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RISK FACTORS' PREDICTION MODEL FOR THE INVESTMENT EVALUATION*

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Abstract. The article deals with the issue of increasing the competitiveness of enterprises and their long-term sustainability based on the efficiency of investment processes. Implementing new approaches to the company's decision-making processes will allow companies to overcome the pitfalls of the market environment created by the post-COVID period and the current energy crisis that has affected the world markets after the conflict between Ukraine and Russia. The article aims to verify the application of the methodology for increasing the competitiveness of enterprises based on the use of a model creating a fusion of traditional and sophisticated tools. The analyses carried out are based on the investment decisions of a real company operating in the Slovak Republic's territory in the production and supply of security products. Mathematical modelling and Monte Carlo simulation are based on the company's accounting and operational financial outputs (profit and loss statement, balance sheet). The methodology is based on mathematical modelling through static traditional financial approaches and their verification through sensitivity analysis, regression analysis and Monte Carlo simulation based on distributional distributions of risk factors. The output is the assessment of risk factors and their significance for the criterion value Net Present Value (NPV).

Keywords: Competitiveness; Sustainability; Monte Carlo Simulation; Sensitivity Analysis; Regression Analysis

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JEL Classifications: C15, G32, L26

1. Introduction

The current situation in the market environment is influenced by the post-COVID impacts and the energy crisis, which is caused by the war conflict. The global energy crisis affected mainly small and medium-sized businesses. Most of these enterprises are solving financial problems that significantly affect the competitiveness and subsequent sustainability of enterprises in the future. The current constructivist approach, which is applied in the management of enterprises in Slovakia, is based on rational approaches, which employ analytical thinking and maximize the benefits of the enterprise. The current enterprises must respond to the solution of the created

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imbalance in the market by changing the approach to a systemic-evolutionary one, the aim of which is to ensure the viability and competitiveness of the enterprise. This approach should become a pillar of the company's decision-making process.

Achieving business viability is aimed at identifying business risk factors early and applying new approaches (Fabianova, 2019; Gavurova, 2022). The authors' definitions of companies' viability and competitiveness differ. In some studies, competitiveness is defined as the ability to protect and improve the company's market position and adapt its market strategy to changes in the market environment (Rodrigues-Diaz, 2018). Some studies describe competitiveness as the continuous competition of companies in domestic and foreign markets (Pike, 2014; Istudor et al., 2022). The business environment is determined by turbulence, which is a consequence of the increased uncertainty of the market environment and the transformation of current business models based on traditional approaches to management (Day and Schoemaker, 2019; Schoemaker and Day, 2021). The current crisis in the market environment has forced businesses to operate more agilely to develop the necessary knowledge and skills and acquire the skills required in financial and investment decision-making. Day and Schoemaker (2019) and other authors (Fabianova, 2019; Ključnikov, 2022; Oulehlova, 2021; Derradji, 2020) emphasize three dynamic capabilities for managing uncertainty and risk: perceiving change earlier than competitors, taking advantage of opportunities more effectively and transforming the business as needed.

2. Review of literature

The investment activity of a company, especially investments in production, is a necessary condition for the competitiveness of every manufacturing company. Organizational structure, resource availability, and risk management attitudes vary depending on the size of firms (Marom et al., 2019). Many studies examine the relationship between competitiveness, innovativeness, and financial risk management (Jin & Lee, 2020; Zhang, 2021; Wille, 2017). For example, Nohong et al. (2019) also analyze some SMEs in Indonesia and show that financial risk management is also affected by the competitiveness of these enterprises. The positive relationship between financial risk management and company competitiveness was also verified by the studies of Karadağ (2018), Yang et al. (2018), Gates et al. (2012) and others. Decision-making on investments is a strategic decision and, therefore, should be supported by a thorough analysis of production possibilities and an analysis of the economic efficiency of the investment, including risk situations. Several research works are devoted to the issue of investment decision-making from different perspectives (Nguyen, 2021). A research paper by Freiberg & Scholz (2015) approaches a comprehensive analysis of the benefits resulting from investment in manufacturing and examines all relevant impacts related to the investment. Within the investment decision-making framework in production enterprises, mentioning the financial point of view is essential, which is usually considered first in practice. Business financing leads to the creation of new tools for financing and securing the needs of the business (Tobisova, 2022; Ključnikov, 2022; Li, 2017). Correct investment decision-making, which is supposed to ensure the viability of the enterprise for many years, must be based on an effective decision and after consideration of all related economic aspects and with the acceptance and determination of an acceptable level of risk (Hwee, 2001; Ristanovic, 2021). In practice, the efficiency and riskiness of investments are often analyzed and evaluated by mathematical and economic methods, e.g. methods based on neural networks (Zhao, 2022; Herianingrum, at al., 2019), methods based on failure mode and effect analysis (FMEA), or based on interval-valued intuitionistic fuzzy analytical hierarchical process (AHP) (Ristanovic, 2022; Ilbahar, 2022). For effective economic and financial risk assessments, applying programs based on Monte Carlo simulations seems appropriate (Huo, 2021). Khalfi & Ourbih-Tari (2019), He (2020) and Zheng (2019) are among the authors who use investment risk analysis using Monte Carlo simulations. They proposed a decision model for evaluating investment risk using the @RISK software. Abba et al. (2022) investigated the investment risks of renewable energy using dynamic risk assessment methods and quantitative methods such as Monte Carlo simulation. The investment model of nuclear power used the theory of real options combined with the Monte Carlo method (Zhu, 2012). As this research above analyzes the effects of competitiveness on financial risk management and efficient investment decisions of

