

# Managing Entrepreneurial Risks



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**Abstract:** An attempt to study the role of risk management from the perspective of an entrepreneur is made in this article. The main goal of this article is to identify the main patterns that define the characteristics of risk assessment in business as the main element contributing to the achievement of economic security of the organization. Methods of cognition, retrospective and documentary analysis, as well as synthesis, generalization, and systematization were used in the article. The goal is to study methods for assessing entrepreneurial risks. The object of the study is public relations associated with the formation of the risk management institution at the micro level. Various types of economic risks, methods of risk analysis and assessment, as well as risk mitigation strategies are explored in the article. Various risk management methods are used in the modern economic analysis. The most efficient way to reduce risk in conditions of instability of the economic and political situation in Russia is diversification, i.e., risk sharing among several business participants. The specifics of applying the project risk analysis methods in practice are explored.

**Keywords:** risk, risk assessment, entrepreneurial risks, economic security.

## I. INTRODUCTION

With the transition to a market economy, various forms of incorporation and the legalization of entrepreneurial activity emerged, which entailed the development of a system of interconnected institutions (legal entities, private entrepreneurship, licensing, insolvency, unfair competition, etc.) that predetermined the development of special mechanisms for their regulation [1].

It is widely known that the prosperity of any country depends on the successful development and state of business. The inefficiency of this area of public relations leads to a reduction in budget revenues and affects the employment of the population, which has negative impact on the social sphere in total.

At the same time, the economic activity of business entities in the market economy is subject to the influence of

uncertainties and is described by various risks [2], [3].

The task of the modern management and state regulation is to create mechanisms to manage these risks efficiently. One of the risk management tools in this area is the institution of entrepreneurial risk assessment [4].

The problems of assessing entrepreneurial risks are addressed in the writings of many Russian researchers. First of all, they are addressed in the writings that analyze insurance and insurance activities (Yu.T. Akhvediani, Yu.N. Zhuravleva, Yu.M. Kovaleva, M.E. Leonidova, A. Manes, V.M. Reznik, and others). The main methodological approaches to risk research are formulated in the writings of the domestic authors (B.Kh. Aliev, A.A. Gvozdenko, N.B. Grishchenko, A.A. Petrov, N.P. Sakhirov, Yu.A. Spletukhov, V.V. Shakhov, and others). The generalized results of the research into the entrepreneurial risk system are provided in the writings of the Russian authors N. Amirkhanyan, N.S. Baimurzaeva, S.A. Bakhmatov, A.S. Boyartseva, O.A. Golikova, A.V. Zolotukhin, Yu.V. Kaygorodtseva, and others.

Nevertheless, despite some attention paid to the problems of entrepreneurial risks in the literature, no special study of the issues of assessing entrepreneurial risks highlighting the specifics of its manifestation in certain areas of entrepreneurial activity has yet been conducted in domestic science.

## II. FUNDAMENTALS OF RISK ASSESSMENT IN BUSINESS. CONCEPT AND TYPES OF ENTREPRENEURIAL RISKS

Risk is one of the essential attributes of entrepreneurial activity, the subjects of which operate in conditions of uncertainty and are exposed to various factors, including:

- technical level of the goods produced using intellectual property;
- production specifics (mass, serial, small batch, piece);
- level of complexity of licensed goods production; data on the legal protection of intellectual property (country of patenting, availability of licenses, etc.);
- patent purity of intellectual property, costs of patent research;
- availability of the legal department in the company;
- territorial diversification of the company (domestic and foreign market);
- customer diversification (data on potential customers); and
- company size [5].

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With the development of science and technology, the importance of competent analysis and forecasting for the development and implementation of a successful economic strategy of an enterprise increases, and therefore insurance against various risks as a way to minimize possible losses are of particular importance.

"The modern economic dictionary defines "risk as a danger of unforeseen losses of expected profit, income, property or cash due to an accidental change in the conditions of economic activity and adverse circumstances" [6].

"Entrepreneurship is impossible without a certain risk. Entrepreneurial risk is a risk arising from any type of entrepreneurial activity due to violation by the counterparties of the entrepreneur of their obligations or a change in the conditions of this activity due to circumstances beyond the control of the entrepreneur, including the risk of losing the expected income" [7].

The problem that remains relevant is finding a uniform approach to understanding the essence of entrepreneurial risk as an independent insurance object. If it remains unsolved, it would seem impossible to determine the distinctive features of entrepreneurial risk insurance against other types of property insurance.

