



STRENGTHENING STRATEGIC AND FINANCIAL STABILITY IN SCIENTIFIC INSTITUTES WITH IMPLEMENTATION OF STRATEGIC RISK MANAGEMENT

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Abstract: [†]This study aims to develop a comprehensive Strategic Risk Management (SRM) framework aligned with the COSO ERM for improving strategic and financial performance in Scientific Institutes. Conducted in a nationally significant Serbian institute, the research evaluates SRM's effectiveness in addressing weaknesses, mitigating threats, and leveraging opportunities. A primary SWOT analysis survey, conducted from June 26 to July 1, 2024, involved 214 participants, with a 55.6% response rate (119 respondents). Findings highlight a sustainable business strategy and SRM's effectiveness in mitigating risks across financial, operational, asset-related, and strategic domains. Financial challenges include declining net profit and persistent negative financial results. Despite the decline in business revenues and net profit, effective asset and capital management, supported by previously accumulated reserves, enabled the Institute to maintain financial stability. To address these risks, the study emphasizes cost management, diversification, and investment in innovation to strengthen financial sustainability and competitiveness. This research underscores SRM's pivotal role in building resilience, advancing institutional goals, and enhancing adaptability for scientific institutes with national importance.

Keywords: SRM, COSO ERM, financial sustainability, SWOT analysis, innovation.

1. INTRODUCTION

This study builds upon the findings of Jonović et al. (2024), initially presented at the 55th International October Conference in Kladovo, hosted by the Mining and Metallurgy Institute Bor in partnership with the Technical Faculty in Bor, University of Belgrade.

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[†] To ensure the confidentiality of the Institute, the authors will refrain from disclosing its name in the research. For future reference, the terms "Institute" or "Scientific research organization" will be used throughout the text.

Additionally, it integrates insights from Jonović et al. (2025), forthcoming in the Journal Mining and Metallurgy Engineering Bor (Issue 1/2025). The research explores the influence of Strategic Risk Management (SRM) within a scientific research institute, maintaining anonymity to uphold confidentiality. By employing COSO ERM (Committee of Sponsoring Organizations – Enterprise Risk Management) framework, the study underscores the significance of applying robust SRM strategies. Primary research utilizing SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis provides a nuanced perspective on the institute's strategic strengths, weaknesses, opportunities, and risks. Secondary research complements this by evaluating financial indicators, revealing the impact of Strategic Risk Management (SRM) connected with the COSO ERM organizational stability. To gauge the efficacy of managing strategic risks, financial data spanning 2020 to 2023 was sourced from the Serbian Business Register Agency (SBRA), in compliance with Serbian accounting regulations for fiscal and calendar-year reporting. Metrics analyzed include total assets, equity; business income, expenses and result; financial result and net profit. This approach provides a comprehensive insight and points to poor risk management in the Institute's operations.

The subject of the research is the application of the combined use of SWOT analysis (primary research) and financial data analysis (secondary research) to assess the impact of COSO ERM on strategic risks and financial stability in the Scientific Institute. Considering that the topic is under-researched, the aim of the paper is to direct research towards the development of a more comprehensive SRM for operational and financial improvements in the work of Scientific Institutes. Unlike the previous two papers, this study presents a comprehensive analysis based on SWOT methodology, supplemented by financial indicators, providing a complete overview of strategic management within the Institute of National Importance for the Republic of Serbia.

The paper is organized into four main sections. The first section provides an introduction to the study, setting the stage for the research. The second section outlines the methodology, explaining the approach and techniques used. The third section presents the findings of the primary research, offering insights derived from data analysis. Finally, the last section delivers the conclusion, summarizing key points and implications.

2. LITERATURE REVIEW

Risk is a factor that all organizations face, regardless of the business organization model. (Panić, 2024) Risk management has become an imperative of modern business, not only because of the needs of the enterprise itself, but also because of the international regulation imposed on the financial sector particularly, the issue that has advanced through institutional risk management (Barjaktarović & Ječmenica, 2011). Although uncertainty and risk represent an integral part of the economic business, risk as a scientific field has a short history (Barjaktarović, 2015). Strategic management in research organizations involves the impact of environmental changes at both national and international levels, taking into account the specificities of scientific research work. Consequently, a comprehensive integration of strategic management characteristics and the research process is required to create an applicable framework for these organizations. (Mousurovic, 2018) According to the Strategy of scientific and technological development of the Republic of Serbia for the period 2021 to 2025 "the power of knowledge", the risk analysis overview by specific goals of the strategy includes: ensuring the necessary conditions for dynamic development of science, technological development, and innovation; increasing the efficiency of resource utilization within the scientific research system; nurturing excellence in science and technological development; strengthening the competitive advantage of the economy; focusing research on societal challenges and priorities;