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enterprises, it differs from other studies. It becomes a valuable contribution to the academic literature. Anyway, investment decisions processes and used tools still require further investigation.

An examination of the financial problems of companies from different approaches and a broad perspective of the application of new sophisticated methods in financial and investment decision-making fill this gap in research.

The research topic of the article is related to the objective and transparent assessment of the company's investment decisions based on criterion parameters relating to practical experience or expert estimates of practitioners. The research problem is the quantitative and qualitative evaluation of the methodology that solves the issue of competitiveness and sustainability of small and medium-sized enterprises in Slovakia (Wille, 2017). The research question is focused on the assessment and verifiability of the methodology for the introduction of new approaches to the evaluation of investment activities of companies based on sophisticated and modern software tools based on the support of decision-making processes through the fusion of traditional and new methods in the field of financial and investment planning. On this basis, the article works with two hypotheses:

Hypothesis 1 (H1). Companies that use a methodology that introduces new software solutions in financial and investment decision-making within the framework of increasing competitiveness and sustainability in the market will obtain a better result based on the competitiveness assessment methodology than companies that only rely on traditional deterministic approaches for financial and investment decision-making.

Hypothesis 2 (H2). Suppose the developed procedure of the complex methodical model of increasing enterprises' competitiveness and sustainability is applicable to assessing the competitiveness and sustainability of enterprises within Slovakia. This sequence of steps is also appropriate within the European integration processes for assessing enterprises in countries with a similar market system.

In the following sections of the article, a comprehensive overview of the relevant literature focused on competitiveness and its increase through mathematical modeling of financial indicators, sensitivity analysis, regression analysis and Monte Carlo simulation with a focus on assessing the company's investment activities. The following section discusses the methodological procedure and methods of analyzing the company's financial data. In the next sections, the research results and discussion are interpreted. At the end of the article, the results of the analyses are evaluated, and future research development trends are presented. The article presents a tool for expanding traditional approaches to measuring competitiveness based on multivariate and stochastic aspects of competitiveness in financial decision-making.

2. Materials and Methods

The issue of the competitiveness of businesses is currently very topical. Many companies in the territory of the Slovak Republic are presently looking for ways to increase their competitiveness. The basis of the article is to present a methodology that can increase the competitiveness of companies in the territory of the Slovak Republic. The article represents a partial output research project, which aims to create and verify a methodology for ensuring the competitiveness and sustainability of companies. The basic approach of the methodology was presented in previous research (Tobisova et al., 2022), which was aimed at solving the issue of investment decisions to implement new software tools into decision-making processes. The essence of the methodology is using the Monte Carlo method implemented in the MS Excel environment and the additional Crystal Ball software tool.

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For the practical application of the methodology, a company that operates in the territory of the Slovak Republic as a manufacturer and supplier of security products was chosen. The company plans to modernize its technological equipment for the production process by purchasing a new line for sheet metal ringing. The purchase price of the line is estimated at €47,422.08. The line will be used for the production of five products.
The methodology consists of three basic steps, which can be described as follows:
1) Development of a mathematical apparatus that uses the calculation of static economic variables based on classic methods in the MS Excel environment.
2) Identification of risk factors that appear as assumptions with defined distributions in the Monte Carlo simulation process.
3) Sensitivity analysis aimed to get a basic idea of the impact of individual risk factors on the criterion value - Net Present Value, and thus also a kind of control, whether the impact makes sense and whether there is an error in the model.
4) The task of Correlation and regression analysis is to analyze mutual relations between variables. Using correlation analysis, we assess the quality (strength, tightness) of the selected regression function between variables. Its task is, therefore, to evaluate the tightness of the statistical dependence between the investigated variables.
5) Monte Carlo simulation, which enables assessment of the criterion quantity also on the basis of stochastic quantities and on the basis of taking time into account. The software tool Crystal Ball, an add-on in the MS Excel environment, was used to implement the simulation.

The first step of the methodology is the development of a mathematical apparatus aimed at calculating the Net Present Value (NPV). The relationships shown in Table 1 were used to prepare the mathematical apparatus.