Most authors adhere to the point of view that entrepreneurial risk can be described as the possibility of events leading to adverse economic consequences in the form of property losses (expenses) or failure to receive the expected income. According to the second position, if entrepreneurial activity is inherently risky, then business entities consciously assume risks in order to ultimately achieve their main goal – deriving a profit [8].

It follows that the entrepreneurial risk:

- is the likelihood of occurrence equally of both the desired and undesired consequences; and

- can be considered as the expectation by a business entity of a positive result of an economic decision made while assuming a negative one [9].

Factors for classifying the risks of entrepreneurial activity can include:

- insurance options (subject to insurance, not subject to insurance);
- sources of occurrence (internal and external);
- duration (short-term, permanent);
- area of origin (production, commercial, technical, financial);
- level of losses (minimum, allowable, critical, catastrophic); and
- type of insurance (justified, unjustified) [10].

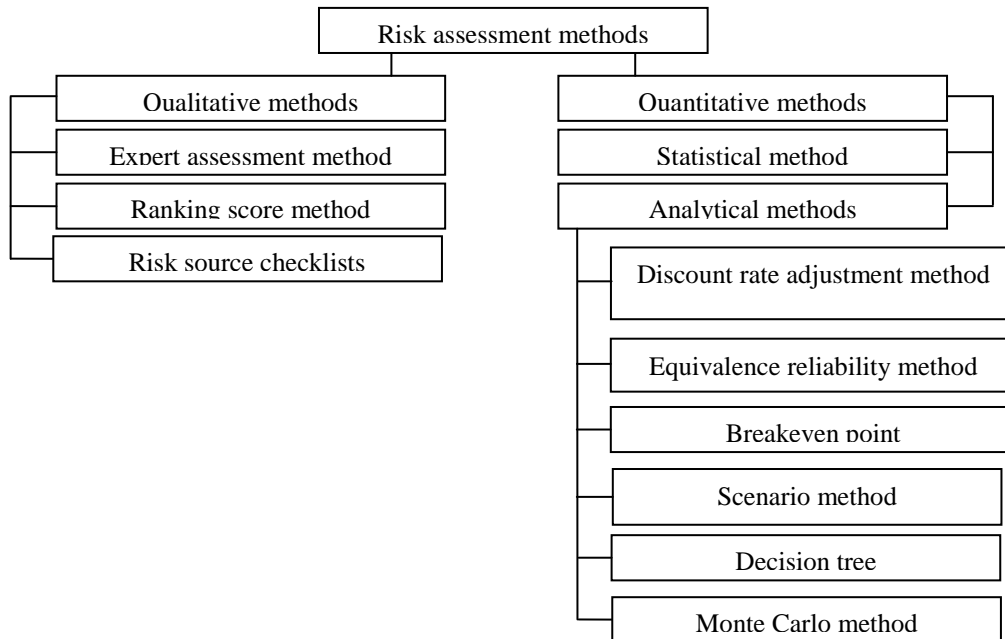
These criteria are fundamental.

As such, the authors' concept of entrepreneurial risk can be provided as an attribute of entrepreneurial activity – it is a complex phenomenon that can be defined as the probability of occurrence of events that directly cause deviations from the expected results of entrepreneurial activity and, accordingly, positively or negatively influence the financial status of an economic entity by virtue of objective factors or behavior of the business entity (its counterparties).

### III. PROPOSED METHODOLOGY

#### A. Block diagram

Risk assessment refers to a set of analytical measures that allow to predict the possibility of obtaining additional entrepreneurial income or a certain amount of damage from the arising risk situation and untimely adoption of measures to prevent risk. All methods are divided into qualitative and quantitative in the literature (Figure 1) [11].



**Fig. 1: Risk assessment methods**

#### B. Algorithm

A qualitative approach identifies the types of risks, describes them, and determines the possible damage.

The following methods of qualitative risk analysis are distinguished:

- expert assessment method;
- ranking score method; and
- risk source checklists.

The expert assessment method is a basis of the qualitative analysis, which is a qualitative risk assessment based on processed expert data. The main advantage of this method is the ability to use the experience and intuition of a competent specialist for making optimal managerial decisions. Expertise can help establish risk characteristics. The advantages of this method include the lack of the need for accurate data and expensive software tools, as well as the simplicity of calculations. However, this method also has disadvantages. These include difficulty in attracting independent experts and the objectivity of their assessments (for example, due to recollecting recent negative events, neglecting rare events, lacking motivation or unwarranted confidentiality), difficulty of forming an expert group, and the need to comply with the requirements of the expert assessment procedure [12].

This method can be used in the absence of data and the inability to describe the risk situation based on the evolutionary development, with a qualitative assessment of risk parameters.

