. For each category of applied projects, a specific set of probable factors was identified for the occurrence of risk factors. The conditions are described under which the organization makes an unambiguous decision about the rejection of the applied project or the impossibility of its implementation in modern conditions and sending it for correction. A number of universal STOP factors are considered that are acceptable for all types of applied projects with an expensive part of both investment and operational nature. In conclusion, the significance of applied projects is disclosed as an innovative component of the transition of the modern Russian economy to a digital basis.

**Keywords** — *applied projects, Information Society, informatization, digitalization of the economy, risks of external projects, STOP-factors*

## I. INTRODUCTION

The current economic situation in the world requires the introduction of digital technologies to solve increasingly complex problems associated with the process of reproduction of resources and meet the needs of society. Informatization is primarily associated with the need to simplify the interaction of public authorities with the subjects of various markets, as well as with the population. Thanks to the creation of the digital economy and the integration of the Russian Federation

into the global "digital family", a significant leap in the development of not only the economic sphere, but also the technical and technological aspects of the functioning of various processes in all industries can occur.

One of the tools for implementing the digital economy is the development and creation of applied projects.

## II. MATERIALS AND METHODS (MODEL)

In this study, methods of analysis and synthesis, induction, systematization were used.

Applied projects (hereinafter referred to as AP) - projects for introducing and servicing products and solutions for industry informatization and enhancing security on the basis of technical infrastructure, software and hardware solutions of partner companies for corporate and government segments, as well as projects for creating unique products and services for individual customers / customer groups.

A distinctive feature of applied projects is the lack of unified technical solutions, as a result of which it is impossible to unify tariffs for the range of services provided and work performed and to develop unified schemes for implementing applied projects [1].

Applied projects include products used to provide services to the Information Society (in accordance with the State Program "Information Society (2011–2020)") on a cloud platform under state or municipal contracts. Services of the information society is the provision of customers of the consumer segment in the use of information and telecommunication technologies, as well as software to ensure access of citizens and organizations to services based on modern information technologies, as well as the development of the technical and technological basis for the development of the information society [2].

As part of the implementation of applied projects, the following tasks are solved:

- Key mechanisms are being developed, fundamental technical tools, basic software and hardware solutions and information resources are being created, which in turn ensure the creation and operation of AP;
- Organizational, software and hardware solutions are being developed to reduce time costs as well as reduce the cost of providing AP services and the effectiveness of electronic ways of interaction between all AP entities;
- A unified technology platform is being created for rapid, secure information exchange between all counterparties.

To make a decision about the feasibility of implementing an applied project in the range of services provided by the organization, it is necessary to make a mandatory analysis of opportunities and assess the feasibility and effectiveness of the AP, as well as the threat of occurrence of risks [3].

All applied projects that can be implemented in an enterprise within the framework of the development of the information society can be divided into 2 categories according to the types of financial resources:

- Investment projects;
- Operational projects.

The specific feature of the projects of category 1 is the need to invest for their implementation. The analysis of these projects is carried out on the basis of an integral point estimate, which consists of the technical and economic indicators of the future project, as well as the assessment of legal risks during project implementation and the general risks that the company will bear by launching the AP for implementation [4].

Investment projects, in turn, can be divided into 3 types:

1 - applied projects that require the organization to incur capital costs accounted for in IFRS (International Financial Reporting Standards)

2 - applied projects that require the company to incur capital costs accounted for in RAS (Russian Financial Reporting Standards).

Projects that require incurring operating costs for implementation can be attributed to 3 types of applied projects. Analysis and evaluation of the effectiveness of this category of projects is carried out taking into account the analysis of the possibility of implementation in certain periods, also taking into account the achievement of the required level of gross margin in the current year [5].

### III. RESULTS AND DISCUSSION

Many foreign scientists are engaged in research of applied projects both from a theoretical point of view and from practical positions. Thus, the authors of the book "Project of applied research" Vanda Zemanova and Martin Dolejs [6]

argue that the development and implementation of applied projects in various spheres of social life are an integral part of the development and transition of the country's economy to a new digital level. Elmar Kutsch and Mark Hall in their work "The Rational Management of Information Technology Projects" [7] determine the need for thorough analysis and risk assessment in the implementation of applied projects to create the optimal technological basis for managing information resources in the framework of digitalization economy.

As a list of risks that arise during the analysis of applied projects, the following:

- Low technical and economic indicators of possible project efficiency, such as a long payback period, low profitability, etc.;
- Impossibility of implementation for technical reasons (lack of necessary equipment, impossibility of technical support for the project implementation);
- Reassessment of project significance for the organization in the medium and long term planning;
- No forecast of project receivables;
- Incorrect assessment of forms and means of interaction between the main project participants.