Table 1. Basic relations of the mathematical apparatus.

Parameter	Formula	Explanatory notes
Operating cost	$\text{Operating cost} = \sum (\text{DC} + \text{IC} + \text{D} + \text{OC})$	DC—Direct cost IC—Indirect cost D—Depreciations OC—Other costs
Revenues	$\text{R} = \sum_{i=0}^{n} (\text{P} + \text{S})$	R—Revenue P—Price S—Sale (quantity of sales)
Operating Cash-flow	$Operating\ CF = Net\ Income \pm Changes\ in\ Assets\ \&\ Liabilities + Non\ Cash\ Expenses$	
Discount rate	$I_{fn} = I_p \times (1 + i)^n$	I_p—current value of investment required for future value to be reached I_f—future value reached at certain value of update i—interest rate (update) n—number of periods
Net Present Value	$NPV = \sum_{i=1}^{n} \frac{CF_i}{(1 + r)^i}$	CF_i - net cash flow in i-year of project existence i - selected year of project operation n - last year of assumed project lifetime r - selected discount rate in %/100

The mathematical model is primarily based on traditional approaches without considering the influence of time. Individual economic quantities are static and do not consider the time factor of inflation and expected economic

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increases in particular sectors. The result of the mathematical model is the calculation of the value of the NPV indicator, which also becomes a simulated quantity in the next steps of the methodology.

The method of calculating the Net Present Value parameter is one of the most appropriate and widely used financial criteria. It includes the entire lifetime of the project, as well as the possibility of investing in another equally risky project. The calculation considers the time value of money and depends only on anticipated cash flows and the opportunity cost of capital. The advantage of this method is that it can describe arbitrary cash flows and also the fact that the result is the absolute value of the benefit of the investment in today's prices. The resulting value indicates how much money the realization of the investment will bring to the company. If the NPV value is positive, the project is feasible. Conversely, if the NPV value is negative, the project is unacceptable. When comparing several investment alternatives, the higher NPV is preferred.

After developing the mathematical model, it is necessary to identify the risk variables in the model, which in the next step represent the basic assumptions of the Monte Carlo simulation. To identify risk variables, it is possible to use the risk mapping method, or it is possible to base it on expert estimates. For the purposes of the article, risk assumptions were established, which are listed in Table 2.

Table 2. Basic relations of the mathematical apparatus.

Assumption	**Distribution function**
VAT	 Uniform
Expected increase in production	 BetaPERT
Expected price growth	 BetaPERT
Expected increase in wages	 BetaPERT
Expected increase in materials	 BetaPERT

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Expected increase in energies	 BetaPERT
Production of product 1 – 5	 BetaPERT
Selling price of product 1 – 5	 BetaPERT
Tax base	 Uniform

As shown in Table 2, individual risk assumptions were assigned distribution functions, within which the simulation ranges were defined as minimum and maximum values.

3. Results

Sensitivity Analysis

The principle of this analysis is that the resulting values of the criterion value are calculated based on the selection of values from predefined intervals of possible values of risk factors. The Crystal Ball software tool was used to perform this analysis. The output is a tornado graph, which displays individual risk factors in descending order according to the degree of their influence on the criterion value. The quantiles of 10% and 90% were chosen for the sensitivity analysis in the simulation environment. Even in this case, the influence of only one risk factor is always considered without considering the simultaneous effect of other risk factors. The result of the sensitivity analysis in the form of a Tornado graph is shown in Fig. 1.

Fig. 1 shows that the main risk factors are the selling prices of products 3 and 4. Subsequently, the selling price of product 2 and the expected increase in prices. The figures show that the 10% quantile of the risk factor in the form of the selling price of product 3 has a value of €17.77, and the selling price of product 4 has a value of €42.78. The 90% quantile reaches the value of 15.23 for the selling price of product 3 and 38.22 for the selling price of 4. In these two factors, the range of values of the criterion value, that is, of the NPV values, is between 10% and 90% of the quantile of the considered sales price of product 3. The stated values can be interpreted so that if the selling price of product 3 is only 10%, the NPV value will be €491,198. It can also interpret the other values from the mentioned Tornado graph similarly.

As part of the sensitivity analysis, the Crystal Ball software tool also offers a Spider Chart based on the same principle as the Tornado graph. The only difference is that the resulting values of the criterion value are monitored

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not only in the interval values of the risk factors but also between them. Spider Chart of the analyzed company is presented in Fig. 2.