I.N. Glazkova offers the following algorithm for a risk analysis:

1) A threshold level is determined for each type of risk, which is acceptable for the organization implementing this project. The threshold risk level is determined on a 100-point scale.

2) If necessary, a differentiated assessment of the level of experts' competence is established, which is confidential. The score is provided on a ten-point scale.

3) The risk is assessed by experts in terms of the probability of a risk event (in fractions of a unit) and the danger of this risk for successful completion of the project (on a 100-point scale).

4) Scores by experts for each type of risk are summarized in tables by the project developer. They determine the integral level for each type of risk.

5) The integral risk level obtained as a result of an expert survey is compared with the threshold level for this type of risk, and a decision is made on the acceptability of this type of risk for the project developer.

6) If the accepted threshold level of one or more types of risk is lower than the integral values obtained, a set of measures is developed to reduce the impact of the identified risks on the success of the project, and a repeated risk analysis is carried out [11].

I.P. Savelieva notes the following sequence of determining risks in the innovative activity of an enterprise based on the conclusions of experts or other specialists:

- all possible causes (sources) of the risk emergence in innovative activity are identified;
- all identified causes are ranked by the degree of significance (impact on risk), and a specific score and weight coefficient are established for each of them in fractions of a unit; and
- a generalized risk assessment (Ra) is determined by the following formula [13]:

$$Ra = \sum d \times Z, (1)$$

where d is the weight coefficient of each investment risk cause; and

Z is the absolute value of each cause in points.

The absolute value in points usually ranges from 1 to 10 or from 1 to 100, but most often from 1 to 10.

The risk decreases as the Ra value approaches unity, and vice versa. This method was especially widely used to determine the investment climate in certain regions of Russia and in some countries.

The ranking score method is based on the formalization of the obtained score. This method is considered a type of expert assessment method, if specialists are involved in this. However, semi-formalized procedures have been often used recently, and therefore this method is considered independent. Ranking is one of the simplest forms of scoring. A scoring system in points is used in this method. The 5-point system is most commonly used (points 1 to 5). Sometimes a scale consisting of 10 points and even 100 points is used. The risk manager is free to choose the most suitable scoring system for the company. The expert assigns a certain score to each risk depending on its impact on the project (or the entire company). The competence of each expert is sometimes taken into account when building a ranking. A completed table "risk ranking" is the result of this method. The utility of ranking increases with experience and the accumulation of a database of previous scorings. In this case, it allows for deeper comparisons [14].

N.A. Smolnikova offers the following method for a qualitative assessment of the enterprise activity [15]. This method allows to determine the risk of activity, which is determined by the internal characteristics of the enterprise and environmental actions. The analysis is carried out on the basis of an element-wise assessment of the influence of internal and external factors on the operation of a given enterprise. The study is conducted using the expert assessment method. The collection and study of the assessments made by various experts, which are built with due consideration of all factors influencing the risk, as well as statistical data, are supposed. Risk is assessed by experts who assign points from 1 to 3, depending on how the risk is assessed: if it is high, then 1 point is assigned, medium is 2 points, and low is 3 points.

Then the total risk assessment is found by the following formula:

$$R = \sum Si / F, (2)$$

where R is the risk coefficient;

S is the points for each factor;

i is the number of points;

F is the number of factors assessed.

The value of the risk coefficient can be obtained as a result of the assessment, which falls within the range from 1 to 3.

If the risk coefficient falls within the interval [1; 1.7], then the strategy for ensuring the profitability of innovative activities is developed in high risk conditions.

If the coefficient value falls within the interval [1.7; 2.4], then the strategy is developed in a medium-risk situation.

If the coefficient value falls within the interval [2.4; 3], then the risk is minimal. An integral assessment of innovative risk is obtained as a result of the normalized values [16].

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*Risk source checklists.* The idea of this method is to use historical data. It is based on using risk lists compiled earlier for previous innovative projects or activities. Past incidents, risk factors, and losses that they caused are analyzed in this method. Additions are made to this list after the implementation of each project to expand it. However, this can lead to a loss of control over it over time.

Besides, some of the negative events may not be included in the checklist, and, accordingly, they will not be taken into account in the future. This method is applicable only at the stage of risk identification.

This method helps the company analyze the mistakes of the past and not repeat them again. However, this method can only be used as a complement to others. The complexity of this method lies in the formation of such a list and its correct interpretation.

The following methods of quantitative risk analysis are distinguished:

- statistical method; and
- analytical methods.
- The analytical methods are represented by the following types:
  - discount rate adjustment method;
  - equivalence reliability method;
  - breakeven point;
  - scenario method;
  - decision tree; and
  - Monte Carlo method.