and enhancing international cooperation. The practice of risk management is commonly known as "enterprise-wide risk management" (ERM). SRM has been described as a subset of ERM, even though the term SRM is believed to be much older than the term ERM (Bromiley et al., 2016). SRM is the process of developing insight to understand what could go wrong that would affect the achievement of a given strategy, and adopting appropriate mitigating actions. (Frigo, & Anderson, 2011) ERM can be used by organizations of any size. If an organization has a mission, a strategy, and objectives—and the need to make decisions that fully consider risk—then ERM can be applied. It can and should be used by all kinds of organizations, from small businesses to community-based social enterprises to government agencies to Fortune 500 companies. (COSO ERM 2017)

A scientific research institute thrives at the strategic level when its overall strategy, the actions of those executing it, and the organization's actual business outcomes remain in sync. Maintaining this alignment ensures that strategic goals translate effectively into tangible operational results.

3. DATA AND METHODOLOGY

The primary research, a SWOT analysis includes a complete questionnaire conducted at the Institute of National Importance for the Republic of Serbia. A variety of methodological approaches were applied in conducting the SWOT analysis during the preparation of the anonymous survey. These included employee interviews, quantitative analysis techniques, and illustrative methods for presenting research outcomes, and the deductive approach for formulating conclusions. The SWOT analysis was undertaken to evaluate the Institute's current status and pinpoint areas for improvement, encompassing both risks and opportunities. Recognized as a critical tool in strategic planning, SWOT analysis aids organizations in aligning their strategies with business demands (Valentin 2001).

This study features a SWOT analysis crafted to guide research toward establishing a more comprehensive SRM framework aimed at enhancing operational efficiency and financial performance within Scientific Institutes. The thorough survey design and integration of diverse methodological approaches significantly enhance the reliability and depth of the findings. Detailed results from the SWOT analysis will be elaborated in Chapter 4. The primary survey is structured into four sections, corresponding to the key components of SWOT: Strengths, Weaknesses, Opportunities, and Threats. It comprises 39 questions, grouped into six subcategories, ranging from the highest-rated to the lowest-rated aspects. The survey explores: Potential strengths within the internal framework of the Institute; Potential weaknesses within the internal framework of the Institute; Potential opportunities arising from the external environment of the Institute; and Threats posed by the external environment of the Institute. Respondents provided their input by selecting from one of five possible ratings. This meticulous design ensures a robust foundation for future strategic planning and decision-making. The answers were analysed 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 anonymous survey with 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).