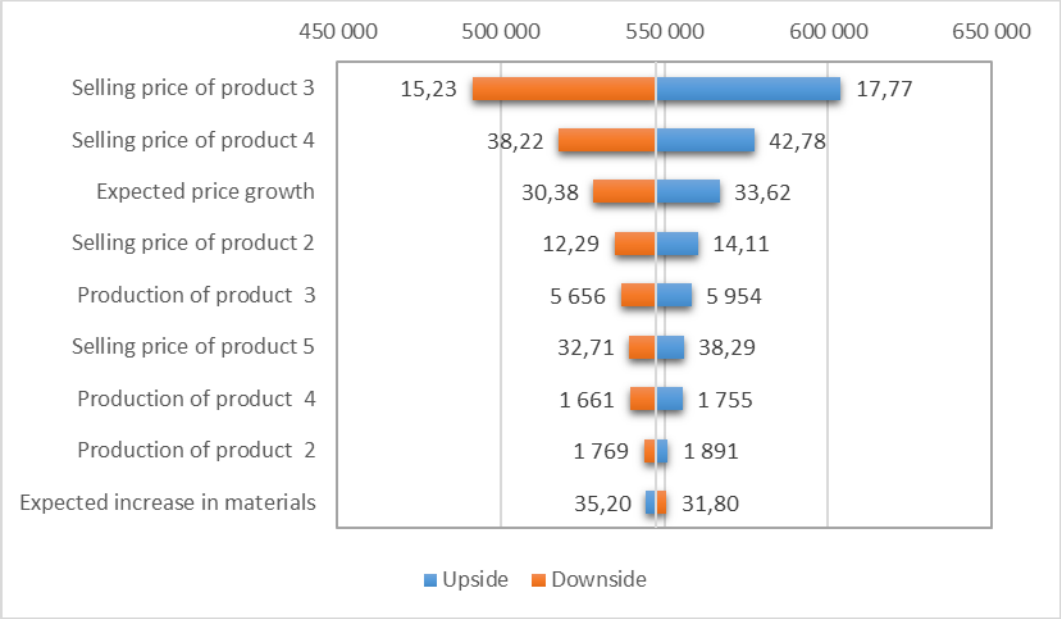

Fig. 1. Result of the sensitivity analysis in the form of a tornado graph. Source: own research.

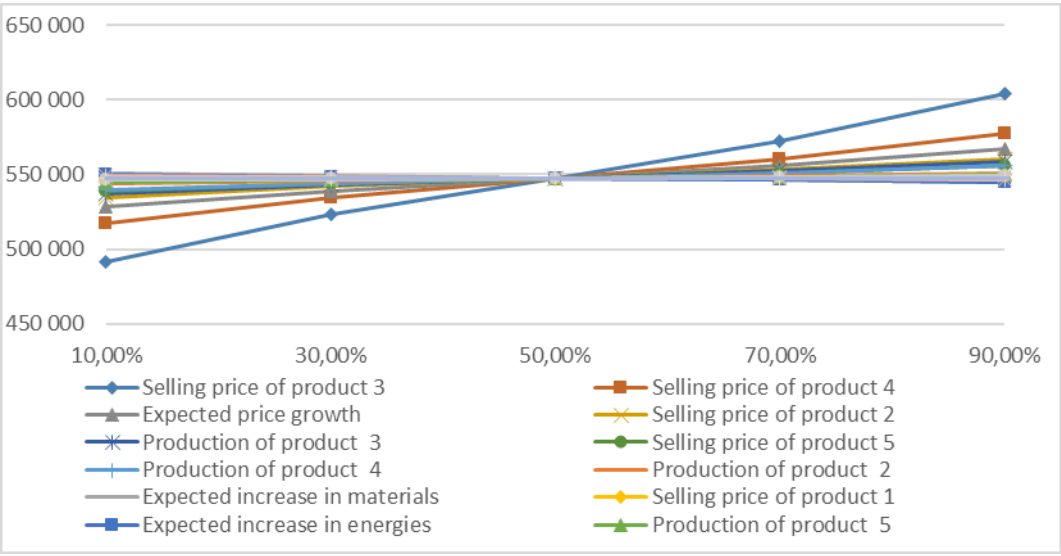

Fig .2 Spider Chart of the analyzed company. Source: own research.

Spider Charts are used to show the degree of influence of risk factors, while the height of the degree of influence is directly proportional to the slope of the lines. The advantage of Spider Charts compared to Tornado graph is the possibility of capturing possible non-linear effects of the risk factor in the observed quantile interface. The Spider Chart also showed the same results demonstrated by the Tornado graph. In this case, the selling price of product 3 and product 4 is considered to be the main risk factors that influence the criterion value.

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Correlation and Regression Analysis

Correlation dependence involves finding relationships between quantities. Causation remains behind in this case. Correlation and regression analysis tasks coincide only in connection with confirming a relationship between the values of two quantities. Regression analysis always has two variables, one of which is dependent.

For the needs of the article, a correlation and regression analysis were performed based on testing occasional relationships between quantities. In this case, the values of the variable were determined, and it was determined whether these variables affect the change of the dependent variable. Crystal Ball software was used to process the analysis, the output of which is Scatter graphs shown in Fig. 3. The factors entering the correlation and regression analysis were risk factors.

