

Article

The Risk Management System as an Enhancement Factor for Investment Attractiveness of Russian Enterprises

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Abstract: The business environment is characterized by a high degree of uncertainty and risk. This primarily requires using resources additional to those that can be obtained from profit. The purpose of the study is to assess the impact of a risk management system on the investment attractiveness of an enterprise. Structurally, the study consisted of three stages. At the first stage of the study, the selected information was grouped depending on the type of documents. The first group included statistical data, indicating the source of the data obtained. The second group of documents included scientific research on the characteristics of the risk management system at enterprises and investment attractiveness. At the second stage of the study, an analysis of enterprises was carried out with the calculation of a correction factor, which determined the possibility of obtaining a loan. At the third stage, an indicator of the effectiveness of the risk management complex was determined. The authors revealed two classes of factors influencing the decision to issue borrowed funds, namely, the parameters of the very enterprise and the parameters of the financed project. It is proposed to divide each of the presented classes into three groups: general reports; consolidated data on the personnel, management, and owners of the enterprise; and reports directly related to risk management. Expert analysis of the identified additional factors influencing the decision to issue borrowed funds supported the conclusion that the group of factors that directly relate to the risk management system has the greatest impact. The analysis of the correspondence of the number of points scored by enterprises according to existing methods and adjusted considering the effects of the identified additional factors gave reason to state that the presence of well-established risk management increases the investment attractiveness of the enterprise. It is revealed that using the methodology for assessing the effectiveness of risk management based on the ratio of the difference in the financial capabilities of the enterprise and the costs of risk management, reduced by the amount of expected damage after the implementation of risk management to the difference in the financial capabilities of the enterprise and the costs of risk management, allows for increasing the investment attractiveness of such enterprises as the Moscow Plant of High-Voltage Fittings JSC and the Moscow Instrumental Plant JSC.

Keywords: system; risk management; investment attractiveness; damage; financial capacity



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1. Introduction

Contemporary business development in the Russian Federation is characterized by a fairly high and constantly growing level of competition in almost all sectors of the economy (Drobysheva et al. 2018). At the same time, the very business environment is characterized

by elevated uncertainty and risk. This primarily requires using resources that are additional to those that can be obtained from profit. However, not all enterprises that need borrowed funds can get them because the credit institution imposes certain requirements on the financial condition of the enterprise, which is among the important criterion considered by the owner of the investment capital.

To successfully attract resources, enterprises need to have investment attractiveness (Budinis et al. 2020; Libman et al. 2021). The most important additional factor influencing the borrower's decision to provide funds is the risk management system, considered a tool that highly guarantees the repayment of the loan. Therefore, it can be stated that well-established risk management can be considered a factor that increases the investment attractiveness of enterprises (Shokhnekh et al. 2019; Szklarz et al. 2021).

Based on the aforementioned facts, we focus our research on the following issues. What are the features of the risk management system? What difficulties exist in the analysis of the investment attractiveness of enterprises? What is the relationship between the risk management system and the investment attractiveness of an enterprise?

The purpose of the present study is to assess the impact of a risk management system on the investment attractiveness of the enterprise. The objectives of the study include monitoring the process and results of assessing the investment attractiveness of the enterprise, analyzing the impact of risk management elements on the investment attractiveness of the enterprise, and developing recommendations for improving the risk management system.

The use of data from Russian enterprises is due to the fact that they are in the same market conditions. In addition, our study is important because it contains accurate estimates and convincing results that provide the formation of a risk management system as a factor in increasing the investment attractiveness of enterprises.

The main scientific result of the study is the identification of the influence of risk management elements on the investment attractiveness of an enterprise and, based on this, the development of recommendations for the effective implementation of a risk management system in an enterprise.

The performed research and the results obtained applied in complex at enterprises contribute to increasing their investment attractiveness. Thus, enterprises increase their chances of obtaining a loan when they first apply to a credit institution, as a result of which time and cost savings are achieved.

The rest of this research work is organized as follows: Section 2 provides a detailed review of the literature on the main determinants of risk management; Section 3 describes the methodology and data; Section 4 contains our main results; Section 5 briefly discusses our estimates and interprets their shortcomings; and Section 6 concludes our study.

2. Literature Review

The results confirmed by the special literature on the impact on the investment attractiveness of enterprises can be grouped into two main categories.

As such, the first and largest category of research (Armenia et al. 2021; Budinis et al. 2020; Dai et al. 2020; Huber and Scheytt 2013; Libman et al. 2021; Obicci 2017; Omri et al. 2019) confirms a direct relationship between the level of risk, on the one hand, and investment attractiveness, on the other. It also raises issues related to risk management.

Huber and Scheytt (2013) provide the following definition of the concept of risk management: it is the process of influencing an object, which ensures coverage of the widest range of possible risks, using all methods of influencing them, as well as reducing the level of identified risks to the minimum or acceptable limits.

