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MAXIMIZING OPPORTUNITIES BY LEVERAGING THE STRATEGIC RISK MANAGEMENT WITHIN THE SCIENTIFIC INSTITUTE^{***}

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Abstract

The research is based upon the insights derived from the conclusions of Jonović et al. (2024) and aims to evaluate the effectiveness of Strategic Risk Management (SRM) linked to the COSO ERM (Committee of Sponsoring Organizations Enterprise Risk Management) framework. Implemented within a scientific institute of significant importance to the Republic of Serbia, the SRM is examined for its ability to identify the weaknesses, address threats, and leverage opportunities. The goal is to identify the risk factors and mitigate them through the SRM as a concept closely related to the COSO ERM framework. The primary research includes a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis survey conducted from June 26 to July 1, 2024, with a sample of 214 respondents and a response rate of 55.6% (119 respondents). The results highlight a sustainable business strategy and effective application of the SRM in the institute.

Keywords: Nationally significant Institute, COSO, ERM, SRM, SWOT Analysis

Note: Having in mind data protection of the Institute, the authors will not mention the name of the Institute in the research (for the future text it will be used Institute).

1 INTRODUCTION

This study is based upon the conclusions of Jonović et al. (2024) [1], presented at the 55th International October Conference in 2024, held in Kladovo, organized by the Mining and Metallurgy Institute Bor and Technical Faculty in Bor, University of Belgrade. Expanding on their research, this paper provides the new insights into the impact of the Strategic Risk Management (SRM) on a scientific research institute (whose identity remains undisclosed to

maintain confidentiality) that has adopted an Integrated Management System (IMS) guided by the principles of the COSO ERM (Committee of Sponsoring Organizations – Enterprise Risk Management) framework. The subject of the paper emphasizes the importance of effective SRM through the application of the COSO ERM framework combined with the SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis, highlighting key strengths (moti-

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vated workforce), weaknesses (equipment and working conditions), opportunities (research impact and collaborations), and threats (budget cuts and talent retention) of the Institute. Furthermore, the research was conducted at an Institute of national importance for the Republic of Serbia, funded by the state budget and possesses intangible resources — the human factor as its greatest potential, with research results holding the significance for society as a whole. In recent years, uncertainty and levels of risk have been increasing both in individual lives and operations of business entities. The reasons for this lie in a turbulent environment where the technological innovations advance rapidly, dynamic nature of business demands the greater seriousness in decision-making, globalization, the global crises resulting in significant losses for all participants in the financial market, COVID-19 pandemic, ongoing crisis in Ukraine, conflict between Israel and Hamas, along with the other negative impacts [2]. Risks are an integral part of operations of any organization. The objectives of risk management within a company are: 1) company can survive losses and sustain further growth thereafter, 2) efficient functioning in a risky environment, and 3) permanent compliance with regulations. Accordingly, the risk management is a dynamic, continuous, and ever-evolving process extending through the implemented organizational strategy [3]. Risk is a condition in which there is a possibility of a negative deviation from desired outcome, expected or hoped for [4]. Finally, the aim of this research is to determine to what extent the SRM, within the ERM process, functioning as an integrated rather than a separate part of the COSO ERM risk management model maximizes opportunities and mitigates risks in the scientific institute. The ERM, as outlined by the COSO in 2017, refers to the integration of culture, skills, and practices with the processes of strategic planning and performance. It serves as the foundation for

organizations to effectively manage risks while achieving, safeguarding, and enhancing value. The definition underscores the ERM emphasis on [5]:

- Understanding and incorporating the organizational culture,
- Building and enhancing the capabilities,
- Implementing the structured practices,
- Aligning the risk management with strategy and performance objectives,
- Addressing the risks in the context of business goals and strategies,
- Establishing a clear connection between the risk management and value creation