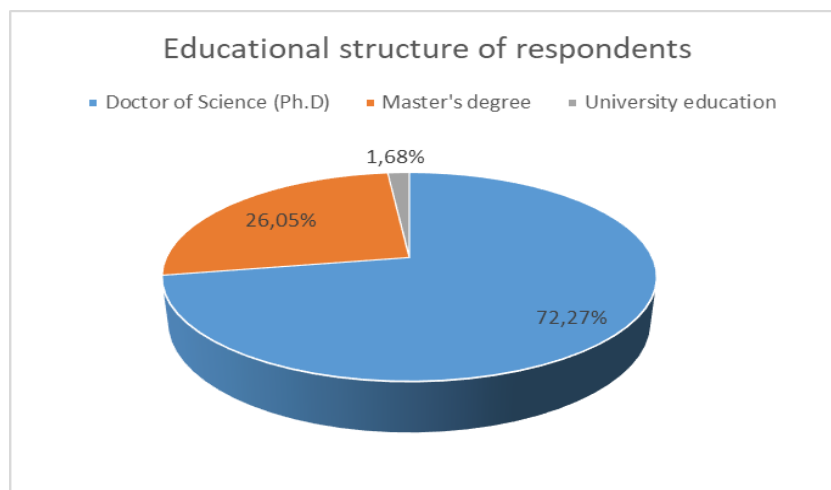


Figure 1. Overview of the educational structure of respondents

The structure of professional titles among respondents (presented by Figure2) provides valuable insights into the composition of expertise within the scientific research institute, highlighting its strengths, weaknesses, opportunities, and threats in the SWOT analysis. Here's an explanation: the highest proportion of respondents belong to the category of Doctor of Science - Scientific Advisor (28.57%), followed closely by senior research associates (23.53%). This indicates that the institute benefits from a strong presence of top-tier professionals with extensive expertise. Their role as scientific advisors and leaders fosters high-quality research and strategic decision-making. Research associates with Doctor of Science degrees (18.49%) and Master's degrees (12.61%) provide a solid base of mid-level researchers who actively contribute to the institute's research output. Master's degree trainees represent only 9.24%. Although they are important for long-term growth and innovation, their relatively small percentage may indicate challenges in attracting or retaining young talent. Categories such as "University education - professional title" (1.68%) and "Other" (1.68%) are quite limited. This could signal a lack of auxiliary staff who perform operational and administrative roles essential for supporting research activities. This structure emphasizes the institute's strengths in expertise and experience while highlighting areas such as talent retention, support roles, and succession planning that require strategic attention. Addressing these gaps proactively will enable the institute to mitigate risks and capitalize on its opportunities.

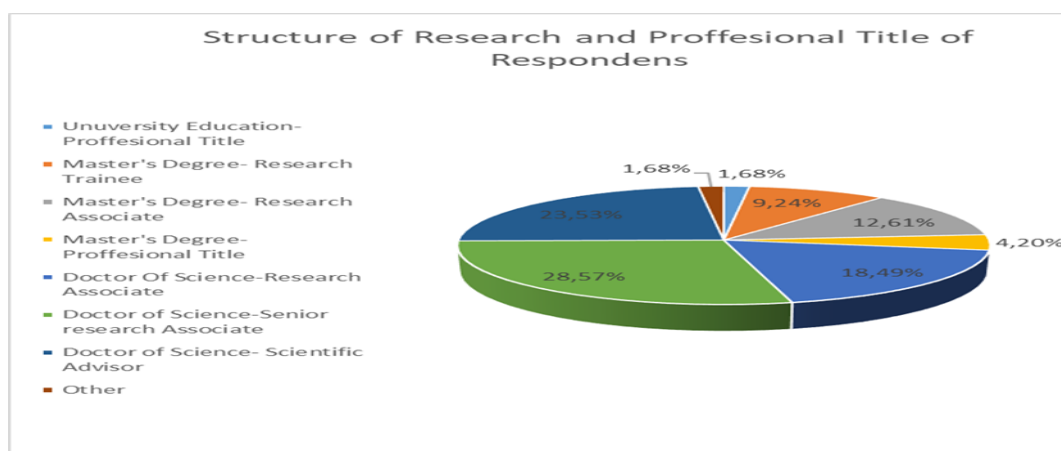


Figure 2. Structure of research and professional title of respondents

4. RESULTS AND DISCUSSION

The findings of the research are organized into two sections as follows: 1) strategic risk assessment for the scientific research organization based on financial data. Authors created the table 1, on the basis of SBRA's data and it provides a detailed overview of relevant financial indicators for SRM of the institute. 2) SWOT (primary research) analysis presented by figures 3, 4, 5, and 6.

4.1. Strategic Risk Assessment for a Scientific Research Organization based on financial data presented in financial reports

To assess how effectively strategic risks are being managed (with the primary business activity 7219, which relates to research and experimental development in natural and technical-technological sciences), secondary research was conducted using publicly accessible data (nevertheless on the quality) from the SBRA for the period 2020 to 2023. This dataset provides a comprehensive picture of the organization's financial health and good risk management practices, including critical metrics such Total assets and Capital/Equity from Balance Sheet; and Operating/Business revenues, expenses and result; financial result and Net profit from Income Statement. It emphasizes the importance of effective SRM for better financial performance.

Table 1. Financial overview of a Scientific Research Organization for the period 2020-2023 in RSD 000

Year	2020	2021	2022	2023
Total assets	212,858	236,947	257,883	335,171
Capital / Equity	132,546	137,049	138,506	138,762
Business income	558,624	624,090	701,521	799,068
Business expenses	548,644	619,496	699,610	798,310
Business results	9,980	4,594	1,911	0.758
Financial result	-405	45	-59	-123
Net profit	10,264	4,503	1,457	955

Source: (SBRA's data for the period 2020 to 2023)

According to the law the institute is obliged to report about financial risks which include credit risk, market risk (the main are foreign exchange and interest rate risks), liquidity risks, as well as capital risk management.

