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USING EXCEL'S SCENARIO MANAGER FOR BUSINESS DECISION-MAKING

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ABSTRACT

The implementation of automated systems using advanced formulas and techniques in Microsoft Excel demonstrates significant benefits in terms of accuracy, efficiency, and data-driven decision-making. This paper provides an insight into the application of the Scenario Manager tool as a support in the decision-making process. The results of simulations conducted using this tool are presented, and the obtained data indicate the possibility of more precise planning and analysis of different business situations. The proposed simulation technique enhances the understanding of potential outcomes, enabling managers and other stakeholders to refine their strategic decision-making process based on realistic parameters.

KEY WORDS: *Microsoft Excel, What-If Analysis, Scenario Manager, Decision-Making*

KORIŠĆENJE EXCEL ALATA SCENARIO MANAGER ZA DONOŠENJE POSLOVNIH ODLUKA

SAŽETAK

Implementacija automatizovanih sistema uz korišćenje naprednih formula i tehnika u programu Microsoft Excel pokazuje značajne prednosti u pogledu tačnosti, efikasnosti i donošenja odluka zasnovanih na podacima. Ovaj rad pruža uvid u primenu alata Scenario Manager kao podršku u procesu odlučivanja. Prikazani su rezultati simulacija sprovedenih korišćenjem ovog alata, a dobijeni podaci ukazuju na mogućnost preciznijeg planiranja i analiziranja različitih poslovnih situacija. Predložena tehnika simulacije doprinosi boljem sagledavanju mogućih ishoda i omogućava menadžerima i drugim korisnicima da unaprede proces donošenja strateških odluka zasnovanih na realnim parametrima.

KLJUČNE REČI: *Microsoft Excel, What-If analiza, Scenario Manager, donošenje odluka*

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INTRODUCTION

Business analytics is key in supporting decision-making and explaining potential solutions to organizational challenges. The importance of implementing business analytics within an organization is reflected in helping to define clear goals, select the appropriate software, train the team and manage changes. Business analytics has transformational power in different sectors and can help businesses choose the platform that best suits their specific needs (Kaurav, 2024).

Excel is part of Microsoft Office and is the most widely used spreadsheet software in the world (Alexander, Kusleika, & Walkenbach, 2019). Excel tables have long been indispensable tools for financial professionals, facilitating data analysis, modeling and decision support (Kumar & Prasath, 2024). It finds application both in individual users, researchers, scientists, educational institutions, and in companies.

Microsoft Excel's sensitivity analysis, or "What-if" analysis, is considered a very important and valuable concept in management science (MS) (Markham & Palocsay, 2006). This powerful feature allows users to explore different scenarios and outcomes by changing inputs within tables. In this way, potential results can be predicted and the effects of different variables can be seen, which facilitates the assessment of risks and opportunities, as well as further planning (Williams, 2025).

Therefore, management educators have moved from teaching the detailed steps of an algorithm to quantitative analysis based on tables (Ragsdale, 2001; Powell, 2001). In this context, the science of management implies the application of methods and tools of science in management and decision-making. This field of study represents the science of making better decisions (Ragsdale, 2001). In general, data associated with real problems are often not clearly defined, have a multidimensional and complex structure, which requires the application of business analytics that deals with solving such problems using various methods (Mishra, 2023). Scenario planning encourages strategic thinking and helps overcome constraints in thinking by creating multiple different scenarios (Amer, Daim, & Jetter, 2013).

However, despite the widespread use of Excel, the impact of the Scenario Manager tool in What-if analysis on the decision-making process remains relatively under-explored. This study aims to fill this gap that is missing by showing a simulation of using this tool to make better financial decisions.

LITERATURE REVIEW

The problems faced by decision-makers in today's competitive, business environment are often very complex. As making good decisions is not an easy task, evaluating these alternatives and choosing the best course of action is the essence of decision analysis (Ragsdale, 2001). It is known that top managers work in a continuous rhythm, moving quickly from one activity to another, which prevents them from deliberate and systematic planning. Olson (1979) points out that in such conditions, effective analysis requires the transfer of relevant information from the personal experience and knowledge of the manager to the analyst. A few decades ago, millions of business people discovered that one of the most effective ways to analyze and evaluate decision-making alternatives is to use electronic tables to build computer models of the problems they face. Today, electronic tables are the most practical and useful tool for business people to implement and analyze computer models.