*The statistical method* is a risk assessment based on average expected losses, standard deviation (coefficient of variation), and probability. The probability can be determined based on different models (depending on the distribution law, inter alia).

This method has several disadvantages:

- retrospective information about risk is required;
- situations of risk in the past are not always repeated in the future; and
- many probability determination models rely on the law of risk distribution; models that are not linked to the distribution law give an indefinite estimate.

The statistical method can be used for frequent risks, for which there is enough reliable statistical data.

*The discount rate adjustment method.* The idea of the method of adjusting the discount rate based on risk is to adjust some basic discount rate, which is considered risk-free (for example, the marginal or average cost of capital for a firm). Such adjustment is made by adding the value of the risk premium, which is estimated by experts or by in-house methods. After that, the efficiency criteria of the investment project are estimated according to the newly obtained standard. The greater is the risk, the higher is the premium. For example, when implementing a new project, a company may set a risk premium of 10 %. If the marginal rate of capital is 9 %, then the discount rate will amount to 19 % [17].

Advantages of the method are as follows:

- ease of estimation;
- apprehensibility and accessibility; and
- lack of need for software (simple calculator is enough).
- At the same time, the method has several disadvantages:

- it does not provide information on the degree of risk. The obtained results depend only on the value of the risk premium;
- it involves an increase in risk in innovative activity over time with a constant ratio. This cannot be considered correct, since many projects are described by the presence of risks at the initial stage and their gradual reduction towards the end of the project. Consequently, profitable projects that do not involve an increase in risk over time will be rejected;
- this method does not carry information about the probabilistic distributions of future payment flows and does not allow them to be estimated, but only normalizes them to the present point in time;
- limited possibilities of building various variants of models.

This method is reduced to analyzing the dependence of solvency criteria on changes in one indicator only – the discount rate.

*The equivalence reliability method* consists in adjusting the cash flows of payments by introducing special reducing coefficients (reliability factors) for each period of the project. The expectation is most often used as a reliable equivalent. The scheduled payments are reduced to the value of payments, the receipt of which is certain and whose values can be determined exactly in this method. The expert assessment method is normally used to determine the value of the reduction coefficient [18]-[20].

Advantages of the method are as follows:

- in comparison with the discount rate adjustment method, it allows to take the risk into account more correctly, since it does not imply an increase in risk with a constant coefficient;
- ease of estimation; and
- accessibility and apprehensibility.
- Disadvantages are as follows:
  - difficulty of estimating confidence factors adequate to risk at each stage of the project; and
  - inability to analyze the probability distributions of key parameters.

*Breakeven point.* This method is a risk assessment based on dependencies and aimed at determining the margin of financial strength and the strength of the impact of operating leverage. The breakeven point allows to determine the required sales volume, which ensures profit, the dependence of the company's profit on price changes, and the share of each product in the share of coverage of total costs. The breakeven point should be used when introducing a new product, upgrading production facilities, or changing production or administrative activities.

As an indicator, the breakeven point describes the sales volume at which sales revenue coincides with costs. Costs can be divided into constant and variable. Fixed costs do not depend on the production volume (they are the cost of rent, lighting, time wages, and maintenance of equipment). Variable costs vary in direct proportion to the production volume (they include raw and finished materials and price wages). The following main factors should be taken into account to determine the breakeven point:



- selling price of a unit;
- variable costs per unit; and
- total fixed costs per unit.

The breakeven point (BEP) is determined by the following formula [21]:

$$BEP = TFC / (P - VC), (3)$$

where TFC is the total fixed costs;

P is the unit price; and

VC is the variable costs.

The breakeven point is the minimum level of sales volume that an enterprise needs to achieve both for each product and the enterprise as a whole.

The disadvantages of this method are instability of sales volumes and inability to estimate sales volumes for future periods reliably. It is also difficult to assess the contribution of logistics to risk assessment parameters.

This method can be used to assess the entrepreneurial risk of an activity.

*Scenario method.* The scenario method is based on a simulation of several project development options. There are usually three of them: optimistic, probable and pessimistic. The risks are assessed for each option. This method allows to obtain information about possible deviations in the project, taking the interaction of the existing factors into account. Another important advantage of this method is the ability to obtain a visual picture of various options for implementing the project. The disadvantage of this method is the focus of the study only on the change in the resulting indicator. The analysis in the scenario method is implemented using software tools. The most affordable is a special tool – a scenario manager in MS Excel. Stages of the scenario analysis are as follows:

- choice of several options for changing the key indicators (possible scenarios: for example, optimistic, probable, and pessimistic);
- determination of the probabilistic assessment for each change option (determined by expertise);
- estimation of the value of the effective indicator for each scenario; and
- analysis of the results [9].