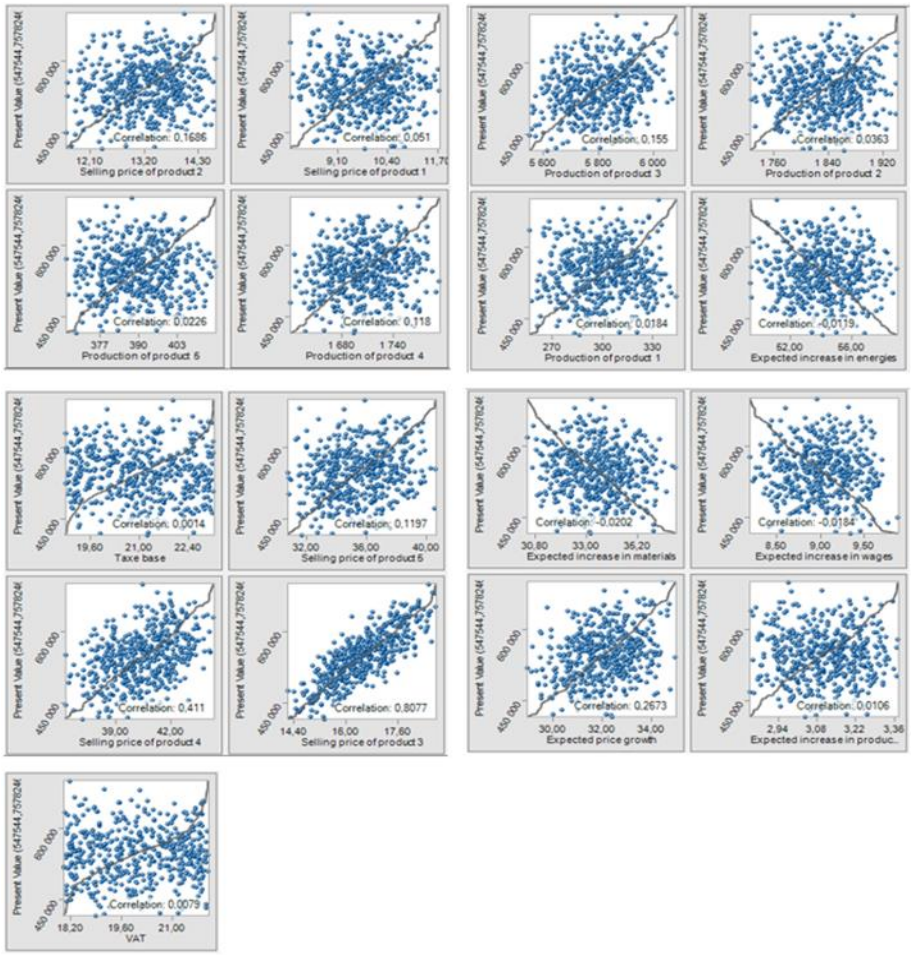

Fig. 3. Scatter graphs of correlation and regression analysis. Source: own research.

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Monte Carlo simulation

If the behavioral results of the model show positive values and appear "acceptable", a Monte Carlo simulation can be performed. The Crystal Ball software tool is used for the simulation. As part of the simulation setup, defining the number of simulation steps is necessary. The number of simulation steps within the company we analyzed was 10,000. The given number indicates how many values were generated for each risk factor and the same number of values obtained for each criterion value. The Monte Carlo simulation outputs a series of frequency histograms of the criterion quantity and its automatic recalculation. Histograms enable a graphical representation of the value of the criterion value and its frequency within the framework of the numerical/probability distribution from the point of view of risk analysis. The graphic representation of the histogram of the quantity of NPV is in Fig. 4.