For this reason, most business people would probably rate an electronic spreadsheet as the most important analytical tool (Ragsdale, 2001).

The very concept of scenario planning is old, since the earliest times people have shown interest in the future and used scenarios as a tool for indirectly exploring the future of society and its institutions (Bradfield et al., 2005). The scenario method is largely derived from military strategy and war planning, and was later taken over and further developed by companies in the business sector (Rounsevell & Metzger, 2010). The term scenario planning is an area that is very broad and according to Bradfield et al. (2005, p.796-797) used in the following contexts:

- In companies that use scenario planning as a long-term planning tool.
- Public policy makers, who increasingly use scenarios for decision-making and policy implementation.
- Professional futuristic institutes of which there are many; most are independent research and membership organizations working to spread ideas about critical trends that will shape the future and promote future research methodologies.
- The scientific community uses scenarios in the complexity of scientific models and theories. Examples of this are climate change development scenarios based on computerized ecological models and economic development scenarios based on econometric models.
- Educational institutes that aim to promote research and development of theories and methods of future study and create a learning environment so that questions are considered in the context of the development of the future.

It is also recommended to integrate Excel into business school teaching whenever appropriate. This would help students acquire the Excel skills they need for the current labor market, as well as help them perform successfully in a competitive business world. This deepens their understanding of financial concepts (Zhang, 2014). Then, the advanced functions of the School can significantly help managers in higher education institutions (HEIs) in optimizing and automating various academic processes, such as entering grades, recording attendance in online classes, identifying overlaps in the exam schedule and creating a schedule (Tayong & Roma, 2023). It has been found that functions and graphs in the Model can be effectively used to convert raw results into ratings and generate success statistics, while PivotTables prove to be an effective tool for detecting overlaps in test terms. Excel also enables accurate attendance tracking and facilitates collaboration through document sharing and shared scheduling. Techniques such as fictitious items (dummies), group coding, and class redeployment can improve the speed and accuracy of an organization, regardless of the software tools the HEI is already using. Adapted implementation is recommended in accordance with the specific objectives and resources of each institution (Tayong & Roma, 2023).

Management problems differ according to whether the variables are under the control of the manager or depend on external factors. Relationships between variables can be clearly defined, but they can also be vague or imprecise. These basic features of the problem should be directed to the selection of the appropriate modeling technique. The goal at the stage of formulating the model is to choose a modeling technique that corresponds to a specific problem. Then, the next step is to apply this formulation in the form of a model

in an Excel table. After verifying that the tabular model has been implemented correctly, the next stage in the problem-solving process is to use the model to analyze the problem itself. The main goal of this phase is to generate and evaluate alternative solutions that could lead to problem-solving. This often involves considering different scenarios or asking multiple "What if?" questions. It is the spreadsheets that are especially useful for this kind of analysis of computational models. In a well-thought-out model in a table, it is relatively easy to change some assumptions in a model and observe what might happen in different situations (Ragsdale, 2001).

One of the most valuable aspects of Excel is its ability to create dynamic models (Alexander et al., 2018). Dynamic models allow users to have a real-time view of data. It has been shown that knowing and using Excel tools and What-if analysis, such as Data Table, Charts, Scenario Manager, Goal Seek and Solver, in finance teaching can help students to intuitively understand financial concepts (e.g., Zhang, 2014). Zhang (2014) uses detailed examples to demonstrate the integration of some of the most powerful Excel tools into finance courses. Horner (2003) believes that business graduates need knowledge of analytical tools because they are important for managerial decision-making. As many as 50% of Fortune-listed companies used scenarios as a business forecasting tool between 1977 and 1981 (Linneman & Klein, 1983, cited in Markham & Palocsay, 2006, p.24). This has led other companies to include scenario planning in their strategic decision-making processes (Schoemaker, 1993).