Understanding how scientific research organizations operate is a complex task, as it requires simultaneously considering the characteristics of researchers, the organizational traits of the research institution itself, and features of the specific industry sector [6]. The proposed model for strategic management in research organizations, known as the "double-loop learning system" according to Arveson integrates the strategic planning and performance evaluation. The model involves two interconnected components: the internal and external system. The internal system focuses on activities directly related to scientific research, while the external system encompasses common activities characteristic of most organizations. Efficient management of the external system supports the smooth conduct of scientific research, reduces delays, and enables the optimal use of available resources. The key idea is not improvement of the research system itself but the modernization of management structures that support the scientific research activities. [7]. It can be said that the SRM involves the identification, evaluation, and management of risks and uncertainties, influenced by both internal and external factors, which may prevent an organization from achieving its strategic goals and objectives. Its primary aim is to safeguard and enhance the value for all stakeholders. As a fundamental element of the ERM, it serves as

an essential foundation for this broader framework. This definition, which also includes the ERM, is based on six key principles [8]:

- It is a process of identifying, evaluating, and managing the risks and events, both internal and external that could jeopardize the achievement of strategic goals and organizational plans.
- Its primary goal is to preserve and enhance the value for shareholders and all relevant stakeholders.
- It represents an essential part and critical element of the overall risk management system at the organizational level.
- As a part of the ERM, this process is implemented through the activities of boards of directors, management, and other key participants.
- It requires a strategic approach to risk, which involves analyzing the impact of internal and external events or scenarios on the organization ability to execute its plans.
- It is a continuous process that must be integrated into all phases of strategic management, from its formulation to execution and monitoring

This definition and principles can be tailored for an organization to develop its own action plans for improving the ERM, with a focus on strategic risks. The contribution of this study lies in the fact that the SWOT analysis identified deficiencies that, with the optimal management strategy, can be turned into business opportunities. Preventive measures are the adoption of current strategy by the managers in order to solve the real problems. Preventive strategies are aimed at the optimal business models that bring the new values, new products and services and new markets [9].

Based on the information presented earlier, the central hypothesis of this study can be stated as follows H0: The implementation of the IMS based on the COSO ERM framework, in combination with the SWOT analy-

sis, enhances the effectiveness of SRM, enabling the scientific institute to make timely and strategically planned actions aligned with a sustainable business strategy.

The paper is organized into four sections: the opening chapter introduces the study, the second details the methodology, the third focuses on the findings of the primary research, and the final chapter offers the conclusion.

2 METHODOLOGY

The primary research, the SWOT analysis, composed of anonymous survey forms on the topic "Maximizing Opportunities by Leveraging SRM within the Scientific Institute," contains the most significant questions about the potentials for improvement in the Institute, as well as the highest-rated questions.

Various methodological approaches were used for conducting the SWOT analysis during the preparation of the anonymous survey: interviews with employees, quantitative methods for the SWOT analysis, illustrative methods for presenting the research results, and the deductive method for drawing conclusions. The SWOT analysis was conducted to assess the current state of the Institute and identify the potential areas for improvement (both risks and opportunities). The SWOT analysis is a valuable tool in strategic planning as it helps the strategies of organizations structure in accordance with the business requirements [10]. Accordingly, this research presents a SWOT analysis developed with the aim of enhancing the strategic risk management within the Institute. The comprehensive survey structure and combination of methodological approaches clearly contribute to the quality of the results. The SWOT analysis, as a primary survey, will be illustrated in Chapter 3.

This primary survey consisted of four parts (which represents elements of the SWOT, i.e. Strengths, Weaknesses, Opportunities, and Threats), with six questions (36 questions in total; in range of top-rated or lowest-rated). The survey consists of the following elements: 1) potential strengths

within the Institute internal context; 2) potential weaknesses within the Institute internal context; 3) potential opportunities in the Institute external environment; 4) threats in the Institute external environment. Respondents answered the questions by selecting one of five possible ratings. The answers were analyzed using a Likert scale from 1 to 5 (where a rating of 1 means strongly disagree, 2 disagree, 3 neutral, 4 agree, and 5 strongly agree). The anony

mous survey with the closed-ended questions was conducted from June 26, 2024, to July 1, 2024, on a sample of 214 respondents. Out of the total number of respondents, 119 employees completed the survey, of which 86 are PhD holders (72.27%), 31 have a Master's degree (26.05%), and 2 respondents have university-level education (1.68%), resulting in a response rate of 55.6% (presented by Figure 1).