The probability of occurrence of risks is directly related to the position of the enterprise in the market, with its financial stability, as well as with the current market conditions and the prospects for its change.

All initiatives of applied projects must undergo an assessment of efficiency until the very moment of concluding an agreement for their implementation, taking into account the changing market situation.

In the process of analyzing and evaluating all possible risks, it is necessary to determine how high their threat is for the firm, what is the probability of their overall occurrence, how long the risks influence the implementation of applied projects, etc. For this, an organization that makes a decision on the implementation of a plan for the implementation of AP in its product portfolio, makes a forecast of the development of all possible factors affecting its activities.

To simplify forecasting the prospects for project implementation, it is advisable to use a pessimistic development scenario, that is, the project should be evaluated in the context of the occurrence of all significant risks identified during the examination.

Significant risks can be considered the risks described above, with a critically high value of their possible occurrence, which can significantly affect the economic performance of the organization in a chosen direction. Also, upon the occurrence of significant risks, the project may become impossible to implement.

The decision on implementation cannot be made without a full assessment and forecast of the effectiveness of the applied project [8].

In case of significant changes in the implementation conditions and economic indicators of the project, additional analysis and re-consideration is possible, taking into account new changes and a forecast for the future.

The analysis and evaluation of projects should be carried out in the worst case scenario, that is, taking into account the occurrence of all types of risks.

For each category of projects, a number of risks can be identified, for which it is preferable to analyze and assess the feasibility of implementing of AP.

The list of risks for projects 1, 2 and 3 types is presented in Fig. 1 (Fig. 1).

The risk of loss of profitability is directly dependent on such components as sources of income. The risk can be considered minimal if the income is formed on the basis of guaranteed payments, which were recorded in the contract or taking into account the actual costs, such as lease payments. Also, this risk is considered insignificant when the tariff set for the selected project is fully controlled by the enterprise. If the revenue side does not include risks, such as the risk of inoperability, the risk of loss of controllability, or the impossibility of assessing the revenue component as a whole, the chosen risk may have a high probability of occurrence, which will adversely affect the organization's work to bring an applied project to the market.

The risk of a low level of EBT margin (the ratio of profit before taxes to revenue from the sale of goods, works, services, expressed as a percentage),% of the project indicates an insufficient amount of cash receipts in the form of marginal profit before tax. For each organization, a threshold level of this indicator is set, however, in general, it can be said that if the EBT margin is in the range of 10% to 30%, the effect of the project may be positive and an additional assessment is required and predicted profit for the calculated period. If the EBT margin value is less than 10%, the project should be abandoned, except in cases of high value of PP for the company, or adjustments should be made to the developed project.

The risk of a change in the term of the income contract is directly related to the indicator of the payback period of applied projects. To level the situation of a mismatch between the terms of the contractual relationship and the payback period, it is necessary to observe a number of conditions. The best option for the implementation of the AP is the contract validity period above the project payback period. In this case, there is no need to adjust the plans for the execution of the AP. If the payback period and the yield period of the contract are equal, then, with the possibility of prolongation of the latter, this threat can also be considered insignificant. The risk increases with an increase in the payback period and its excess over the term of the contractual obligations. When forming risk scenarios, the possibility of non-prolongation of the contractual relationship should be considered. Then an additional assessment of the project will be required using net present value indicators. If the result of the calculation of the net present value is positive, then the application project is subject to further consideration.

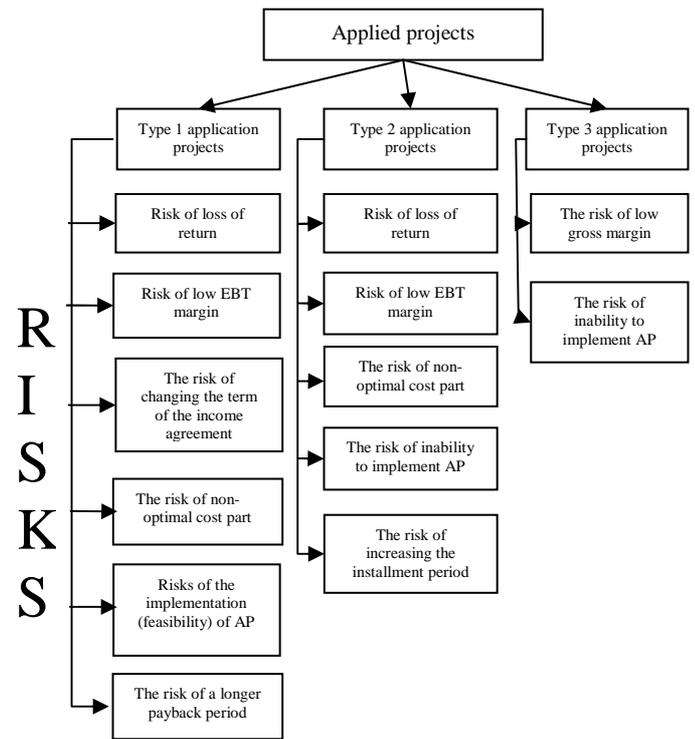


Fig. 1 List of risks for all types of application projects.