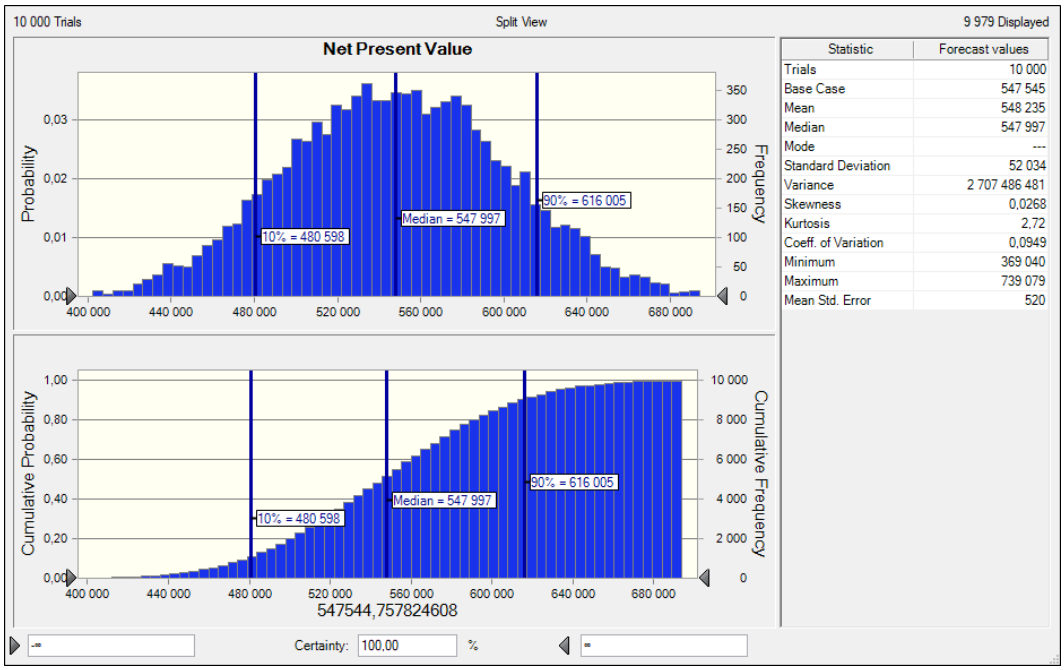

Fig. 4. Scatter graphs of correlation and regression analysis. Source: own research.

The probability histogram shows a symmetric distribution according to the mean and probability. At the same time, it is possible to identify that the company, when buying a new production line, with 100% probability, will achieve positive values of the monitored variable, i.e. Net Present Value. The mean value in the form of the median in the Monte Carlo simulation is €547,997.

The Crystal Ball software environment also enables sensitivity analysis through Monte Carlo simulation. This sensitivity analysis is comparable to the outputs obtained through classical sensitivity analyses (such as the sensitivity analysis above), but it is built on entirely different approaches. The basic approach is the distribution of individual risk factors from the point of view of their contribution to the aggregate variance of the distribution of the criterion quantity. For the analyzed company, the sensitivity analysis is calculated using the Monte Carlo simulation tool shown in Fig. 5.

This presentation of risk factors and their impact on the criterion value is clear and easy to read. When taking a closer look at the processing of this analysis, however, it is evident that this is only a derived calculation, the accuracy of which could be better. Sensitivity analysis through Monte Carlo simulation is based on rank

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correlation. This correlation is based on the generation of individual risk factor values. The result is subsequently summarized criterion values. This contributes to the dispersion, which is based on the square of the rank correlation values and their subsequent normalization to 100%. The resulting values are sorted in the next step, while the degree of rank correlation between the risk factors and the criterion value is calculated. This method makes it possible to identify the influence of individual risk factors on the criterion value based on correlation. In contrast, the effect of all other variables is taken into account.

Implementing simulations and new approaches to increasing enterprises' competitiveness and subsequent sustainability is a challenging process primarily due to the fundamental differences between the deterministic and stochastic methods. The success of new modern approaches to companies' decision-making processes results mainly from a change in thinking and the ability to overcome negative attitudes towards change. In current enterprises in the territory of the Slovak Republic, the use of approaches used for a long time in all areas of the company, whether decision-making, economic or operational, still prevails. However, the development of the current market environment forces companies to reach for new approaches that would allow them to gain an advantage in tough competitive battles in individual markets. Using modern software tools can save companies time and facilitate decision-making when making investment decisions, which is a prerequisite for the sustainability of companies in the future.