To fully explore the concept of risk management, it is appropriate to give the definition proposed by Gnych et al. (2020): it is a holistic continuous process that aims at minimizing the effects of negative risk factors, which involves market monitoring, risk identification and assessment, analysis of acceptable risk management methods, implementation of risk management measures according to the selected management methods, and monitoring the results.

We believe that this original definition significantly complements the conceptual framework in the field of risk management. To make sure that the concept of risk management is multifaceted, i.e., it can be considered from several positions, it is appropriate to cite the opinion of [Toleuly et al. \(2020\)](#): each enterprise has its advantages and based on this identifies risks to which it may be exposed.

According to [Obicci \(2017\)](#), such actions are called a risk management system. This is a special type of activity aimed at mitigating the impact of risks on the ultimate results of a company's performance. Indeed, the definition quoted differs from the definitions given above, which testifies to the versatility of this concept.

The following scientific idea expressed by [Wu et al. \(2022\)](#) regarding the definition of the essence of the concept of risk management at an enterprise is valuable: it is the process of identifying the risks faced by a business entity, conducting their qualitative and quantitative analysis, assessing risk, as well as developing a behavior strategy of this entity in the event of the realization of specific types of risks.

According to our observations, in the above definition, its authors note actions that need to be implemented in the risk management process and especially highlight the latter one, namely, forming a risk management strategy.

On the other hand, there is a second group of research results ([Szklarz et al. 2021](#); [Wu et al. 2022](#)), which confirms the reverse effect of the risk management system on investment attractiveness. In fact, these studies confirm the fact that an increased level of risk leads to a decrease in investment attractiveness.

The main goal of risk management is to stabilize the receipt of the planned profit of the enterprise, which positively affects its investment attractiveness. Therefore, we propose the following definition of the investment attractiveness of an enterprise: it is the degree of willingness of a potential investor to invest in an enterprise with certain characteristics of its economic activity, which is expressed in a predetermined ratio of risk and return on investment.

Scientific works highlight factors that affect the investment attractiveness of an enterprise: the political and macroeconomic environment in which it operates; its financial condition; its production potential and the level of viability and efficiency of its management system ([Becheikh 2021](#); [Libman et al. 2021](#)).

In addition, it is possible to single out the requirements that the integral indicator of the investment attractiveness of an enterprise must meet. It is calculated based on a system of indicators reflecting the results of the enterprise. It should contain and summarize data from various sources. It is calculated on the basis of comparing the values of indicators with a certain equivalent. It synthesizes the results of quantitative and qualitative analysis of the enterprise.

Recently, political risk has begun to play an important role in investment attractiveness, especially for Russian enterprises. All of this forced the Central Bank of the Russian Federation to raise the key rate to an unplanned 20%. Among others, it is possible to allocate the enterprises of mechanical engineering. They received the most necessary benefits, even earlier than backbone enterprises. All of this is aimed at stabilizing prices; maintaining the possibility of making payments both with external entities and within the country; retention of foreign exchange earnings within the country; retention of foreign capital in the Russian Federation; maintaining the efficiency of companies under foreign control; ensuring the performance of companies dependent on external companies; and support for Russian businesses under severe sanctions.

At the same time, the opinion of some authors who conclude that economic sanctions are duplicitous deserves attention ([Vorotnikov et al. 2019](#); [Becheikh 2021](#)). In their opinion, a characteristic feature of the implementation of the sanctions policy is the presence of significant overall losses that countries incur from breaking integration and cooperation ties in the modern interconnected world.

Based on the aforementioned ideas, we formulated our research hypotheses as follows:

Hypothesis 1. *An increase in risks leads to an increase in the investment attractiveness of an enterprise.*

Hypothesis 2. *An increase in risks leads to a decrease in the investment attractiveness of an enterprise.*

3. Methods

Based on the proposed hypotheses, the theoretical and methodological basis of the study was the classical provisions of the management theory, as well as scientific and theoretical developments of scientists on the problems of risk management and enterprise economics.

When clarifying the essence of economic risk and the specifics of risk management, methods of logic and systematic and comparative analysis were used. When monitoring the results of assessing the investment attractiveness of enterprises and analyzing the impact of additional factors on the decision to invest, including the implementation of risk management by enterprises, statistical methods, expert assessment methods, and a systematic approach were employed. When developing recommendations from the risk management department and organizing its functioning, as well as recommendations on the application of the main risk management methods, the authors used economic and mathematical methods, as well as methods of system analysis, analogies, and logic.

Structurally, the study consisted of a comprehensive analysis of the dependence of production and economic efficiency on the level of capital equipment at the enterprises under study, assessment of the risk management system at an enterprise, as well as identification of the impact of the risk management system on the investment attractiveness of an enterprise.

The source documents for the study were selected subject to the availability of key features of the risk management system, a detailed analysis of investment attractiveness, which determine the dependence of the risk management system and the investment attractiveness of the enterprise (Figure 1).