In addition to the selected indicator of the net present value, it is necessary to calculate the terminal project cost indicator. The terminal cost of the project can be defined as the present value of future cash inflows and outflows for the project, with the mandatory condition of stable fixed growth rates calculated for a certain point in the future.

The terminal value is the difference between the residual value of the equipment at the time of dismantling, the cost of dismantling and the% failure (assessment of impairment).

The risk of nonoptimality of the cost part may arise if it is impossible to evaluate the full list of the company's costs for the implementation of an application project due to lack of experience with similar software and detailing the work in the project's terms of reference. If the project amount of costs can be predicted only for individual elements of the project, then this type of risk may not be critical when deciding on the implementation of the AP. The risk can be considered minimal and insignificant only when the acquisition of equipment, software and commissioning takes place at prices not lower than the contractual obligations of the parties optimized for the selected application project. Also, the risk is almost completely absent when the costs already take into account not only the purchase of equipment, but also its insurance or its spare parts.

In terms of the risk of implementation or feasibility of an application project of categories 1 and 2, it is necessary to consider the conditions under which the evaluated project can be implemented or rejected. If the organization has experience in implementing such projects and economic efficiency is proved by positive values of the main technical and economic

indicators, such as Gross margin (GM) (gross margin, the difference between the proceeds from the sale of goods, works, services and direct costs), EBT, OIBDA (operating income before depreciation and amortization), etc., then this initiative can be implemented in the organization's portfolio. Moreover, if in the course of forecasting the prospects of the selected project, its pilot part was implemented and there were no significant obstacles to its implementation, then the selected risk can also be considered insignificant for this project. Also, the transparency of the commissioning process requires the formation of a detailed technical task. The timing of the future application project should be feasible and optimal for the enterprise. In the case when similar projects have been implemented in other branches of the organization and in the technical task there are elements for which there is no experience of application in the selected branch, however, there is experience in the head office of the company, the risk of project feasibility increases. In this case, it is necessary to work out in detail the possibilities and threats of the occurrence of this risk and objectively predict the feasibility of the implementation of this applied project. With a complete lack of implementation experience and long payback periods or the impossibility of assessing the feasibility of the selected project with a high degree of probability should be rejected, except in cases of high importance for the development of the organization. In this case, additional expertise is also required to determine the need for AP implementation.

The payback period is one of the most significant criteria for evaluating the effectiveness of any project. For applied projects, it is advisable to apply the standard methodology for assessing this factor.

The risk of increasing the payback period may lead to a loss of profitability of projects. In this regard, it is advisable to consider the gradation of the estimated payback periods. If the project pays off in less than 4 years, then this project can be unambiguously accepted for implementation, since the degree of occurrence of additional risks in a given time period is relatively low and the planning for the implementation and development of the applied project can be considered objective. If the term for the initial calculation exceeds 6 years or the project as a whole turns out to be indestructible, then two solutions are possible in the current situation: revising the project with changed conditions for its implementation or completely abandoning the AP.

When conducting an assessment on such a criterion as the payback period, it is necessary to take into account that the horizon of consideration of this factor is the effect of the contract. If the payback period exceeds the contract term, then it is necessary to form different scenarios for the occurrence of risks for each project.

To determine the risk scenario, a list of criteria should be formed that will be fundamental for the evaluation of applied projects [9]. For each project, individual criteria specific only for this project can be formulated, however several of them can be singled out that are common to all types of projects (both investment and operational). These criteria include: the ability to use equipment designed for this AP; the possibility of using the infrastructure of one project for other purposes

and projects to generate additional income; accounting for the cost of dismantling equipment for this project; recoupment of investments and costs that cannot be used for other purposes during the term of the contract on the current AP.

Based on the above criteria, 3 groups of risk scenarios can be proposed.

- 1 group of scenarios is based on the possibility of parallel use of equipment in several projects at once. Upon the occurrence of this scenario, it should be a description and calculation of the technical and economic indicators of the implementation of these projects, as well as the features and conditions of the simultaneous operation of equipment.
- 2 group of scenarios is applied in the event that parallel use of infrastructure in several AP is impossible from a technical point of view. These scenarios provide options for the occurrence of risk, taking into account the reuse of equipment in other projects.
- Group 3 of scenarios as well as Group 2 is used when parallel operation of equipment is impossible; in this case, the possibility of reselling equipment and generating additional income is considered. Then there is a complete rejection of the plan to launch a new application project on the market.