To conduct What-if analysis, users have three basic options: Goal Seek, Scenario Manager, and Data Table (Alexander et al., 2018). Each of these tools is used in different situations and solves a different range of problems.

- Goal Seek is used for simpler calculations involving a single variable. It is practical when we are missing one input value, as Goal Seek changes that cell to achieve the desired result in the target cell, which is especially useful for financial projections or calculating target values (Williams, 2025). Examples of analysis using Goal Seek include finding the point of coverage, crossover rates for two capital budget projects, and implied option volatility (Zhang, 2014).
- If we have more than one input, we can use the Scenario Manager. Through this tool, users can store different sets of input values in a relatively simple way and give a name to each set (Alexander et al., 2018). Can perform sensitivity analysis for up to 32 input variables. The scenario manager can help analyze how investments would behave in different market conditions, for example: changing interest rates, inflation, stock prices, etc. By creating different scenarios (e.g., optimistic, pessimistic and realistic) and thus seeing how these changes would affect the results of investments. This analysis contributes to better decision-making.
- Data Table is a great tool for sensitivity analysis. With the help of the Data Table tool, it can be shown how the price of a stock changes with the rate of return or how the price of a bond changes over time (Zhang, 2014). Also, with this tool, users can analyze how changing one variable affects another variable. For example: the future value in relation to the number of periods, the price of shares in relation to the dividend growth rate, or the net present value of the project in relation to the discount rate. In combination with the graph, the visualization of nonlinear relationships comes to the fore.

If managers and other users want a larger number of restrictions, or requirements that they want to enter into the analysis, they can use the Solver tool. Solver finds the optimal value of the target cell by changing the values in the cells used to calculate that target cell.

METODOLOGY

Formatting a table, entering data, and creating formulas requires a certain level of expertise. The analyst must be familiar with Excel tables, able to express the model in a more abstract, table-based structure, and recognize how to adjust the data to the format required by the tables. However, due to the ease of modification, this approach is likely to be transferable to technically less trained staff as well (Ragsdale, 2001).

When using Scenario Manager, a model is first created that represents a set of input data, where the output is the result of these inputs. Then you go to the Data tab, where the What-If Analysis option (from the drop-down menu) is selected, and within it the Scenario Manager option. Scenarios are created by clicking the "Add..." button. When creating each scenario, names are assigned and it is desirable to describe the nature of that scenario. We presented it as an optimistic, pessimistic and realistic scenario.

RESULTS

Table 1 presents a model with input and output parameters on the basis of which scenario simulations will be done. The topic of the simulation is the assessment of the cost-effectiveness of training of employees after the initial investment, as a support to managerial decision-making through ROI analysis in different scenarios. It is based on the assumption that investing in training from advanced Excel would lead to an increase in employee productivity. The idea is that, by acquiring new knowledge and skills, employees could save a significant amount of working time, by replacing the jobs they had previously done manually with automated procedures. Specifically, tasks that previously took hours after training could be completed faster and more efficiently, which would free time for other activities and improve the overall efficiency of the business. Kumar & Prasath (2024) also emphasize the importance of user training and emphasize the need for organizations to invest in adequate training programs, in order to provide users with the necessary skills and knowledge to work in Exel. Finally, they highlight the importance of applying good table design principles as a key factor to foster informed and effective decision-making in the financial context.

Table 1. Excel Training Investment Cost-Effectiveness Model

Initial parameters	
Number of employees in training	5
Training cost per person (€)	430
Monthly time savings per person (hours)	6
Value of one working hour (€)	10
Training duration per person (hours)	12
Calculated results	
Total training cost (€)	2,150

Lost productivity (€)	600
Total investment cost (€)	2,750
Annual savings (€)	3,600
Investment gain (€)	850
ROI (Return on Investment) (%)	30.91%
Breakeven point (months)	9.17

Source: Author's own calculations

The analysis included five initial parameters, defined as approximate values, to simulate the model and present potential financial effects:

- the estimated number of employees to be sent for training;
- the cost of training per employee, which includes a proportional part of the cost of the lecturer the fee of the lecturer is allocated to the participants of the training, thereby eliminating the need for a separate fixed cost of the organization;
- expected efficiency of work after training;
- the value of one working hour; and
- length of training for one employee.