#### *Decision tree.*

The decision tree method is often used to analyze the risks of innovative projects. It is suggested that the project has several development options. Each decision made on the project determines one of the scenarios of its further development. Classification and forecasting problems are solved using the decision tree. A decision tree is a schematic representation of a decision problem. The branches of the decision tree represent various events (decisions), and its vertices are the key states in which the need for choice arises. The decision tree is most often downward, i.e., it is built from top to bottom. The following stages of building a decision tree are distinguished:

- a key problem is initially indicated; it will be a vertex of the tree;
- for each moment, all possible options for further events are determined that may affect a key problem; they will be arcs of the tree originating from the vertex;
- the time of occurrence of events is indicated;

- monetary and probabilistic characteristics are prescribed for each arc;
- the results are analyzed.

The basis of the simplest structure of the decision tree is answers "yes" and "no" to questions.

The disadvantage of the decision tree is the limited number of solutions to the problem. In the process of building a decision tree, the attention should be paid to its size. It should not be too overloaded, because it reduces the ability to generalize and give correct answers [22].

*Monte Carlo method.* The Monte Carlo method is another simulation method. Its main difference is the following: modeling is not performed using the real observable values of market factors in the Monte Carlo method. Instead, a statistical distribution is selected. The idea of this method is to build a model consisting of random variables, over which a series of experiments is carried out in order to identify the influence of the source data on the dependent values – for example, on solvency. Data on sales volumes, prices, and costs are used as the basis for experiments when analyzing an innovative project.

The stages are the following:

- the relationship between the initial and output indicators is established as an equation or inequality;
- distribution functions are set for the input parameters of the model;
- a series of computer experiments of the model is carried out (the hypothetical sets of factor values is generated, which, for example, are used to estimate profits and losses caused by changes in the portfolio value);
- the distribution function of the model is built and risk parameters are estimated (for example, the distribution of portfolio gains and losses); and
- the results are analyzed.

This method can be easily implemented in Excel.

The significance of this method is determined by the complexity of design solutions, and high instability and uncertainty of information in investment design.

The main difficulty in using the Monte Carlo method is to select an adequate distribution for each market factor and the assessment of its parameters. Another problem is the high cost of time and technical resources. Besides, hypothetical probability distributions may fail to correspond to reality.

## IV. RESULTS

Logistic LLC is a company providing comprehensive services in logistics and freight forwarding.

The transportation company Logistic LLC has been successfully operating in the transportation services market since 1999 and is one of the leaders in the freight transportation industry. The company has been providing full-cycle logistics services for 16 years and enjoys a reputation of a reliable and professional partner. The company provides its customers with a full range of transportation services today, including freight transportation by road, rail, and sea.

Logistic LLC offers the following services:

- 1) Sea transportation;
- 2) Rail transportation;
- 3) Road transportation;

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- 4) Customs clearance; and
- 5) Container fleet.

The transportation efficiency in logistics is determined by three factors: speed and continuity. The speed is described by the time from the order formation to delivery. The continuity is described by the order completeness, packaging quality, and supplies stability. The performance of the enterprise is also influenced by:

- ability to deliver on demand;
- convenience of placing an order;
- ability to provide loans; and
- ability to choose a delivery method.

Let us analyze these indicators.

- 1) Time from the order formation to delivery (Table 1).

**Table 1: Estimation of the delivery time for orders of Logistic LLC for 2016 – 2018**

Indicator	2016		2017		2018	
	order, pcs.	share, %	order, pcs.	share, %	order, pcs.	share, %
In time	2,435	100	2,639	100	2,845	100
Not in time	0	0	0	0	0	0
Total	2,435	100	2,639	100	2,845	100

There were no orders completed with term violation: this positively describes the enterprise operation in the order delivery. In order to ensure the timely delivery of goods, the company managers have to take the additional time into account in case of an increase in the loading time for transport, an increase in the parking time on the way, and delays on the way for reasons beyond the control of the carrier's company (force majeure circumstances).

2) Order completeness. The completeness of the order execution is described by the following indicators: provision of the required shipping information, accuracy in filling out delivery bills, adherence to the delivery route, and shortage of cargo. Analysis of the enterprise operation has revealed that customers are promptly provided with the necessary shipping

information, the delivery bills are filled out promptly and accurately, the delivery routes are always followed, and there is no shortage of cargo.