The key parameters for assessing the positive and negative aspects of using the three groups of scenarios are the payback period of the applied project, the net present value, the terminal value, and the expert assessment of the likelihood of risk occurring (low, medium, high) [10].

When forming any of the scenarios, it is necessary to adhere to a certain set of rules: the scenario must contain a narrative part and prerequisites for its occurrence, a feasibility study for the given scenario conditions, and also a detailed calculated probability of occurrence. Only if all these conditions are present can a full-fledged conclusion be made about the expediency of applying the selected scenario, as well as about the prospects for implementing an applied project.

For projects 2 types, the risks of changing the structure of the revenue component, the risk of getting a low EBT margin, % of the project, the risk of non-optimality of the cost part of the project, the risks of not implementing the project are identical to the risks of type 1 projects (Fig.1).

The risk of an increase in the installment period for type 2 projects may adversely affect the economic performance of a future project. If the installment period does not exceed 3 years, then this risk will be minimal. If the installment period exceeds 5 years, the firm should abandon the implementation of this AP, since the probability of economic losses increases significantly with an increase in the term of payments for the project, installments for a period of 3 to 5 years generally indicate a low degree of risk of loss of profitability and the feasibility of implementing an application project in the product portfolio of the organization.

The minimum unit for consideration of projects of 3 types, you can define the contract. A project of type 3 includes a set of initiatives that are limited to a product or service within the framework of a constituent entity of the Russian Federation.

The main risk in assessing the economic efficiency of type 3 projects is the low gross margin (Fig.1). The decision on the implementation of projects of type 3 is made on the basis of possible future revenues. The higher the gross margin, the more financial resources it saves for each ruble of the project for additional obligations and expenses. In general, this indicator does not have a direct impact on the economic efficiency of the AP, but is used in the calculations of a number of indicators to determine the financial stability of the organization and the profitability of the future project. The gross margin level is calculated and determined centrally in the organization and the future profitability of the project is estimated by comparing and comparing this indicator with the target value budgeted for the organization. If the project is implemented for more than one year, then the gross margin should be considered and assessed by the minimum value for the industry.

For projects whose implementation is directly related to the need for the company to incur operating costs, the risk of impracticability can be assessed as follows. If a potential project contains elements and work that can be implemented by the organization or its business partners within the strictly defined timeframes established in the process of analyzing the AP, and possible failures in execution or penalties will not exceed the income from the project, then this risk is considered acceptable and uncritical for a similar project.

The risk of impracticability for projects of category 3 is considered high if the technical task of the AP includes components that cannot be implemented neither by the company, nor its partners, or the implementation requires much more time than can be established in the contract or the income from the project can be significantly less than the estimated costs on him. In this case, you should abandon the execution of this project or carry out its refinement and re-assessment of the viability in the market of information and telecommunication services.

In the framework of the above-mentioned risks of project implementation, a number of factors (risk assessment values) can be distinguished, on the basis of which an unambiguous decision can be made about the inexpediency of further evaluation and implementation of proposed applied projects in the organization. These factors can be defined as STOP-factors.

The list of STOP-factors can be set individually for each project in view of the features of each applied project.

However, it is possible to identify a number of STOP-factors that will be universal for all categories of projects and fundamental in the course of project appraisal [11].

As universal STOP factors, the following can be distinguished:

- a low level of% EBT for the project (the minimum level of these indicators is usually set centrally in the enterprise for the current year, depending on market conditions and environmental conditions);
- high risk of receivables, which. It is impossible to repay or arrears, which may adversely affect the cash flow for the application under consideration.

A project that has received a number of STOP-factors (low level of performance indicators, but not critical, established by the management of the company) can be accepted into implementation work only if it carries significant significance for the future development of the organization or for society, as a whole [12].

If there is such a project in the assortment of projects being implemented, the decision on implementation and the conditions under which the project will be implemented is made at the level of the company's top management, since it carries an increased risk of both investment, legal and image character.

#### IV. CONCLUSION

As part of the implementation of applied projects, it is possible to distinguish various categories of AP depending on the costs incurred by the organization. Each category of applied projects has specific risks that, to a greater or lesser extent, limit the firm's ability to implement projects. There are also risks that may at the evaluation stage of applied projects clearly signal the inappropriateness of considering the possibility of implementing applied projects in their current form without any changes [13].

Based on the above, we can conclude that the implementation of applied projects is subject to the appearance of hazards and risks from the external environment of the organization. Detailed analysis and prediction of the possibilities of risk occurrence should help reduce errors in the process of developing and executing applied projects. Since applied projects are an innovative component of the digitization of the economy, they are highly demanded by major players in various industries and require close attention and additional analysis and checks for feasibility and hazards associated with AP.

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