The key financial indicators (Table 2) were calculated based on the input parameters: total training cost, missed productivity during training, total investment cost, annual savings, investment gain, return on investment (ROI) and cost coverage point (breakeven point).

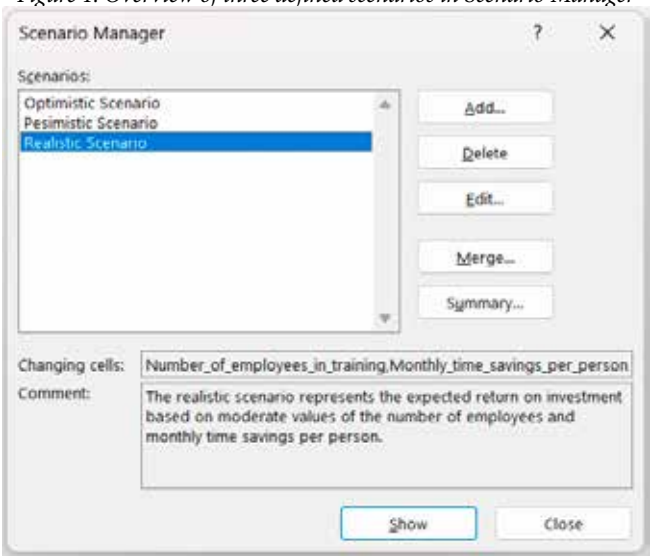
Table 2. Model calculations and calculated results with formulas

Model calculations	
Number of employees in training	=C4
Training cost per person (€)	=C5
Monthly time savings per person (hours)	=C6
Value of one working hour (€)	=C7
Training duration per person (hours)	=C8
Calculated results	
Total training cost (€)	=C4*C5
Lost productivity (€)	=C4*C7*C8
Total investment cost (€)	=C10+C11
Annual savings (€)	=C4*C6*C7*12
Investment gain (€)	=C13-C12
ROI (Return on Investment) (%)	=C14/C12
Breakeven point (months)	=C12/(C4*C6*C7)

Excel tables have become ubiquitous tools in financial decision-making processes, and knowledge of their design, including layout, formula construction, and data validation, can significantly affect the accuracy, efficiency, and reliability of decisions made on their basis (Kumar & Prasath, 2024).

Then, the Scenario Manager tool defines the parameters for all three simulations, which is shown in Figure 1.

Figure 1. Overview of three defined scenarios in Scenario Manager



Of the five input parameters, we took two variables that would be a priority for managers when making a decision: the number of employees in training and monthly time savings per person.

The Scenario Manager tool enables automatic report generation called Scenario Summary, which shows all scenarios side by side, allowing easier comparison and discussion basis (Markham & Palocsay, 2006), which can be seen in Table 3.

Tabela 3. Scenario Summary Report

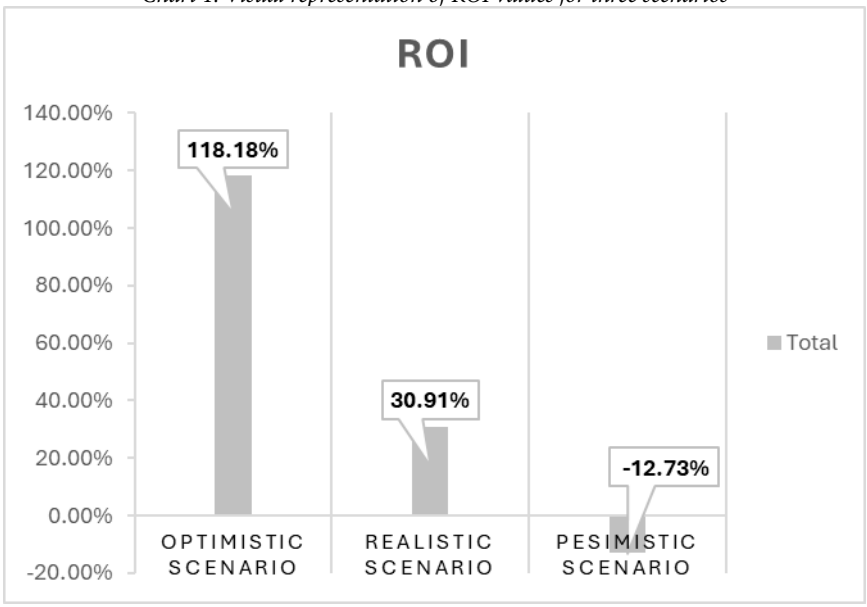
Scenario Summary				
	Current Values:	Optimistic Scenario	Pesimistic Scenario	Realistic Scenario
Changing Cells:				
Number_of_employees_in_training	5	8	3	5
Monthly_time_savings_per_person	6	10	4	6
Result Cells:				
ROI__Return_on_Investment	30.91%	118.18%	-12.73%	30.91%
Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.				