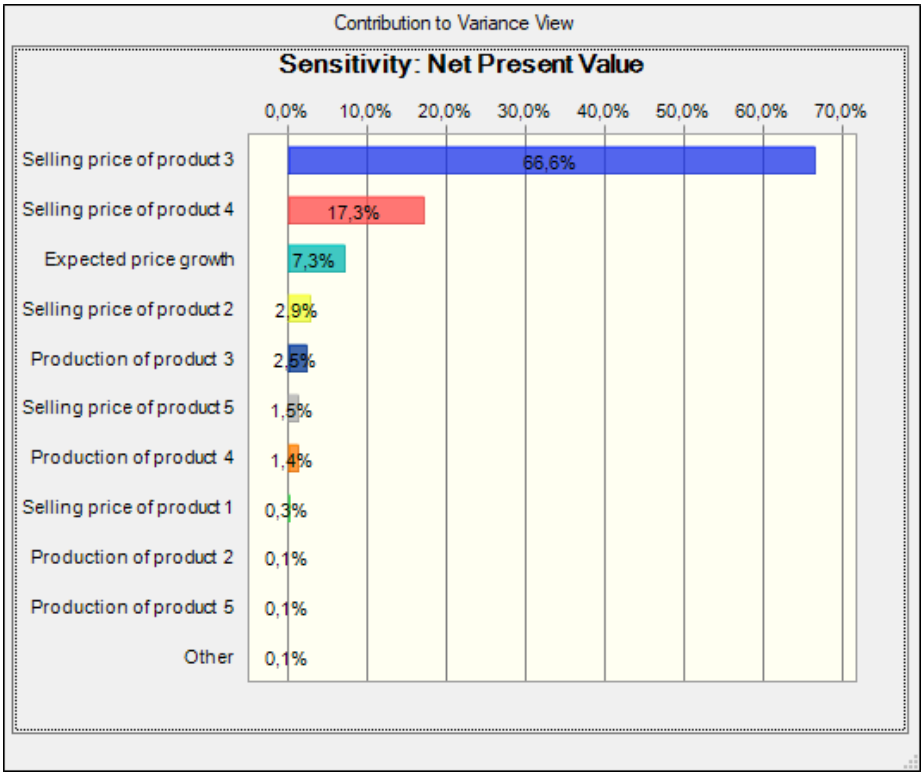

Fig. 5. Sensitivity Analysis of NPV – Monte Carlo Simulation. Source: own research.

Sensitivity analysis in the Monte Carlo simulation environment has its limits. The limiting factor is primarily the impact of risk factors, which are analyzed separately in the calculations without implementing dependencies between individual risk factors. This approach can lead to the exclusion of one of the factors based on the assessment of its insignificant influence on the criterion value, taking into account the influence of other risk

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factors. Despite this fact, sensitivity analysis in the software environment of the Monte Carlo method has several advantages. The first advantage is the possibility of the first graphic control between individual factors and the criterion value. The second advantage is evaluating the significance of the analyzed risk factors from the point of view of their relationship to the criterion value. As part of the relevance evaluation, a list of those risk factors that are no longer significant for further analysis is created. The third advantage of sensitivity analysis is the possibility of identifying non-linear relationships between risk factors and the criterion variable. The considerable sensitivity of the model causes significant changes in the resulting values of the criterion quantity, even with minor changes in the importance of the risk factors. Low sensitivity, on the other hand, means that even the most extensive changes in the values of the risk factors may not cause significant changes in the criterion value.

From the sensitivity analysis for the analyzed company, it follows that the most risky factors that significantly impact the change of the criterion value are the selling prices of products 3 and 4. The above-processed sensitivity analyses, i.e. classical sensitivity analysis and sensitivity analysis in Monte Carlo simulation, showed a significant influence of the same factors on the criterion value, confirming the methodology's correctness aimed at increasing enterprises' competitiveness. The fundamental pillar of the methodology is the Monte Carlo method, which requires a complex analysis based on a stochastic approach and consideration of the time factor when assessing investments.

From the simulation results, the most exciting value is the difference between the mean value and the median based on the skewness of the distribution. The distribution is skewed in favor of the company to the right because the skewness shows a positive value. From the 10,000 generated values, it can be found that the median value for NPV is €548,235, which is €690 higher than the starting value for the most likely scenario (Base Case). The realization of the investment will reach the lowest value of €369,040 and the highest value of €739,079. The probability distribution of NPV is relatively symmetrical; a slight positive skewness (Skewness) of 0.0268 informs about the deviation of the probability distribution to the right, i.e. towards higher profit values. The skewness of the distribution (Kurtosis) of size 2.72 means that the resulting probability distribution shows the so-called fat tails versus a normal distribution (with a kurtosis of 0), i.e. the probabilities of extreme events are higher than the normal distribution predicts. From the abovementioned characteristics, we can conclude that the research confirmed a significant dependence between competitiveness and financial risk management.

4. Discussion, limitations and implications

As mentioned in the literature review, many authors are devoted to the issue of simulations in financial management. The broad applicability of simulations creates space for individual researchers to devote themselves to various specific areas of the researched topic in their studies. As it has been proven, many authors focus their research on monitoring the interrelationships between competitiveness, innovativeness and financial risk management in companies in different parts of the world (Jin & Lee, 2020; Zhang, 2021; Nohong, 2019; Karadağ, 2018; Yang, 2018; Gates, 2012) and various sectors of the economy (Kucera, 2021; Mazanec, 2021). However, these authors do not use modern software tools and apply selected economic methods to solve the problem. Opposite the application of modern tools and techniques in financial planning is dealt with by other authors (Ristanovic, 2022; Ilbahar, 2022; Zhu, 2012; Zhao, 2022; Hussain, 2019), who focus their research on the Monte Carlo method and its applicability in various sectors of the economy. However, they apply the Monte Carlo method to production processes, logistics, engineering, etc.

In Slovakia, there needs to be a guide for small and medium-sized companies to solve financial planning and simulation of investment decisions, which would allow these companies to integrate modern software tools into decision-making processes.