Business revenues, expenses and result are crucial for SRM. It can be noticed that there was an increase of business income and expenses due to the fact that the institute was focused on the based activity. However it was influenced by COVID-19 pandemic and post-pandemic in terms of keeping the health of employees and continuing with the business: and inflation caused globally by the war in Ukraine (which impacted the costs incurred by the Institute during and after 2022) which had impact on the cost of material and services which the Institute use i.e. business expenses had higher increase comparing the business revenues. It had an impact of achieved business result which used to have decreasing trend in the analysed period. The institute incurred losses in its financial results due to negative foreign-exchange and interest rate differences. Furthermore, the management of the company reported that they didn't use any financial derivate in order to mitigate those risks. Moreover, it should be mentioned that the institute had positive other result which had decreasing trend in analysed period. Finally, it can be noticed that net-profit had decreasing trend in analysed period. Based on financial data

from the income statement, the institute should enhance its SRM practices in the future, focusing on revenue management and profitability.

The Institute had reserves from previous periods, which ensured its stability. Overall, asset management was effective, as its value increased during the analysed period. Based on this indicator, the organization was successful in the domain of SRM. Capital management was also efficient in the context of SRM. Capital had grown from 132,546 in 2020 to 138,762 in 2023. This was due to the achieved non-distributed profit from the previous period, which had an increasing trend.

4.2. SWOT analysis

To carry out a more detailed assessment, it is recommended to conduct a SWOT analysis and develop a comprehensive risk management strategy.

Strengths:

- Highest score: Publishing in prestigious scientific journals (4.66) reflects a strong academic reputation.
- Lowest score: Collaboration with other scientific and educational institutions in Serbia (3.89), while positive, suggests room for enhancement.
- Average score: Innovativeness in developing new products, services, or technologies (4.20) highlights creativity and scientific advancement.
- Conclusion: The Institute's strengths lie in its publication quality, innovation, and collaborative efforts, contributing to academic credibility and technological progress.

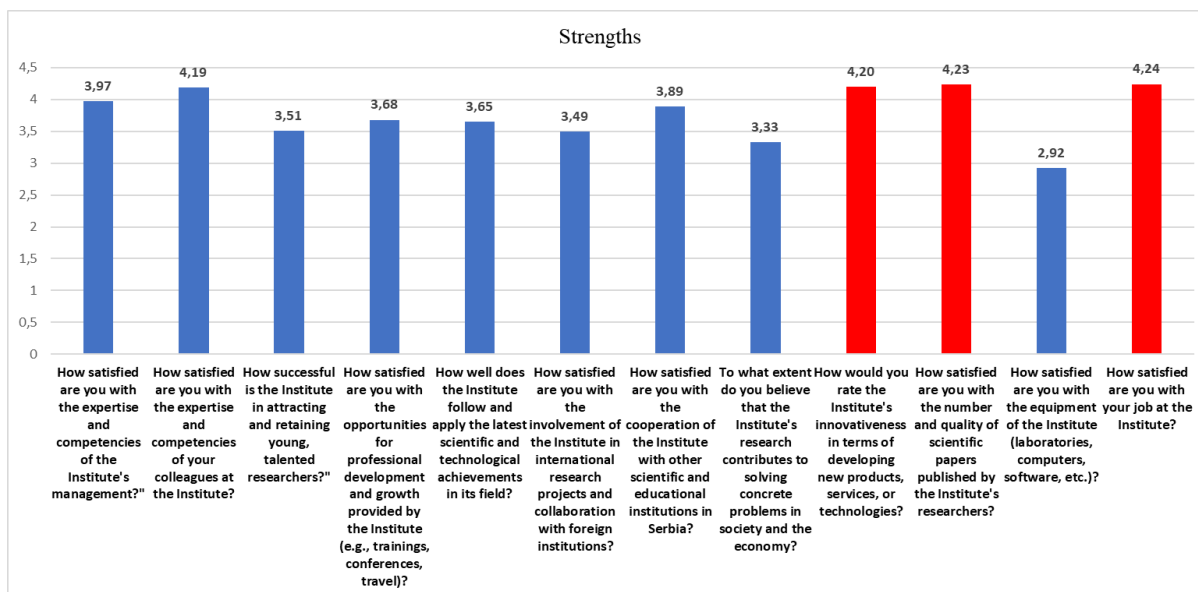


Figure 3. Potential strengths of the external business context in the period 2021-2024