- 3) The packaging quality will be analyzed in Table 2.

Packaging was assessed based on a customer survey on how satisfied they were with the packaging upon receipt of the goods. In general, the quality of packaging is assessed at 70.8 % of the 100 % possible  $[(2,361 \times 0.83 + 390 \times 0.137 + 80 \times 0.028 + 14 \times 0.005) / 2,845]$ . The customers are satisfied with the packaging quality: 83.0 % of customers gave an excellent rating, 13.7 % rated it as good. Satisfactory and poor grades were only 2.8 and 0.5 %.

**Table 2: Assessment of the quality of the goods packaging in VL Logistic LLC for 2016 – 2018**

Quality	2016		2017		2018	
	order, pcs.	share, %	order, pcs.	share, %	order, pcs.	share, %
Excellent	1,851	76.0	2,085	79.0	2,361	83.0
Good	499	20.5	451	17.1	390	13.7
Satisfactory	61	2.5	79	3.0	80	2.8
Bad	24	1.0	24	0.9	14	0.5
Total number of orders	2,435	100	2,639	100	2,845	100

The efficiency of the cargo delivery technologies is estimated as above average, because from the 9 indicators assessed, 5 were ranked positively and four negatively. The company has reserves to improve the efficiency of cargo delivery technologies.

Overall, the activities of Logistic LLC are described positively. The increase in transportation volumes, profit, and sales revenue had a positive effect on the company's bottom line. Evaluation of the enterprise performance on the delivery of goods indicates that the volume of sales of transport services in 2018 was expanding, which was a positive factor

in the economic activities of Logistic LLC. The company provides a wide range of freight forwarding services. Pricing at the enterprise is described positively, since the transport fares used allow to make an alternative choice regarding the price and delivery time. However, the company does not have a system of discounts on fares. A negative factor in the enterprise activities is the limited geography of cargo delivery, and international routes are not developed.

The classification of risks is presented in Table 3.

**Table 3: Classification of risks in Logistic LLC**

Risks	Main losses (damage), %
Organizational risks	
Failure of the partners to comply with contractual obligations	10
Untimely delivery of spare parts	5
Risk of shortage of spare parts	10
Remoteness from suppliers of spare parts	10
Market risks	
Customer solvency	15
Unforeseen costs	10
Demand volatility	10
Entrepreneurial (commercial) risks	
Risk of drop in prices for services provided	5
Risk of increase in prices and fares for third-party services	5
Risk of accidental loss of customer property	20
Increase in transportation costs	45
Delivery schedule violation	35
Credit risk	
Risk of complete non-implementation of services	25
Risk of nonpayment for provided services	25
Risk of loss of financial stability	30
Technical risk	
Risk of fires, accidents and breakdowns, operation downtime	20
Force majeure circumstances	10
Technical and technological risks	
Risk associated with the breakdown of computer equipment and other equipment used for some functions	15

The most significant risks for the enterprise are the following:

- increase in transportation costs;
- violation of the delivery schedule; and
- risk of loss of financial stability.

Summarized information about the opportunities, weaknesses and strengths, as well as threats to the enterprise development is provided in the SWOT matrix analysis (Table 4).

**Table 4: SWOT matrix analysis**

Strengths	Weaknesses
It sets clear goals and develops an action strategy for the coming year	The number of transportation companies is constantly increasing
Operation of departments is clearly planned	Poor customer solvency
Personnel policy is clearly planned	Demand volatility
It provides its customers with advertising catalogs	Unforeseen costs
Opportunities	Threats
Improving the quality of services	Failure of the partners to comply with contractual obligations
Increasing the amount of services sold	Untimely delivery or shortage of spare parts
Seeking for suppliers of spare parts close to the enterprise	Increase in transportation costs
	Delivery schedule violation
	Non-payment for provided services
	Loss of financial stability
	Increase in prices and fares for third-party services
	Drop in prices for services provided
	Breakdown of computer equipment used for some functions

Let us assess the identified internal and external factors next. Xi scores are assigned to each identified strength and weakness on a scale from 0 to 5 (the most significant manifestation of the factor corresponds to the highest score). The following indicators are used to assess external factors: probability of occurrence of event P (from 0 to 1) (the maximum probability of occurrence of an event corresponds to 1); the significance of the Kj factor, indicating the degree of its influence on the company activities on a scale from 0 to 5 (the highest degree of influence corresponds to the highest score).