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We also concluded that the system of risk management and financial planning represents a multidimensional concept and a complex process that creates a prerequisite for creating a basic system procedure for evaluating, controlling and determining an acceptable level of business risk. This procedure represents a unique and original tool for supporting managerial decision-making processes in various companies. The uniqueness of this fuzzy rooting methodology, presented in the previous sections, is demonstrated using the Mont Carlo method on a numerical example. Many authors (Ejegwa & Onyeke, 2021; Aruldoss et al., 2013; Burton et al., 2020) currently use such methodologies to demonstrate decision-making processes in different parts of societies.

The practical benefit of the presented procedures, methods, methodologies, and algorithm is their functionality and usability. Functionality is defined by the very existence of the methodology and subsequently by its practical verification in Slovak companies. However, the condition remains the clear interpretation of the results, for which the assumption of their correlation with other companies in the business environment applies.

Although the Monte Carlo method is used in companies operating in countries with a solid economic background and in large foreign corporations, this method is rarely used in Slovakia. The proposed methodology in the presented form provides businesses in Slovakia with guidance for introducing effective tools into investment decisions by enabling companies to see the behavior of the investment and its input variables (funding sources, credit terms, etc.) in a set time horizon. Such a focus of research is also necessary from the point of view of practical application to increase the effectiveness and efficiency of models and methodologies in the conditions of the Slovak Republic. We consider the mentioned connections and causal relationships to be significant in the direction of practical application; therefore, we recommend that they be addressed in future research as well.

Conclusions

The research goal was quantitative and qualitative verification of the methodology focused on the issue of increasing the competitiveness and sustainability of small and medium-sized enterprises in Slovakia. The proposed methodology is an effective tool that introduces new approaches to the evaluation of investment activities of companies based on modern tools, which it implements into companies' decision-making processes. The methodology was and is being verified as a part of the research project on real small and medium-sized enterprises that conduct their business activities in Slovakia and plan to improve their competitiveness and sustainability in the future. The methodology is based on a sequence of steps based on the following areas: (i) mathematical modeling with deterministic quantities, (ii) sensitivity analysis focused on the detection of critical factors that significantly affect the NPV criterion value, (iii) regression analysis for detecting interdependencies between methodology values and (iv) simulation through the Monte Carlo method, the calculations of which were carried out by the Crystal Ball software tool in the MS Excel environment. The proposed software tool was also chosen due to its relatively straightforward operation and easy availability. The fusion of traditional and modern tools, integrated and interconnected within the methodology, gives businesses a sophisticated tool for managing today's turbulent environment. A combination of deterministic and stochastic modeling makes it possible to perform analyses and simulations that consider the time factor in financial and investment planning. The graphic outputs of individual analyses provide a simple, easy-to-read tool for assessing demanding numerical and statistical data, which is the methodology's output. The advantage of the Monte Carlo simulation is also an overview of statistical analyses, which enables a more effective assessment of the outputs of the methodology.

Within the sensitivity and regression analysis framework, it is possible to identify risk factors that significantly affect the simulated quantity. The simulated value of the methodology can be profit, cash-flow, NPV, or any other financial indicator. To fulfill the research task of the article, the NPV value was chosen as a criterion value, which integrates the time factor through simulation, which allows companies a simple and practical insight into the

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future development of financial indicators. The issue of increasing competitiveness and ensuring the sustainability of businesses is currently very topical, primarily due to the turbulent market situation due to the global economic and energy crisis. In this environment, it is pretty challenging to implement investment decisions without detailed planning. Among experts in the academic and scientific field, there is a rather significant discussion about mitigating risks in the business environment.

As demonstrated during the research, the methodology in its individual steps is feasible, and the interconnection of individual analyzes represents a multi-criteria tool for assessing companies' investment decisions. Despite the advantages of computer simulations, it is also necessary to point out possible shortcomings and threats arising from using these tools. Sufficient skills and knowledge in controlling the software environment and following procedures may not represent quality outputs. For the simulations to work effectively, it is necessary to know and correctly identify the distribution functions in the initial steps of the simulation, to master the basic mathematical relationships in financial modeling that define the correlations and dependencies between individual factors, and above all, to properly identify the criterion value entering the simulation as the resulting value. The source of information in individual steps is thus the results of expert estimates and detailed analysis of financial data of companies. The methodology as a tool for increasing the competitiveness and sustainability of enterprises is a simple tool for solving financial and investment decisions. Still, its use in practice is much broader than the article states. Developments in the business environment and computer technology field create prerequisites for expanding the use of software tools for simulation in risk management.

The article demonstrated that companies that integrate modern approaches into their decision-making processes can increase their competitiveness and thus ensure sustainability in the market environment. Simulations and modeling considering the time factor give these companies an advantage in the form of knowledge of future developments or the possible behavior of financial indicators in the future already in real-time. The sequence of steps in the methodology can be applied to various companies in Slovakia. Due to the relatively clear and simple display of deterministic mathematical correlations and calculations, the methodology can be easily modified to different market environments in other countries, creating a prerequisite for its wide use in practice.

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