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

Weaknesses:

- Highest score: Work atmosphere (3.92), although satisfactory, indicates scope for improvement in creating a motivating environment.
- Lowest score: Knowledge and technology transfer (3.08), signaling challenges in applying research outputs practically.

- Average score: Salary and benefits (3.71) require attention for better talent retention and satisfaction.
- Conclusion: Addressing weaknesses like technology transfer and employee compensation can enhance internal operations and external relevance.

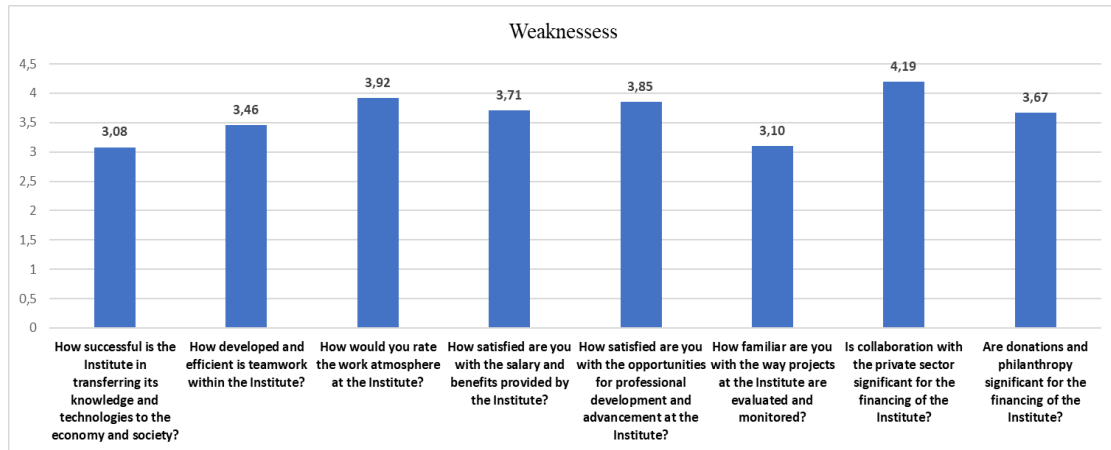


Figure 4. Potential weaknesses of the external business context in the period 2021-2024

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

Opportunities:

- Highest score: National projects and competitions (4.65) offer excellent avenues for funding and showcasing expertise.
- Lowest score: Collaboration with companies and industry (4.05) holds potential for practical research applications.
- Average score: Popularization of science (4.54) can enhance societal engagement and visibility.
- Conclusion: Leveraging opportunities like national initiatives and public science outreach can boost both impact and recognition.

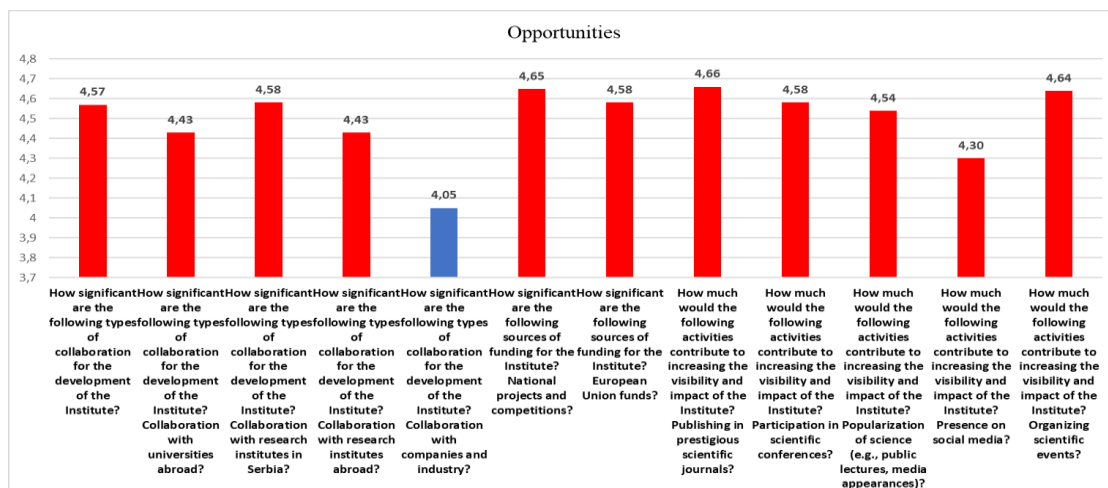


Figure 5. Potential weaknesses of the external business context in the period 2021-2024