The resulting matrix of rankings is presented in Table 5. The factors of the external and internal environment are linked. A score ranking of their interaction xij on a scale from

– 1 to 1 is introduced for each pair of factors. The ranking is positive in case of a direct relationship and negative in case of a reverse relationship. The stronger is the dependence of factors, the higher is the modulo estimate. The matrix of rankings for the interaction of factors of the external and internal environment is provided in Table 6. Let us compose the final matrix of rankings containing the complex evaluation parameters Xij estimated by the following formula:

$$X_{ij} = X_i * K_j * P_j * x_{ij}, (4)$$

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where  $X_i$  is the comprehensive ranking of the interaction of factors;

$K_j$  is the score for the strength/weakness of the company;

$P_j$  is the probability of the external environment factor manifestation; and

$x_{ij}$  is the degree of interaction of the paired analysis factors.

The final ranking matrix is presented in Table 7.

Based on a comparison of the sums of weighted scores of each sector, it can be concluded that the interaction of the

company's strengths and threats from the external environment yields the maximum modulus sum of quantitative rankings. This means that this quadrant should be paid the greatest attention, especially such a threat as the increase in transport costs, which scored the most.

The least probable risks, as well as the risks associated with insignificant losses, include failure of the partners to comply with contractual obligations, as well as untimely delivery or shortage of spare parts (scored the least).

**Table 5: Matrix of rankings by factors in the SWOT analysis**

			External environment													
			Opportunities			Threats										
			Improving the quality of services	Increasing the amount of services sold	Seeking for suppliers of spare parts close to the enterprise	Failure of the partners to comply with contractual obligations	Untimely delivery or shortage of spare parts	Increase in transportation costs	Delivery schedule violation	Nonpayment for provided services	Loss of financial stability	Increase in prices and fares for third-party services	Drop in prices for services provided	Breakdown of computer equipment and other equipment used for some functions		
			$P =$	1	1	1	0.6	0.6	1	1	1	1	1	0.8	0.7	
			$K =$	4	4	4	2	2	5	5	5	5	5	4	3	
Internal environment	Strengths	It sets clear goals and develops an action strategy for the coming year	$X1 =$	3	12	12	12	6	6	15	15	15	15	15	12	9
		Operation of departments is clearly planned	$X2 =$	4	16	16	16	8	8	20	20	20	20	20	16	12
		Personnel policy is clearly planned	$X3 =$	5	20	20	20	10	10	25	25	25	25	25	20	15
		It provides its customers with advertising catalogs	$X4 =$	5	20	20	20	10	10	25	25	25	25	25	20	15
	Weaknesses	The number of transportation companies is constantly increasing	$X5 =$	2	8	8	8	4	4	10	10	10	10	10	8	6
		Poor customer solvency	$X6 =$	3	12	12	12	6	6	15	15	15	15	15	12	9
		Demand volatility	$X7 =$	4	16	16	16	8	8	20	20	20	20	20	16	12
		Unforeseen costs	$X8 =$	5	20	20	20	10	10	25	25	25	25	25	20	15



Table 6: Matrix of rankings for the interaction of factors in the SWOT analysis

			External environment											
			Opportunities				Threats							
			Improving the quality of services	Increasing the amount of services sold	Seeking for suppliers of spare parts close to the enterprise	Failure of the partners to comply with contractual obligations	Untimely delivery or shortage of spare parts	Increase in transportation costs	Delivery schedule violation	Nonpayment for provided services	Loss of financial stability	Increase in prices and fares for third-party services	Drop in prices for services provided	Breakdown of computer equipment and other equipment used for some functions
Internal environment	Strengths	It sets clear goals and develops an action strategy for the coming year	1	1	0.5	-1	-1	-1	-1	-1	-0.9	-0.5	-0.1	-1
		Operation of departments is clearly planned	1	1	0.8	-1	-1	-1	-0.9	-0.5	-0.6	-1	-1	-1
		Personnel policy is clearly planned	1	1	0.8	-1	-1	-0.9	-0.5	-0.6	-1	-1	-1	-1
		It provides its customers with advertising catalogs	1	1	0.9	-1	-1	-1	-1	-0.9	-0.8	-1	-1	-1
	Weaknesses	The number of transportation companies is constantly increasing	-0.3	-0.3	-0.5	1	0.5	0.8	0.5	0.9	1	1	0.7	0.7
		Poor customer solvency	0	-0.5	-0.8	1	0.8	0.8	1	0.8	1	1	0.8	0.8
		Demand volatility	-0.8	-0.7	-0.9	1	1	1	1	1	0.9	1	1	1
	Unforeseen costs	-1	-1	-1	1	0.8	1	1	1	0.8	1	1	1	