The Summary Report scenario allows a direct comparison of three defined scenarios: optimistic, pessimistic and realistic. As a result, the ROI (Return on Investment) was selected in the Scenario Manager report, as it is a key indicator of the return on investment and allows easy comparison between different scenarios.

It is evident that the optimistic scenario shows an ROI of 118.18%, a realistic 30.91%, while the pessimistic scenario records a negative ROI (-12.73%), which indicates that in the most unfavorable variant, investment would not be justified.

The Summary scenario also provides a second view of the report, through the Scenario PivotTable report, on the basis of which a graph is made for a clear and visual presentation of the analysis (Chart 1).

Chart 1. Visual representation of ROI values for three scenarios



Source: Author's own presentation

Pivot tables are a powerful tool for structuring and displaying raw data in a clear and unified way, while creating intuitive dashboards is possible with the help of the PivotChart function (Halder, 2023). In addition, it's very easy to share Excel files with colleagues or host a workbook on SharePoint for better performance and security (Clark, 2020).

DISCUSSION

Based on the results shown, it can be seen that the tool stores the values of input variables for each scenario and provides a summary of output variables for all scenarios in one table (Zhang, 2014). The tool can significantly contribute to the quality of the business decision-making process, especially in situations where it is necessary to look at several variants of possible outcomes. The analysis of three scenarios – optimistic, realistic and pessimistic – clearly indicated that changing only two key parameters (the number of employees in training and monthly saving of working time per person) can have a pronounced impact on the value of return on investment (ROI). In practice, this approach allows managers to identify the limit of profitability and identify the conditions under which investment can become risky or unsustainable.

It is important to point out that the Scenario Manager, although easy to use, requires prior knowledge of Excel functions, clearly defined input parameters and an understanding of the interconnection of variables. The added value of this approach is the generated Scenario Summary report that offers a clear visual representation for the interpretation of the results.

The limitation of this study is that the model was developed and applied in this simulation analysis with only two variables, and further research can be directed to other business processes. Although the selection of the presented parameters allowed for a clear analysis, this approach limits the breadth of perceiving the problem. In this regard, future research may include other methods and techniques that could provide even more promising results.

CONCLUSION

This paper shows how to integrate a useful Excel tool into the decision-making process. Its implementation does not require complex software systems, which makes it particularly suitable for organizations that want to improve the quality of decision-making. Based on this, it can be concluded that Scenario Manager, although often considered as a simple tool, has significant potential in strategic planning. By studying different scenarios, managers analyze all possible future trends and make better strategic decisions based on that (Bunn & Salo, 1993). The results of the simulation show different investment outcomes, especially in the context of estimating the return on investment in employee training. The analysis conducted through three scenarios confirmed that clearly defined parameters and a structured model can provide precise guidelines for assessing cost-effectiveness and risk. In conclusion, understanding Excel is essential to empowering financial professionals to make informed decisions that lead to the success of an organization. Future research should focus on expanding the model and integrating Scenario Manager with other analytical tools, thus further increasing its utility value in dynamic business environments.

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