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

Threats:

- Highest score: Brain drain (4.03) poses a significant risk to retaining intellectual talent.

- Lowest score: Reduction in science budget (3.22), threatening resource availability.
- Average score: Competition from other institutions (3.57) requires differentiation to sustain relevance.
- Conclusion: Proactively tackling threats like brain drain and funding challenges is crucial for securing the Institute's strategic position.

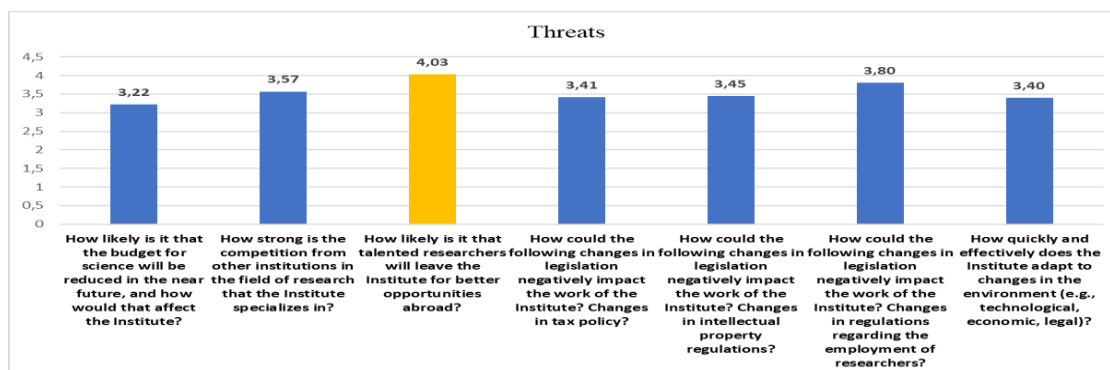


Figure 6. Potential weaknesses of the external business context in the period 2021-2024

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

With an average SWOT score of 3.86, the Institute demonstrates resilience against potential threats. However, targeted strategies for retaining qualified personnel and improving infrastructure can further strengthen its strategic position and ensure long-term sustainability.

5. CONCLUSION

The research is important as it highlights strengthening strategic and financial stability in Scientific Institutes with SRM and the application of COSO ERM principles in an Institute of National Importance for the Republic of Serbia. The financial indicators of the Institute highlight significant challenges in revenue management and profitability, particularly in the context of the COVID-19 pandemic and the post-pandemic period. The Institute recorded a significant decrease in business results, financial results, and net profit during the period from 2020 to 2023, indicating financial uncertainty and potential inefficiencies in operations. To enhance SRM, the Institute should optimize risk assessment mechanisms, diversify revenue sources, and improve investment strategies, ensuring sustainable financial stability and greater adaptability to external economic challenges. The implementation of innovative SRM methods, aligned with COSO ERM, can contribute to better financial risk planning and management, strengthening the Institute's competitive advantage and long-term sustainability within the scientific research community. The low score for equipment (2.92) suggests inadequate infrastructure, which could impede cutting-edge research. Strategic vulnerabilities include reliance on operational revenue and limited diversification, making the Institute susceptible to external changes, while external funding risks and difficulties in retaining young researchers further challenge innovation and growth. Addressing these risks through enhanced strategic planning, investment in infrastructure, diversification of income sources, and fostering innovation will be critical for achieving financial stability, strengthening operational efficiency, and ensuring long-term resilience in scientific research institutions. Connecting these factors with a sustainable business strategy (SWOT analysis) with an average rating 3.86 ensures greater financial stability, operational efficiency, and long-term resilience, which is the core objective of the Institute in the context of SRM and the application of COSO ERM principles.