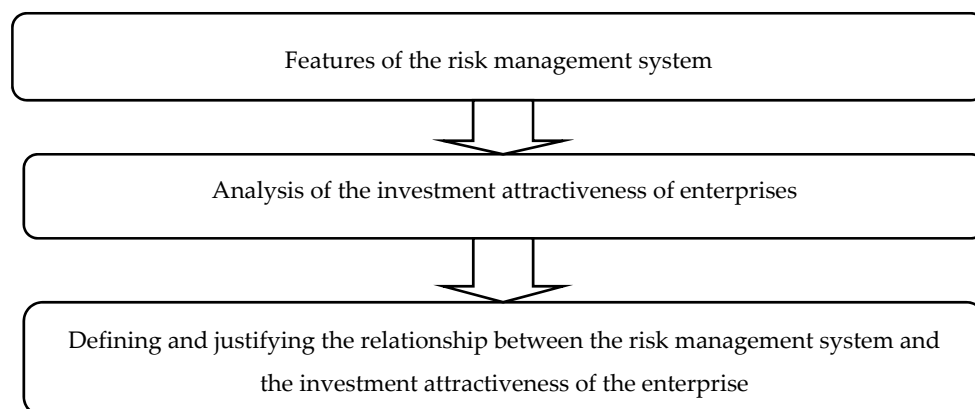


Figure 1. Stages of selecting information for the study.

Our sample consisted of data on 22 medium and large Russian enterprises that have been on the market for more than 5 years. They represented the field of mechanical engineering, which is very dependent on external factors. These enterprises were divided into groups according to the level of capital equipment. The choice of these enterprises was due to the possibility of obtaining analytical data from these enterprises, as well as the fact that their activities were carried out in the manufacturing sector.

At the first stage of the study, the selected information was grouped depending on the type of documents. The first group included statistical information indicating the source of the data obtained. The second group of documents included scientific research on the

characteristics of the risk management system at enterprises and investment attractiveness (Gafarov et al. 2009; Libman et al. 2021; Toleuuly et al. 2020).

At the second stage of the study, an analysis was conducted of enterprises that in the period of 2017–2020 applied to the Moscow branches of Tinkoff Bank, Alfa-Bank, VTB, Fora-Bank, and Raiffeisen Bank for a loan.

In addition, each business entity was assigned a correction factor, which can be calculated using the Formula (1) (Filyppova et al. 2019). The correction factor was used to adjust the number of points scored by the enterprise after the banks have analyzed the enterprise according to their methodology.

$$K_{corr} = \left(\frac{B^1}{B_{max}^1} \right) \times 0.7 + \left(\frac{B^2}{B_{max}^2} \right) \times 0.3 \quad (1)$$

where K_{corr} is the correction factor, B^1 , B^2 are the numbers of points for the first (enterprise settings) and second (project parameters) blocks; B_{max}^1 , B_{max}^2 are the maximum numbers of points for the first and second blocks; 0.7 and 0.3 are the weights of the ratios.

From the list of enterprises of each bank, based on the random sampling technique, enterprises that were analyzed. The correction factor was calculated for each enterprise. Employing the correction factor, the corrected number of points of each enterprise was calculated. Next, the correlation was calculated between the corrected number of points of the enterprise and the result of the assessment that is, obtaining a loan or refusing to lend.

At the third stage of the study, it was proposed to use the indicator of the comprehensive risk management effectiveness (2) (Filyppova et al. 2019):

$$E_{ml/ex}^{CRM} = \frac{FC - D_{ml/ex}}{FC} - \frac{C^{CRM} + D_{ml/ex}^{CRM} - D_{ml/ex}}{FC - 3^{KPM}} \quad (2)$$

where FC is the financial capabilities of the enterprise; $D_{ml/max/ex}$ is the most likely loss, the maximum possible loss, and the expected value of damage, respectively; K_{FC}^{Dml} , K_{FC}^{Dmax} , K_{FC}^{Dex} are the coefficients of the financial capabilities of the enterprise to cover the most likely damage, the maximum possible damage, and the expected value of the loss, respectively; C^{CRM} is the cost of comprehensive risk management; D_{ml}^{CRM} , D_{max}^{CRM} , D_{ex}^{CRM} are the values of the most likely damage, the maximum possible damage and the expected value of the loss, respectively, after the implementation of comprehensive risk management; k_{CRM}^{Dml} , k_{CRM}^{Dmax} , k_{CRM}^{Dex} are the coefficients of the financial capabilities of the enterprise to cover various types of damage after the implementation of comprehensive risk management; $E_{ml/ex}^{CRM}$ is the effectiveness of the comprehensive risk management; k_{ML}^D , k_{MAX}^D , k_{EX}^D are the coefficients of changes in the values of various types of damage after the implementation of comprehensive risk management.