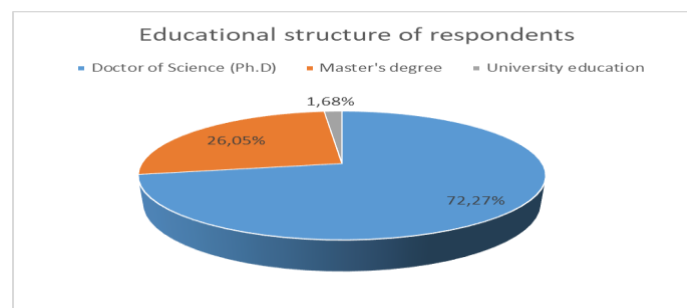


Figure 1 Overview of the educational structure of respondents

3 RESULTS AND DISCUSSION

The results, obtained from the SWOT analysis, conducted on the basis on the survey for potential strengths and weaknesses of the internal context, as well

as opportunities and threats of the external context of the Institute, are presented in the following illustrations in Figures 2, 3, and 4, 5 and Table 1 created on the basis of the conducted survey.

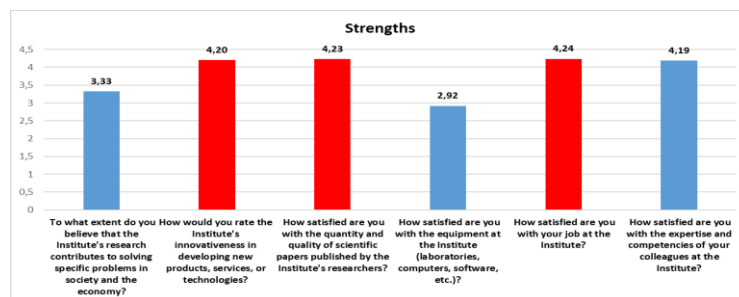


Figure 2 Potential Strengths of the Institute Internal Context (Source: authors)

Legend: Possible strengths: >4.20 ; Sustainable context: $>2.60 < 4.20$; Possible weaknesses: <2.60

Figure 2 illustrates the potential strengths of the Institute internal business context. Based on the survey data, the lowest average

score of 2.92 was given to the question about satisfaction with the Institute equipment (laboratories, computers, software, etc.),

indicating a need for modernization. The highest average score of 4.24 was for satisfaction with the job at the institute, proving that the employees at the institute

highly appreciate and are very satisfied with their work. The average score of 3.85 indicates a sustainable business context.

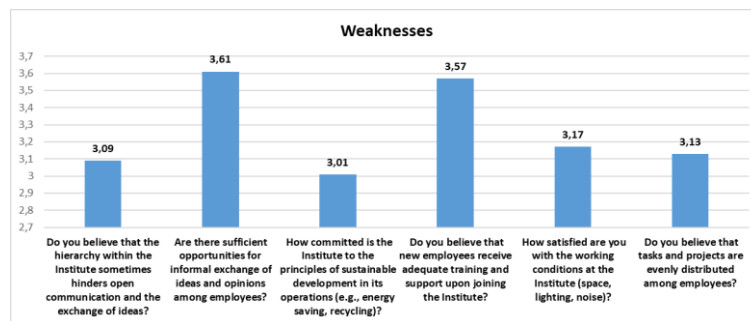


Figure 3 Potential Weakness of the Institute internal context (Source: authors)

Legend: Possible strengths: >4.20 ; Sustainable context: $>2.60 < 4.20$; Possible weaknesses: <2.60

Figure 3 shows the potential weaknesses of the Institute internal business context. Analyzing the responses to questions about the potential weaknesses in the internal context, the lowest average score of 3.01 was obtained for question regarding satisfaction with working conditions (space, lighting, noise). This indicates a sustainable context but shows a room for improvement. The Institute should focus more on improving the working environment and conditions. The

highest average score of 3.61 was obtained for opportunities for informal exchange the ideas among employees, indicating a sustainable business cooperation. The average survey score of 3.26 proves a sustainable business context. Despite this, it is suggested to improve the working conditions, hold workshops on sustainable development, and provide better support and training for the new employees.