Table 7: Final matrix of rankings of the SWOT analysis

			External environment												
			Opportunities				Threats								
			Improving the quality of services	Increasing the amount of services sold	Seeking for suppliers of spare parts close to the enterprise	Total	Failure of the partners to comply with contractual obligations	Untimely delivery or shortage of spare parts	Increase in transportation costs	Delivery schedule violation	Nonpayment for provided services	Loss of financial stability	Increase in prices and fares for third-party services	Drop in prices for services provided	Breakdown of computer equipment and other equipment used for some functions
Internal environment	Strengths	It sets clear goals and develops an action strategy for the coming year	12	12	6	30	-3.6	-3.6	-15	-15	-13.5	-7.5	-0.96	-6.3	-80.46
		Operation of departments is clearly planned	16	16	12.8	44.8	-4.8	-4.8	-20	-18	-10	-12	-20	-12.8	-8.4

## Managing Entrepreneurial Risks

	Personnel policy is clearly planned	20	20	16	56	-6	-6	-22.5	-12.5	-15	-25	-25	-16	-10.5	-138.5
	It provides its customers with advertising catalogs	20	20	18	58	-6	-6	-25	-25	-22.5	-20	-25	-16	-10.5	-156
	Total	68	68	52.8	188.8	-20.4	-20.4	-82.5	-70.5	-62.5	-70.5	-77.5	-45.76	-35.7	-485.76
Weaknesses	The number of transportation companies is constantly increasing	-2.4	-2.4	-4	-8.8	2.4	1.2	8	5	9	10	10	4.48	2.94	53.02
	Poor customer solvency	0	-6	-9.6	-15.6	3.6	2.88	12	15	12	15	15	7.68	5.04	88.2
	Demand volatility	-12.8	-11.2	-14.4	-38.4	4.8	4.8	20	20	20	18	20	12.8	8.4	128.8
	Unforeseen costs	-20	-20	-20	-60	6	4.8	25	25	25	20	25	16	10.5	157.3
	Total	-35.2	-39.6	-48	-122.8	16.8	13.68	65	65	66	63	70	40.96	26.88	427.32

The measures will be developed for the remaining risks to prevent or reduce them (Table 8).

**Table 8: Measures to prevent or reduce risks**

Risk	Minimization method
Increase in transportation costs	Route optimization
Delivery schedule violation	Dispatching
Non-payment for provided services	Accounts receivable management (factoring operations, offsetting)
Loss of financial stability	Financial analysis
Increase in prices and fares for third-party services	Price analysis
Drop in prices for services provided	Price analysis
Breakdown of computer equipment and other equipment used for some functions	Conclusion of an agreement with a third party for comprehensive servicing

### V. CONCLUSION

The entrepreneurial risk is a complex phenomenon that can be defined as the probability of occurrence of events that directly cause deviations from the expected results of entrepreneurial activity and, accordingly, positively or negatively influence the financial position of an economic entity due to objective factors or the behavior of the business entity (its counterparties).

Risk assessment is understood as a set of analytical measures that allow to predict the possibility of obtaining additional entrepreneurial income or a certain amount of damage from the arising risk situation and untimely adoption of measures to prevent risk. The division of all methods into qualitative and quantitative is accepted in the literature. The following methods of qualitative risk analysis are distinguished: the expert assessment method, the ranking score method, and the risk source checklists. The qualitative analysis is based on the expert assessment method, which is a qualitative risk assessment based on the processed expert data. The following methods of quantitative risk analysis are distinguished: statistical method and analytical methods. The analytical methods are represented by the following types: the discount rate adjustment method, the equivalence reliability method, the breakeven point, the scenario method, the decision tree, and the Monte Carlo method.

The transport company Logistic LLC was the object of research. Overall, the activities of Logistic LLC are described positively. The increase in transportation volumes, profit, and sales revenue had a positive effect on the company's bottom line. Evaluation of the enterprise performance on the delivery of goods indicates that the volume of sales of transport

services in 2018 was expanding, which was a positive factor in the economic activities of Logistic LLC.

Several risk groups were identified at the enterprise: organizational, market, entrepreneurial (commercial), credit, technical, technical, and technological risk. The most significant risks for the enterprise are increase in transportation costs, delivery schedule violation, and loss of financial stability. The least probable risks, as well as the risks associated with insignificant losses, include failure of the partners to comply with contractual obligations, as well as untimely delivery or shortage of spare parts (scored the least).

The measures have been developed for the remaining risks to prevent or reduce them. For example, it has been recommended to minimize the risk of an increase in transport costs through route optimization and the delivery schedule violation through dispatching.

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