Besides, to conduct a quantitative assessment of the degree of internal risks based on recommendations and standards, the authors have selected and calculated indicators that comprehensively characterize the activities of economic entities. Moreover, the authors have developed a scale of correspondence of the calculated indicators to various risk zones: the minimum risk zone corresponds to the value 1, the acceptable risk zone–2, the critical risk zone–3, and the catastrophic risk zone–4.

The level of net income from the sale of products per one ruble of costs is chosen as the effective indicator. During the step-by-step analysis, four mutually independent factors were considered that affect the effective indicator, namely, capital return (x_1); production costs per ruble of products sold (x_2), the coefficient of the suitability of fixed assets (x_3), and the working capital financed by equity to total assets ratio (x_4).

4. Results

The conducted research and the obtained quantitative characteristics convince us that one of the indisputable criteria that revitalizes economic processes is the activation of

investment operations. There is a clearly expressed cause-and-effect relationship between the growth of investments and positive production dynamics.

At the same time, an increase in production and economic efficiency is revealed depending on the availability, condition, fixed capital concentration volume, capital intensity, and capital equipment of production, as well as a capital–labor ratio. One of the ways to increase the investment activity of business entities is the intensification of production, which determines the priority of investment objects (Table 1).

Table 1. Dependence of production and economic efficiency on the level of capital equipment at the Russian enterprises under study.

| Indicators | Groups of Enterprises by the Level of Capital Equipment | | |
|-----------------------------------------|---------------------------------------------------------|--------|--------|
| | I | II | III |
| Number of enterprises in the group | 8 | 7 | 7 |
| Deterioration level of fixed capital, % | 62.9 | 12.5 | 28.2 |
| Fixed capital per thousand rubles: | | | |
| 100 rubles of gross output | 39.1 | 162.7 | 354.8 |
| 100 employees | 333.2 | 1516.9 | 2687.8 |
| 100 rubles of operating assets, rub. | 16.7 | 81.7 | 180.4 |
| Profitability level, % | 7.9 | 8.6 | 8.8 |

Source: Compiled by the authors based on the data of the studied enterprises.

Despite the acute shortage of investment funds, the concentration of fixed capital remains necessary, which beneficially affects the production and economic results of entrepreneurial activity (Budinis et al. 2020; Drobysheva et al. 2018; Nashkerska and Mykytyuk 2018). The data provided indicate that with an increase in the volume of fixed capital, the production of gross output, gross income and profit increases, as well as the level of profitability.

Thus, compared with group I, in group III of the enterprises, gross output was produced by 26.5% more, marketable products—by 35.7%, profits—by 33.3%, and the level of profitability prevailed by 0.9 percentage points. The same pattern is observed between groups I and II, as well as groups II and III. Consequently, the further development of production, first of all, will depend on the availability of fixed capital, which is derived from the provided investments.

In the course of the research, a model for optimizing the structure of production was developed and the need for investment resources was determined using economic and mathematical methods in three variants using a single matrix. For each option, new restrictions have been introduced to the problem under consideration. The solution obtained allowed for determination of the production volume of each type of product, the final technical and economic performance indicators, the need for investment resources and operating assets for 2022. Taking into account these indicators will contribute to forming the investment attractiveness of the enterprise (Table 2).

Table 2. Economic efficiency forecast of production and the need for financial resources of the Aeroelectromash JSC.

| Indicators | Variants | | |
|---------------------------------------|-------------|----------|------------|
| | Pessimistic | Expected | Optimistic |
| Production: | | | |
| Gross output, mln rubles. | 72.7 | 91.8 | 97.4 |
| Marketable products, mln rubles | 130.8 | 165.8 | 176.6 |
| Production costs, mln rubles | 104.5 | 127.6 | 143.9 |
| Labor costs, thousand man-hour | 10.5 | 9.7 | 8.8 |
| Need for investments, mln rubles | 318.5 | 485.7 | 652.6 |
| Gross profit, mln rubles | 26.4 | 38.4 | 50.6 |
| Profitability level, % | 25.3 | 30.2 | 35.0 |
| Payback period of investments, months | 17.3 | 14.8 | 12.7 |
| Return on investment, % | 5.7 | 6.8 | 7.6 |

Source: Compiled by the authors based on the data of the studied enterprises.

Besides, the need for investments of the model enterprise was extrapolated to other enterprises of the Moscow Region (Table 3).