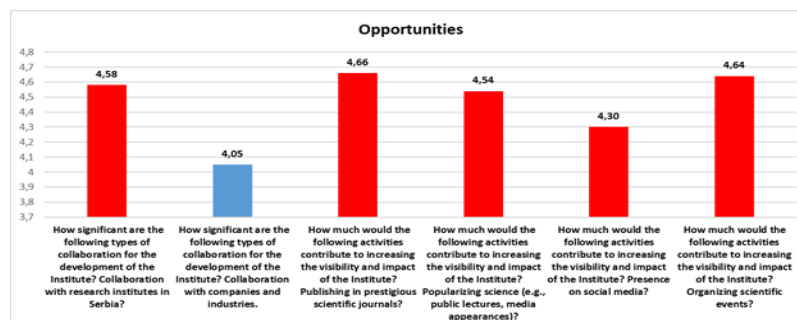


Figure 4 Potential Opportunities of the Institute external context (Source: authors)

Legend: Possible strengths: >4.20 ; Sustainable context: $>2.60 < 4.20$; Possible weaknesses: <2.60

Figure 4 presents the potential opportunities of the Institute external business context. An average score of 4.05 on question about the importance of collaboration with compa-

nies and industry highlights the opportunities available to the Institute. The highest average score of 4.66 was given to the question about the significance of publishing scientific papers

in prestigious scientific journals, showing the outstanding external opportunities that researchers can utilize to improve the Institute operations. The average survey score of 4.46

indicates the exceptional potential external opportunities. It can be concluded that the Institute should be focused on re-cognizing these opportunities.

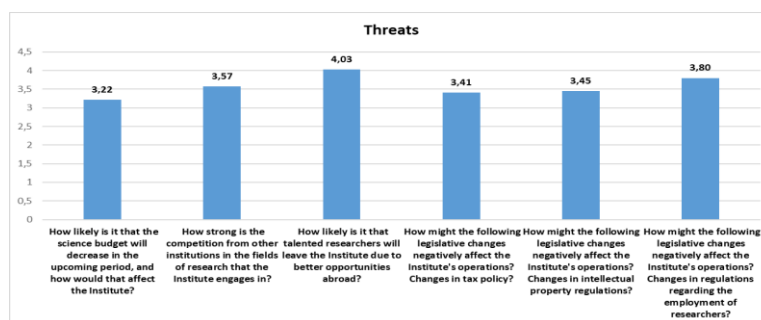


Figure 5 Potential Threats of the Institute external context (Source: authors)

Legend: Possible Threats: >4.20; Sustainable context: >2.60<4.20; Possible opportunities: <2.60

Figure 5 depicts the potential threats of the Institute external business context. The findings highlight two areas requiring the strategic attention from the Institute. While the moderate concern regarding the potential decrease in the science budget (average score: 3.22) indicates a sustainable context, it also suggests the importance of proactive measures to mitigate this risk. Efforts such as lobbying for favorable policies and diversifying funding sources are recommended to ensure resilience and minimize negative impacts. The higher concern over the likelihood of talented researchers leaving for better conditions abroad (average score: 4.03) underscores the urgent need for the Institute to implement the retention strategies. This may include offering the competitive incentives, professional growth opportunities, and fostering a supportive work environment. Overall, the average score of 3.58 demonstrates the Institute ability to resist the potential threats effectively. However, the focused actions to retain talent and address budgetary risks will further strengthen its strategic position and long-term sustainability.

The H0 hypothesis of this primary research: The implementation of the IMS

based on the COSO ERM framework, in combination with the SWOT analysis, enhances the effectiveness of the SRM, enabling the scientific institute to make timely and strategically planned actions aligned with a sustainable business strategy is confirmed by the fact that the SWOT analysis shows a sustainable business context with an average score of 3.79.

4 CONCLUSION

The survey results provide a comprehensive insight into the Institute internal and external context. It is important to emphasized that the H0 (stated as follows: The implementation of the IMS, based on the COSO ERM framework in combination with SWOT analysis, enhances the effectiveness of the SRM, enabling the scientific institute to undertake timely and strategically planned actions aligned with a sustainable business strategy) is confirmed by the findings of the SWOT analysis, which indicates a stable and sustainable business environment, as reflected by the average score of 3.79. Strengths shows that the highest satisfaction with the job at the Institute (average score: 4.24) reflects a highly moti-

vated workforce. Employees value their work, which is a core strength that contributes to a sustainable and productive organizational culture.