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REFERENCES

- Barjaktarović, L. (2015). Risk management (5th ed.), (Upravljanje rizikom) (5. izd.), University of Singidunum, Belgrade. (Foreword, III), (Predgovor, III.) ISBN: 978-86-7912-603-0. (in Serbian)
- Barjaktarović, L., Pindžo, R., Djulić, K., & Vjetrov, A. (2017). Implementation of the ERM concept in Serbia: comparative analysis – real sector and financial sector. *Banking, (Bankarstvo)*, 46(2), p.50–67. <https://doi.org/10.5937/bankarstvo1702050B>
- Barjaktarovic, L., Ječmenica, D. (2011), Review of the Implementation of Basel II Standards in the Banking Sector of Serbia, (Osvrt na implementaciju standarda Bazela II u poslovanje bankarskog sektora Srbije), *Management* 59, p. 71-77. https://management-stari.fon.bg.ac.rs/index.php?option=com_content&view=article&id=116%3Aosvrt-na-implementaciju-standarda-bazela-ii-u-poslovanje-bankarskog-sektora-srbije&catid=18&lang=sr. (in Serbian)
- Bromiley, P., Rau, D. & McShane, M.K. 2016. Can strategic risk management contribute to enterprise risk management? Strategic management perspective. *Finance Faculty Publications*, (3): p.140-156. <https://doi.org/10.2139/ssrn.2512477>.
- Committee of Sponsoring Organizations /COSO/ (2017). COSO ERM Integrating with Strategy and Performance. Accessed 01/25/2025. https://www.coso.org/files/ugd/3059fc_61ea5985b03c4293960642fdce408eaa.pdf
- Frigo, M.L. & Anderson, R.J. 2011. What is strategic risk management? *Strategic Finance*, 92(10): p.21-22. https://www.markfrigo.com/what_is_strategic_risk_management_-_strategic_finance_-_april_2011.pdf; Accessed 2021/5/26.
- Jonović, M., Barjaktarović, L., Stevanović, M., Bugarin, D. (2024). Transforming risks into opportunities through the strategic management of a scientific institute. The book of proceedings – International October conference on mining and metallurgy - 55th IOC 2024 Kladovo, Mining and Metallurgy institute Bor & Tehnical Faculty Bor, University of Belgrade, Serbia, p.435- 440. [https:// DOI: 10.5937/IOC24435J 40](https://doi.org/10.5937/IOC24435J40).
- Jonović, M., Barjaktarović, L., Bugarin, D. (2025). “Strengthening Strategic and Financial Stability in Scientific Institutes with SRM” *Journal Mining and Metallurgy Engineering Bor*, 1/2025, in press.
- Mousurovic, M. (2018). Integrated Strategic Management Model in Scientific Research Organizations (Integrisani model strateškog upravljanja u naučnoistraživačkim organizacijama). Doctoral Dissertation, University of Belgrade, Faculty of Organizational Sciences, p.253-260. UDK no: 005.8, <https://eteze.bg.ac.rs/application/showtheses?thesesId=6283>. (in Serbian).
- Ministry of Science and Technological Development, Strategy for scientific and technological development of the Republic of Serbia for the period from 2021 to 2025 "The power of knowledge" (Strategija naučnog i tehnološkog razvoja Republike Srbije za period od 2021. do 2025. godine „Moć znanja). p.75.

- <https://nitra.gov.rs/images/ministarstvo/dokumenta/Strategija-nauc-tehnol-razvoj-RS-Moc-znanja.pdf>. Accessed 4/20/2025. (in Serbian).
- Panić, M. (2024) Enterprise risk management using the finea-ahp approach 38-48. International May Conference on Strategic Management Original research. University of Belgrade, Technical Faculty in Bor, Serbia, International May Conference on Strategic Management – IMCSM24 May 2024, Bor, Republic of Serbia, Volume XX, Issue (1) (2024), p. 38-48. <https://DOI: 10.5937/IMCSM24004P>
- Serbian Business Registers Agency (2020-2024). <https://www.apr.gov.rs/registers/financial-statements/search-of-published-financial-statements.4289.html>. Accessed 2/8/2025.
- Valentin, E. K. (2001). Swot Analysis from a Resource-Based View. Journal of Marketing Theory and Practice, 9(2), p.54–69. <https://doi.org/10.1080/10696679.2001.11501891>.