Table 3. Prediction of the need and investment sources at the studied enterprises of the Moscow Region, mln rubles.

| No | Name of the Enterprise | Total | Including Sources | | | |
|----|------------------------------------------------------|-------|-------------------|--------|------|-------|
| | | | Depreciation | Profit | Loan | Other |
| 1 | Moscow Plant of High-Voltage Fittings JSC | 13.21 | 1.47 | 3.18 | 7.95 | 0.61 |
| 2 | Moscow Plant of High-Voltage Fittings JSC | 5.85 | 0.64 | 1.42 | 3.52 | 0.27 |
| 3 | Moscow Plant for Electric Measuring Instruments CJSC | 4.81 | 0.54 | 1.16 | 2.88 | 0.23 |
| 4 | Mayak Machine-Building Plant JSC | 14.90 | 1.68 | 3.58 | 8.96 | 0.68 |
| 5 | Elektrozavod JSC | 5.60 | 0.63 | 1.35 | 3.36 | 0.26 |

Source: Compiled by the authors based on the data of the studied enterprises.

Prediction calculations show that to significantly improve the material and technical recourses of the studied enterprises, it is necessary to disburse a significant part of the investments. On average, the enterprises will be able to cover the need for real investments by 35.4% from their in-house sources, by 60.2%—from borrowed funds (bank, commodity, and leasing loans) and by 4.4%—from other sources of funds.

A comparative analysis of the methods of assessing the investment attractiveness of an enterprise based on the financial condition used by Raiffeisen Bank, Tinkoff, Alfa-Bank, Fora-Bank, and VTB has shown that the main source of information for assessing the financial condition of an enterprise is the enterprise's balance sheet and cash flow statement.

In addition, the enterprise has a better chance of getting a loan from the bank where it is serviced, that is, has a main and additional account in national or foreign currency. Besides, formal and informal relations of the enterprise's management with the bank increase the chances of getting a loan. Unlike other analyzed banks, to get a loan from Fora-Bank, it is necessary to provide reports for previous periods, that is, an enterprise that has been operating for just a year or two has fewer chances of getting a loan.

The calculation results have shown that the correlation between the adjusted scores of the enterprise and the evaluation result of lending in the Alfa-Bank is 0.91, the Tinkoff—0.79 in Fora-Bank—0.69, Raiffeisen Bank—0.84, and VTB Bank—0.73 (Table 4).

Table 4. The difference in the values of correlation after adjusting using the correction factor.

| Indicators | Alfa-Bank | Tinkoff | Fora-Bank | Raiffeisen Bank | VTB Bank |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------|-----------|-----------------|----------|
| The correlation value between the number of points scored by enterprises according to the methods used by banks and obtaining a loan for the entire (general) sample of enterprises (before sampling) | 0.49 | 0.47 | 0.37 | 0.53 | 0.53 |
| The correlation value between the number of points scored by enterprises after adjustment using the correction factor, and obtaining a loan for a sample of enterprises (after adjustment) | 0.91 | 0.79 | 0.69 | 0.84 | 0.73 |
| The difference in the correlation value after adjustment and before sampling | 0.42 | 0.32 | 0.32 | 0.31 | 0.2 |

Source: Compiled by the authors based on data of the studied banks.

All these correlation indicators are significantly higher than those calculated before and after the sample. This allows for the conclusion that additional factors significantly influence the decisions of potential investors about lending.

The practice has shown that one of the main tasks of the risk management department is to develop comprehensive measures for risk management, which should be documented in the risk management program (Armenia et al. 2021; Dai et al. 2020; Nashkerska and Mykytyuk 2018). At the same time, the risk management program is an action guide of all structural divisions of the enterprise to prevent the occurrence of an undesirable event and to minimize damage after the occurrence of such an undesirable event.

Additionally, one can use a risk management complex, which provides for the procedure for actions in the following three situations: (1) The pre-risk situation is when an adverse event has not yet occurred. In this case, the enterprises' actions are aimed at reducing the probability of a risk situation and reducing the damage from the occurrence of a potential risk situation. (2) The occurred risk situation is when actions are aimed at reducing the damage from the occurrence of an adverse event. (3) The post-risk situation is when all the actions provided for by the risk management complex have been performed, i.e., actions aimed at optimizing the enterprise's activities to reduce the likelihood of such a risk in the future, or reducing the damage from its occurrence, and analyzing the effectiveness of managing this risk (Nemirova and Savelyeva 2020; Omri et al. 2019; Zavalko et al. 2018).

The approbation of recommendations on the implementation of the risk management complex in practice at the trade and production enterprises of Moscow Plant of High-Voltage Fittings JSC and Moscow Machine Tool Plant JSC led to a change in the management structure of enterprises, and the assessment of the implemented risk management has shown average efficiency (Table 5).