Table 1 SWOT analysis of Strategic context report of the scientific Institute

SWOT Analysis		
Internal context	STRENGTHS How satisfied are you with your job at the Institute? (4.24) How satisfied are you with the quantity and quality of scientific papers published by the Institute researchers? (4.23) How would you rate the Institute innovativeness in developing the new products, services, or technologies? (4.20) How satisfied are you with the expertise and competencies of your colleagues at the Institute? (4.19) To what extent do you believe that the Institute research contributes to solving the specific problems in society and economy? (3.33) How satisfied are you with the equipment at the Institute (laboratories, computers, software, etc.)? (2.92)	WEAKNESSES How committed is the Institute to the principles of sustainable development in its operations (e.g., energy saving, recycling)? (3.01) Do you believe that the hierarchy within the Institute sometimes hinders open communication and exchange of ideas? (3.09) Do you believe that the tasks and projects are evenly distributed among employees? (3.13) How satisfied are you with the working conditions at the Institute (space, lighting, noise)? (3.17) Do you believe that the new employees receive adequate training and support upon joining the Institute? (3.57) Are there sufficient opportunities for informal exchange of ideas and opinions among employees? (3.61)
	OPPORTUNITIES How much would the following activities contribute to increasing the visibility and impact of the Institute? Publishing in prestigious scientific journals? (4.66) How much would the following activities contribute to increasing the visibility and impact of the Institute? Organizing scientific events? (4.64) How significant are the following types of collaboration for the development of the Institute? Collaboration with research institutes in Serbia? (4.58) How much would the following activities contribute to increasing the visibility and impact of the Institute? Popularizing science (e.g., public lectures, media appearances)? (4.54) How much would the following activities contribute to increasing the visibility and impact of the Institute? Presence on social media? (4.30) How significant are the following types of collaboration for the development of the Institute? Collaboration with companies and industries. (4.05)	THREATS How likely is it that the science budget will decrease in the upcoming period, and how would that affect the Institute? (3.22) How might the following legislative changes negatively affect the Institute operations? Changes in tax policy? (3.41) How might the following legislative changes negatively affect the Institute operations? Changes in the intellectual property regulations? (3.45) How strong is the competition from the other institutions in the fields of research that the Institute engages in? (3.57) How might the following legislative changes negatively affect the Institute operations? Changes in regulations regarding the employment of researchers? (3.80) How likely is it that the talented researchers will leave the Institute due to better opportunities abroad? (4.03)

Source: Authors created data on the basis of the survey conducted

Weaknesses indicates that areas such as satisfaction with equipment (average score: 2.92) and working conditions (average score: 3.01) require the immediate improvement. Modernizing facilities and creating a more

supportive work environment should be priorities to address these internal challenges. Additional support and training programs for the new employees will also strengthen the Institute internal operations. Opportunities

provide an insight that the external context reveals the exceptional potential, such as the significance of publishing in the prestigious scientific journals (average score: 4.66) and collaboration with the companies and industries (average score: 4.05). These opportunities present a clear pathway for enhancing the Institute research impact and partnerships. Threats highlighted challenges such as the potential decrease in the science budget (average score: 3.22) and likelihood of talented researchers leaving for better opportunities abroad (average score: 4.03) highlight critical risks. To address these threats, the Institute must actively lobby for supportive policies, diversify funding sources, and implement competitive retention strategies to secure its talent pool. It is important to mention that the limitations of the analysis include the use of anonymous questionnaires with closed-ended responses, which restricts the range and adaptability of the answers provided. Likewise complex problems can be reduced to overly simplistic terms, which can result in the loss of important nuances and interdependencies.

The Institute exhibits a solid foundation, with strengths and opportunities that outweigh the identified weaknesses and threats. However, to maintain its sustainability and achieve strategic growth, it is vital to invest in modernizing the infrastructure, retaining talent, and leveraging external opportunities through strategic collaborations and enhanced research visibility. Addressing these areas strategically will strengthen the Institute position and ensure its long-term success. Future research directions should adopt a systematic approach to analyzing the organizational conditions that support the mission and vision of the Institute. Additionally, they should analyze financial parameters related to profitability, as well as the success of strategic risk management.

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