Table 5. Analysis of the risk management effectiveness of at the studied enterprises.

| Name, Measurement Unit of the Indicator | Moscow Plant of High-Voltage Fittings JSC | Moscow Machine Tool Plant JSC | Name, Measurement Unit of the Indicator | Moscow Plant of High-Voltage Fittings JSC | Moscow Machine Tool Plant JSC |
|--------------------------------------------------|-------------------------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------|----------------------------------|
| FC, ruble | 175,600,000 | 123,000,000 | D_{ex}^{CRM} , ruble | 7,100,000 | 2,100,000 |
| D_{ml} , ruble | 36,500,000 | 21,000,000 | k_{CRM}^{Dml} | 0.91 | 0.93 |
| D_{max} , ruble | 123,200,000 | 72,000,000 | k_{CRM}^{Dmax} | 0.69 | 0.56 |
| D_{ex} , ruble | 12,000,000 | 3,000,000 | k_{CRM}^{Dex} | 0.95 | 0.98 |
| K_{FC}^{Dml} | 0.79 | 0.83 | E_{CRM}^{Dml} | 0.12 | 0.1 |
| K_{FC}^{Dmax} | 0.3 | 0.42 | E_{CRM}^{Dmax} | 0.39 | 0.15 |
| K_{FC}^{Dex} | 0.93 | 0.98 | E_{ex}^{CRM} | 0.02 | 0.004 |
| C_{CRM}^{Dml} , ruble | 40,000,000 | 20,000,000 | k_{ML}^D | 0.66 | 0.67 |
| D_{ml}^{CRM} , ruble | 12,300,000 | 6,900,000 | k_{MAX}^D | 0.66 | 0.38 |
| D_{max}^{CRM} , ruble | 42,000,000 | 45,000,000 | k_{EX}^D | 0.41 | 0.3 |

Source: Compiled by the authors based on data of the studied enterprises.

The reason for the low value of risk management effectiveness is the fact that it was applied for the first time and the calculation was made after a short period after the changes.

After determining the comprehensive indicators of external and internal risks, the integrated indicator of the impact of risks on the activities of business entities was calculated as arithmetic weighted from the comprehensive indicators of the impact of internal and external risks (Table 6).

The obtained values of the integral risk indicator are confirmed by the data of the taxonomic analysis, which allowed for the ranking of enterprises by their level of risk protection, as well as identifying leading enterprises and outsiders. All of this confirms hypothesis 2, according to which an increase in risks leads to a decrease in the investment attractiveness of an enterprise, which rejects hypothesis 1.

Table 6. Integral assessment of the overall impact of risks on studied enterprises.

| Enterprise | Normalized Complex Assessment of External Risks | Normalized Comprehensive Assessment of Internal Risks | The Specific Weight of the Degree of Impact of External Risks | The Specific Weight of the Degree of Impact of Internal Risks | Integral Risk Indicator | Rank |
|------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|-------------------------|------|
| Moscow Plant of High-Voltage Fittings JSC | 3.0 | 1.9 | 0.4 | 0.6 | 2.3 | 2 |
| Moscow Plant of High-Voltage Fittings JSC | 3.0 | 1.8 | 0.5 | 0.5 | 2.4 | 3 |
| Moscow Plant for Electric Measuring Instruments PJSC | 3.0 | 2.5 | 0.4 | 0.6 | 2.7 | 4 |
| Mayak Machine-Building Plant JSC | 3.0 | 1.5 | 0.5 | 0.5 | 2.2 | 1 |
| Elektrozavod JSC | 4.0 | 2.4 | 0.5 | 0.5 | 3.2 | 5 |
| Aeroelectromash JSC | 4.0 | 2.9 | 0.6 | 0.4 | 3.6 | 6 |

Source: Compiled by the authors based on data of the studied enterprises.

5. Discussion

We can clearly see that the proposed methodology for assessing the risks of enterprises' activities allows for determination of the zone and degree of risk of an economic entity, as well as the probability and level of possible losses. This can be used as a basis for developing a risk management system.

Our findings are consistent with the results of [Armenia et al. \(2021\)](#); [Budinis et al. \(2020\)](#); [Dai et al. \(2020\)](#); [Huber and Scheytt \(2013\)](#); [Libman et al. \(2021\)](#); [Obicci \(2017\)](#); [Omri et al. \(2019\)](#), who also found that there is a dialectical relationship between the level of risk management and the investment attractiveness of an enterprise. These studies also support the idea that more than 50% of all resources spent on risk management are used on the implementation of risk management techniques, namely, obtaining more information about the upcoming choice and results; risk distribution among project participants; risk diversification; risk transfer; reserving funds; taking risks into account when financing the project; risk insurance; limiting; risk avoidance; risk-taking; risk pooling; and other methods.

At that, the success of risk management depends on rationality (timeliness, expediency, appropriateness of using certain techniques) ([Nemirova and Savelyeva 2020](#)). In this context, the main principle of reserving funds to cover unforeseen expenses is to prevent the use of a reserve to cover expenses incurred as a result of unsatisfactory work and losses. Therefore, the grouping of unforeseen expenses and the amount of the reserve for each group should be defined in advance.

[Omri et al. \(2019\)](#) believe that it is expedient for each enterprise to compile its in-house classification of risk management methods, which should include two groups of methods—methods related to the specifics of individual types of risk, most significant for the enterprise and methods related to the specifics of the industry branch to which the enterprise belongs.

Thus, our results support the idea that risk accounting for project financing includes an analysis of four types of risks: the risk of non-viability of the project; tax risk; the risk of non-payment of debts; and the risk of incomplete construction. When taking on risks, an enterprise should strictly comply with the rule—the occurrence of all adverse events at the same time should allow the enterprise to operate.

The developed methodological support for risk management is consistent with the results of [Armenia et al. \(2021\)](#), who note that for effective risk management, enterprises should apply all basic risk management methods according to the level of probability of risk occurrence, the amount of damage from its realization, and the purpose of risk management.

The results of our study are consistent with those of [Szklarz et al. \(2021\)](#) who also found that enterprise management should have risk management tools that will take into account the specifics of a particular enterprise.

This issue has also been raised by [Tóth et al. \(2019\)](#) who note that the choice of an adequate risk management method allows the enterprise to flexibly respond to environmental threats and to carry out effective performance.

However, [Gnych et al. \(2020\)](#) note that by rejecting the risk, the enterprise also refuses the activities for which this risk is provided. This means that there should be an alternative development plan involving activities that use other risk management techniques.

6. Conclusions

Well-established risk management can be considered a factor that increases the investment attractiveness of enterprises. The purpose of our article was to develop recommendations for the formation of an integrated risk management system and its application to increase the investment attractiveness of an enterprise. Structurally, the study consisted in a consistent analysis of the dependence of production and economic efficiency on the level of capital equipment at the enterprises under study, an assessment of the risk management system at the enterprise, and also in identifying the impact of the risk management system on investment attractiveness.

In the course of the study, it was found that hypothesis 2 is confirmed, according to which an increase in risks leads to a decrease in the investment attractiveness of an enterprise. All of this characterizes the willingness of a potential investor to invest in an enterprise with certain characteristics of its economic performance. All of this is expressed in a predetermined ratio of risk and return on investment. At that, enterprises, all other things being equal, have different chances to attract borrowed funds when applying to different organizations. This is explained by differences in methodological approaches to the assessment of the enterprise.

Besides, two classes of factors influencing the decision to issue borrowed funds were revealed: the parameters of the enterprise itself, and the parameters of the financed project. Each of the presented classes can be divided into three groups: general reports; consolidated data on the personnel, management, and owners of the enterprise; and reports directly related to risk management.

Expert analysis of the identified additional factors influencing the decision to issue borrowed funds allowed us to conclude that the group of factors that directly relate to the risk management system has the greatest impact. The analysis of the correspondence of the number of points scored by enterprises according to existing methods and adjusted considering the effects of the identified additional factors gave reason to state that the presence of well-established risk management increases the investment attractiveness of the enterprise.

Using the methodology for assessing the effectiveness of risk management based on the ratio of the difference in the financial capabilities of the enterprise and the costs of risk management, reduced by the amount of expected damage after the implementation of risk management, to the difference in the financial capabilities of the enterprise and the risk management costs, allows for an increase in the investment attractiveness of the enterprise.

Our article has several limitations related to the use of macroeconomic data and the sample size. Since the small sample size is a limitation of this research, future analysis would benefit from more data. Of course, if the data is collected at the individual level, the results may vary. In addition, our results are limited to using only data available to Russian enterprises. This data limitation can be reduced by conducting estimates on separate sub-samples of enterprises from other countries. We also consider the possibility of the impact of sanctions on the investment attractiveness of Russian enterprises. All of this forced the Central Bank of the Russian Federation to raise the key rate. In general, that is a good measure to contain the inflationary explosion. Of course, this will prevent businesses from accessing cheap loans. However, judging by the measures taken by the

Government of the Russian Federation, a decision was made to manually direct financial flows through concessional lending.

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References

- Armenia, Stefano, Marco Angelini, Fabio Nonino, Giulia Palombi, and Mario Francesco Schlitzer. 2021. A dynamic simulation approach to support the evaluation of cyber risks and security investments in SMEs. *Decision Support Systems* 147: 113580. [\[CrossRef\]](#)
- Becheikh, Nizar. 2021. Political stability and economic growth in developing economies: Lessons from Morocco, Tunisia and Egypt ten years after the Arab Spring. *Insights into Regional Development* 3: 229–51. [\[CrossRef\]](#)
- Budinis, Sara, Julia Sachs, Sara Giarola, and Adam Hawkes. 2020. An agent-based modelling approach to simulate the investment decision of industrial enterprises. *Journal of Cleaner Production* 267: 121835. [\[CrossRef\]](#)
- Dai, Yixin, Jiani Hou, and Xing Li. 2020. Industry policy, cross-region investment, and enterprise investment efficiency. *Research in International Business and Finance* 56: 101372. [\[CrossRef\]](#)
- Drobysheva, Nataliya Nikolaevna, Elena Petrovna Zvyagintseva, Elena Alekseevna Fedorova, Nataliya Aleksandrovna Kindrya, and Olga Evgenievna Lebedeva. 2018. Development of Crisis Phenomena in Social and Economic Systems in Conditions of Globalization. *International Journal of Engineering and Technology (UAE)* 7: 131–34. [\[CrossRef\]](#)
- Filyppova, Svitlana, Iryna Bashynska, Borys Kholod, Larysa Prodanova, Larysa Ivanchenkova, and Viacheslav Ivanchenkov. 2019. Risk Management through Systematization: Risk Management Culture. *International Journal of Recent Technology and Engineering* 8: 6047–52. [\[CrossRef\]](#)
- Gafarov, Nail, Roman Samsonov, Dmitry Lyugay, and Sergey Valkovsky. 2009. Company Activity and Risk Management Improvements: Focuses on Gazprom's Reserves Replacement. *GAS Industry of Russia* 3: 2–5.
- Gnych, Sophia, Steven Lawry, Rebecca McLain, Iliana Monterroso, and Anukram Adhikary. 2020. Is community tenure facilitating investment in the commons for inclusive and sustainable development? *Forest Policy and Economics* 111: 102088. [\[CrossRef\]](#)
- Huber, Christian, and Tobias Scheytt. 2013. The Dispositive of Risk Management: Reconstructing Risk Management after the Financial Crisis. *Management Accounting Research* 24: 88–99. [\[CrossRef\]](#)
- Libman, Alexander, Randall W. Stone, and Evgeny Vinokurov. 2021. Russian power and the state-owned enterprise. *European Journal of Political Economy* 73: 102122. [\[CrossRef\]](#)
- Nashkarska, Mariya, and Nataliya Mykytyuk. 2018. Remarks Concerning Methodology Improvement for Integrated Assessment of a Company's Investment Attractiveness. *Economics, Entrepreneurship, Management* 5: 47–54. [\[CrossRef\]](#)
- Nemirova, Gulzida I., and Tatiana I. Savelyeva. 2020. Significance Assessment of the Risk Management System to Improve the Quality of Customs Service Provision. *Economic Consultant* 3: 42–52. [\[CrossRef\]](#)
- Obicci, Peter Adoko. 2017. *Risk Management Strategies in Public-Private Partnerships*. Hershey: IGI Global. [\[CrossRef\]](#)
- Omri, Emna, Nouri Chtourou, and Damien Bazin. 2019. Risk management and policy implications for concentrating solar power technology investments in Tunisia. *Journal of Environmental Management* 237: 504–18. [\[CrossRef\]](#) [\[PubMed\]](#)
- Shokhnekh, Anna V., Olga A. Mironova, Farid F. Hanafeev, Olga A. Kuzmenko, and Lyubov F. Shilova. 2019. Indicators of Artificial Intelligence of Financial Evaluation of Small Business Investment Attractiveness. *Studies in Computational Intelligence* 826: 1031–41.
- Szklarz, Piotr, Rafał Klóska, Rafał Czyżycki, and Elżbieta Ociepa-Kicińska. 2021. Do the innovative MNEs generate an added value in emerging economy?: Evidence from Scandinavian enterprises in Poland. *Procedia Computer Science* 192: 2180–89. [\[CrossRef\]](#)
- Toleuuly, Almas, Bauyrzhan Yessengeldin, Zhibek Khussainova, Anar Yessengeldina, Azamat Zhanseitov, and Sholpan Jumabaeva. 2020. Features of E-Commerce Risk Management in Modern Conditions. *Academy of Strategic Management Journal* 19: 515.
- Tóth, Zsófia, Marzena E. Nieroda, and Bernadett Koles. 2019. Becoming a more attractive supplier by managing references—The case of small and medium-sized enterprises in a digitally enhanced business environment. *Industrial Marketing Management* 84: 312–27. [\[CrossRef\]](#)
- Vorotnikov, Igor Leonidovich, Irina Fedorovna Sukhanova, Mariya Yuryevna Lyavina, Marina Ivanovna Glukhova, and Konstantin Aleksandrovich Petrov. 2019. Economic sanctions and import substitution. *Entrepreneurship and Sustainability Issues* 6: 1872–83. [\[CrossRef\]](#)

- Wu, Jiansong, Linlin Zhang, Yiping Bai, and Genserik Reniers. 2022. A safety investment optimization model for power grid enterprises based on System Dynamics and Bayesian network theory. *Reliability Engineering & System Safety* 221: 108331.
- Zavalko, Natalia Aleksandrovna, Veronika Olegovna Kozhina, Oksana Petrovna Kovaleva, Roman Vladimirovich Kolupaev, and Olga Yevgenievna Lebedeva. 2018. System Approach to Diagnostics and Early Prevention of a Financial Crisis at an Enterprise. *Journal of Applied Economic Sciences* 13: 84–88.